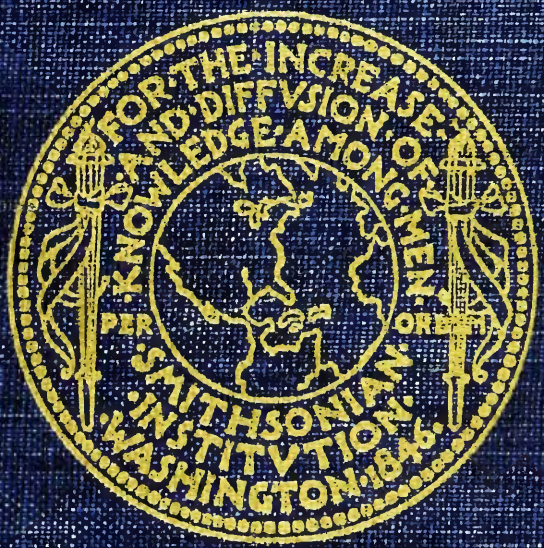
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SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY

VOLUME I [Whole Volume]

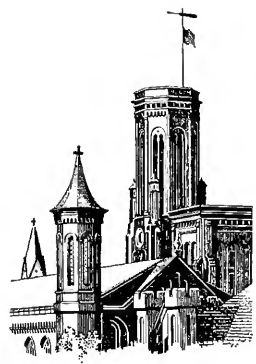
Valdivia Bay, looking from the Machalilla Phase site of G–110: La Cabuya northward toward the Valdivia Valley (upper left), showing typical overcast conditions during the *garúa* season.

Early Formative Period of Coastal Ecuador:

THE VALDIVIA AND MACHALILLA PHASES

Betty J. Meggers, Clifford Evans, and Emilio Estrada

SMITHSONIAN INSTITUTION
Washington 1965



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Smithsonian Contributions to Anthropology

Anthropology was the subject of the first Smithsonian publication, "Ancient Monuments of the Mississippi Valley," by E. George Squier and E. H. Davis. Issued in 1848 as volume 1 of the *Smithsonian Contributions to Knowledge*, it has become a landmark in North American archeology.

Smithsonian interest in anthropology has continued through the years. Several Smithsonian series have been devoted exclusively to anthropology. In addition, works on this subject have appeared regularly in a number of the Institution's other series. Among these (with first or inclusive dates of such appearance) are the Smithsonian *Annual Report* (from 1865), *Smithsonian Miscellaneous Collections* (from 1860), *Explorations and Fieldwork of the Smithsonian Institution* (1927–1940), *Smithsonian Institution War Background Studies* (1942–1945), *United States National Museum Annual Report* (1884–1904), *United States National Museum Bulletin* (from 1879), and the *Proceedings* (from 1878) and the *Circular* (1883–1888) *of the United States National Museum.*

Among the series devoted exclusively to anthropology, some have been short lived, others have continued to this day. *Contributions to North American Ethnology* (vols. 1–7, 9) was issued from 1877 to 1895. The first through the forty-seventh *Annual Report of the Bureau of American Ethnology* (1879–80 through 1929–30) contained scientific papers, often of monographic length, on the American Indians (the forty-eighth *Report*, 1930–31, contains an index to these papers). And 16 volumes of the *Publications of the Institute of Social Anthropology* appeared between 1944 and 1953.

In 1896 the first *Bulletin of the Bureau of American Ethnology* was issued. This series soon became a major vehicle for anthropological publication by scientists at the Smithsonian and around the world. In some 200 *Bulletins* have appeared monographs and shorter papers on the archeology, ethnology, linguistics, and physical anthropology of the New World, and also basic handbooks on the Indians of North America (no. 30) and of South America (no. 143), and on North American languages (no. 40). Within the *Bulletin* series also have appeared the subseries *Anthropological Papers*, nos. 1–80 (1938–1965) and *River Basin Surveys Papers*, nos. 1–39 (1953–1965).

In 1964, the Bureau of American Ethnology and the U.S. National Museum Department of Anthropology were replaced by the Smithsonian Office of Anthropology. It consists of a Division of Physical Anthropology and a Division of Cultural Anthropology concerned with archeology, ethnology, and linguistics. It also administers the Smithsonian River Basin Surveys. Unlike the former Bureau, its activities are not restricted to the native peoples of the New World. While continuing work in this field, the Office of Anthropology is expanding its research programs in Africa, Asia, and the Pacific.

Such reorganization and expansion make it appropriate to consolidate anthropological publication at the Smithsonian in a new series of worldwide scope: *Smithsonian Contributions to Anthropology*.

This volume inaugurates the new series. With rare exceptions, all future anthropological monographs and papers issued by the Smithsonian will appear in this series. In addition to works by members of the staff, a select number of contributions will be accepted from authors outside the Smithsonian Institution.

Copies of *Smithsonian Contributions to Anthropology* are distributed by the Smithsonian to libraries, to research institutions, and to recognized specialists in the various fields treated, both in this country, and abroad. Further free distribution is made by the Superintendent of Documents to depository libraries in each of the 50 States.

Students and other interested individuals may purchase copies from the Superintendent of Documents, as indicated on the opposite page.

RICHARD B. WOODBURY, Acting Head
Smithsonian Office of Anthropology
Museum of Natural History

Preface

The publication of this report is a monument to the importance of international cooperation in scientific endeavor. The archeological sites and complexes were discovered by Ecuadorians, detailed analysis of the developmental sequences was furnished by North Americans, invaluable information for comparative study was provided by Japanese, and a Chilean prepared the report on skeletal remains. To those of us who are listed as authors, working with all of these people has been a memorable experience not only because the scientific results have been so exciting, but because the context in which they have been derived has been so rewarding.

The largest contribution has been made by the many Ecuadorians who have assisted with fieldwork and preparation of the bulk of material for analysis over the years. Some should be singled out for special mention. Dr. Carlos Zevallos Menéndez, then President of the Casa de la Cultura Ecuatoriana, Núcleo del Guayas, arranged for permission under the Ecuadorian antiquity laws to conduct the archeological field research. Félix Martínez and later Julio Viteri served as foremen during much of the excavation at G–31. During two seasons of work by Meggers and Evans at G–31 and G–54, Francisco Salcedo generously made available a comfortable house near the site as field headquarters. Washing and preliminary sorting of material from G–84 and G–31, Cut J was done by Walter Molina, part-time aide in the Museo "Víctor Emilio Estrada."

Staff members of the former Division of Archeology, Museum of Natural History, U.S. National Museum who have over the years assisted in the laborious job of washing, numbering and classifying Valdivia and Machalilla Phase materials, are Mr. George Metcalf, Mr. Robert C. Jenkins, and Mrs. Willie Mae Pelham. We are indebted to personnel of other divisions for identification of stone, bone and shell remains, including Dr. Harald A. Rehder, Division of Mollusks; Dr. Henry Setzer, Division of Mammals; Dr. E. P. Henderson, Division of Meteorites; Dr. Leonard P. Schultz and Dr. William R. Taylor, Division of Fishes. Mr. Henry Wright assisted one summer with sorting of rocks from G–31: Valdivia into possible and impossible artifacts.

Carbon-14 determinations, which confirm the early chronological placement of the Valdivia complex, were made over several years at three different laboratories: the United States Geological Survey Low Frequency Radiation Laboratory, the University of Michigan Laboratory, and the Smithsonian Institution Carbon-Dating Laboratory. We would like to thank Dr. Meyer Rubin of the United States Geological Survey for his willingness to accept shell samples for dating at a time when this material was considered unsuitable in many quarters, and Dr. Austin Long of the Department of Radiation and Organisms, Smithsonian Institution Carbon-Dating Laboratory for consultation and advice in the evaluation of the entire series of dates, which led to several of the interpretations in the section on dating.

Our inferences about the origin of Valdivia Phase pottery would have been poorly supported had it not been for the opportunity to visit Japan during March and April, 1963 to examine collections and talk with experts on the Early and Middle Jomon Period. Initial communication with Japanese archeologists was facilitated by advice and introductions from Dr. Chester Chard, University of Wisconsin; Dr. Richard K. Beardsley, University of Michigan, and Dr. Edward Norbeck, William Marsh Rice University. Informed in advance of our general problem, members of the staff of the Institute of Cultural Anthropology, University of Tokyo, headed by Prof. Seiichi Izumi, laid out a tentative schedule of visits that permitted us to make best use of our limited time. Our ability to accomplish so much was largely because of this generous unsolicited aid by Prof. Izumi and his colleagues, Prof. Shozo Masuda and Prof. Toshihiko Sono. Through their

advice, we were accompanied on trips outside the Tokyo area by one of their senior graduate students, Mr. Hiroaki Okada, who served as an efficient guide and interpreter, and an amused informant on Japanese inns and outs. Our search for Valdivia-like pottery led up a few blind alleys and into several productive fields, and we gratefully acknowledge guidance and information from the following individuals: Prof. Sugao Yamanouchi, and Prof. N. Watanabe, Department of Physical Anthropology, University of Tokyo; Prof. Sosuke Sugihara, Department of Archeology, Meiji University; Prof. Teruya Esaka, Department of Archeology, Keio University; Mr. Chosuke Serizawa, Tokyo; Prof. J. Edward Kidder, Jr., Archeology Laboratory, International Christian University; Prof. Kyoichi Arimitsu, Department of Archeology, University of Kyoto; Mr. Fukuhara and Mr. and Mrs. Shirakiba, Department of Archeology, Tenri Museum; Mr. Yoshimasa Kamaki and Mr. and Mrs. T. Macabe, Kurashiki Archeological Museum; Prof. Teigo Yoshida, Institute of Comparative Education and Culture, University of Kyushu; Prof. Morimitsu Ushijima and Mr. Mitsuhiko Higashi, Kumamoto Municipal Museum; Prof. Matsumoto, Department of History, University of Kumamoto; Prof. Sadanori Kawaguchi, Goyokuryu High School, Kagoshima; and Mr. M. Furuta of Shimabara. Prof. Ichiro Yawata, Archaeological Laboratory, Tokyo University of Education, led us on a memorable visit to an inland Middle Jomon site near the town of Oomiyama. The warm welcome and open generosity of all these people in providing us with advice, assistance and freedom to take notes and photographs of anything and everything is beyond the power of words to acknowledge. We hope that they will receive some satisfaction from seeing how significant has been their contribution to the conclusions in this report.

Financial support for the research has come from a number of different organizations, whose contribution we gratefully record: the American Philosophical Society for Penrose Fund Grants 2012 and 2370; the National Science Foundation for Grants G–9055 and G–15641 to the Institute of Andean Research for a three-year program entitled "Interrelationships of New World Cultures", under which we were included as Project J: Coastal Ecuador; and the National Science Foundation Cooperative International Science Activities Program (supplemental funds to Grant GS–37), for sponsoring the trip to Japan. Throughout the various periods of field investigation from 1957–1961, a large portion of the field expense was borne by the Museo "Víctor Emilio Estrada".

Individuals who deserve special thanks for aid in preparation of the monograph are Miss Judith Hill, Secretary of the former Division of Archeology, United States National Museum, who skillfully and uncomplainingly deciphered the rough drafts, improved the consistency of the style and format, and typed rapidly, neatly and efficiently the final copy of the manuscript; Mr. George Robert Lewis, Scientific Illustrator, of the former Department of Anthropology, United States National Museum, who produced the beautiful and accurate line drawings; Mr. Jack Scott, Head, Museum of Natural History Photo Lab, for production of excellent enlargements from negatives taken under varying conditions over several years; and Prof. Kazuo Terada, University of Tokyo, who translated statements from Japanese publications.

As the first of a new format, this volume presented special problems to the Editorial and Publications Division, Smithsonian Institution. We wish to express our gratitude to Mrs. Joan Horn and Mr. John S. Lea for their constructive suggestions, careful editing for consistency and accuracy, and forebearance with our many demands. To the Government Printing Office, we offer a word of admiration for the remarkably error-free setting of the text and tables, their speed of execution of each phase of the work, and their high quality reproduction of a wide variety of photographs into excellent plates.

We have left until last the recording of our indebtedness to those Ecuadorian colleagues with whom we shared the excitement of discovering the early Formative cultures of coastal Ecuador and of reconstructing from fragments of pottery, stone and shell, long forgotten historical events: Francisco Huerta Rendón, Carlos Zevallos Menéndez and Olaf Holm. The years we worked together under the leadership of Emilio Estrada are treasured memories to all of us—golden years beyond repetition or recall. The unexpected death of Estrada in November 1961, shortly following the final season of fieldwork, brought an end to many dreams, but one at least has developed in a manner he would have loved to see—the verification of his correlation, timidly proposed many years ago, between Valdivia and Jomon. His co-authorship of this report is not simply a tribute—it is a position fully earned.

BJM
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Smithsonian Institution
Washington, D.C.
June 22, 1964

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Introduction

THEORETICAL APPROACH TO ANALYSIS AND CLASSIFICATION

Archeology, unlike other scientific disciplines, has no universally recognized system of classification and nomenclature. Each investigator feels free to invent his own frame of reference, with the result that data are frequently presented in terms that are not easily compared. Since the philosophical approach underlying a classification has a significant influence on the conclusions, it seems worthwhile to explain the point of view employed in this report and the rationale behind selection of certain kinds of information as significant.

Any scientist approaching the material encompassed by his field of specialization must organize it into distinguishable categories whose functions and interrelations can be observed, described and if possible explained. Depending on the discreteness of the phenomena and their susceptibility to alteration, his task varies from easy to difficult. A physicist, for example, has no trouble distinguishing a neutron from an electron; in structure and behavior they are definable with high precision. Nor is there any argument about whether carbon is different from nitrogen, which follows it in the periodic sequence of atoms. Carbon has several subvarieties, of which radioactive carbon-14 is well known to archeologists. No one argues that carbon-12 should not be separated from carbon-14 for purposes of analysis and description, nor is there any disagreement that both belong to the same larger category or type. Their behavior can be predicted; it is known with what other elements they will combine and in what proportions; and it is even known under what circumstances such combinations are likely to take place.

The biologist has a more difficult job. The types with which he must deal differ from those of the chemist or physicist in that, unlike the elementary particles or the chemical elements, they represent populations that vary through time and place. Carbon-12 is identical in all respects today to what it was ten million years ago, while the modern horse is not only recognizably different from its Eocene predecessor but also variable within the limits of a small inbreeding population. Mutation, genetic drift and other factors operate under natural selection to produce a kaleidoscope of results that may make boundaries drawn between varieties and occasionally between species arbitrary (Dobzhansky quoted in Grant, 1963, pp. 317–318; Simpson, 1961, pp. 117–119).

Simpson (1961, p. 152) has summarized the situation recently:

> Among evolutionary species there cannot possibly be a general dichotomy between free interbreeding and no interbreeding. Every intermediate stage occurs, and there is no practically definable point in time when two infraspecific populations suddenly become separate species. Fortunately for the neontologists, the majority of living populations have either definitely passed that hypothetical point or are not yet close to it. Nevertheless speciation is actively occurring today, and many populations are in the intermediate stages of some, but reduced, interbreeding. Again, if there are distinct gaps between ranges of characters, it is sufficiently probable that isolation is at least complete enough to warrant specific separation. There remain numerous doubtful cases where decision depends on the personal judgment of each practitioner of the art of classification. To insist on an absolute objective criterion would be to deny the facts of life, especially the inescapable fact of evolution.

The archeologist who attempts to classify potsherds is also confronted with a continually changing class of phenomena (cf. Vogt, 1960, pp. 19–21), varying geographically and temporally as a result not only of cultural differences respecting function, production, and style, but also of accidental inconsistencies in raw materials, differential skill of potters, their susceptibility to influence from exposure to other pottery

styles, and occasional individual deviations from typical forms and decorative patterns. The difficulty of arriving at generally acceptable criteria for separating this continuum into a series of types has resulted in lack of uniformity in the approach to pottery classification not only between workers in different areas, but even among people dealing with similar material.

A number of commentaries have been published on the theory of pottery classification, and authors differ especially on the precision with which ceramic types should be described. In our view, part of the problem comes from a difference in theoretical position: archeologists who see culture as an evolving continuum will find it difficult to define precise categories; those who take a timeless view tend to look for absolute types, describable in very exact terms. Since we incline toward the first approach, our pottery type classification represents an effort to recognize divisions within the mass of material recovered from tests and excavations that can serve as a basis for reconstructing the culture and its history.

In many respects our view coincides with the population approach that has come to prevail in the biological definition of types, and has been well stated recently by Simpson (1961, pp. 183–184):

> It has already been emphasized often enough that taxa are inherently variable and that attention to their variability is essential in their description and necessary in their practical definition. That naturally demands taking into account all available specimens and involves the principle that no one specimen referred to the taxon is, for these purposes, any more important or any more typical than any other. Some specimens are of course more nearly average than others as regards particular characters in the sense of being nearer the mean, although this is rarely true of all characters of one organism. The mere fact that a valid average is recognized means that *all* specimens have been taken into account and none especially weighted.

Its application to classification problems in archeology was discussed a decade ago by Ford (1954), to whom the reader is referred for more detailed explanation.

When several thousand sherds, representing the contents of a level in one of the sections of Cut J at Site G–31: Valdivia, are spread out on a table, it is possible to distinguish several kinds of differences. Among them are decorated and plain sherds, polished and unpolished surfaces, red-slipped and unslipped surfaces, coarse and fine sand temper. A classification based on one or more of these differences can accommodate without any difficulty about 75 to 85 percent of the sherds. There will remain, however, a group of borderline examples, where the surfaces are neither unpolished nor well polished, where the temper is intermediate between coarse and fine, where a type of decoration normally applied to an unslipped surface is found on a red-slipped one, etc. These variants are an expression of lack of standardization in production, of differences in sources of raw materials, of the individuality of the potters, of the instability inherent in all evolving systems. At a later point in time, some variants may become sufficiently well defined and frequent to warrant recognition as separate pottery types, in which case the problem of where to draw the line is between parent and offspring rather than between contemporaries.

Although each pottery type is a combination of many kinds of traits (temper, color, surface treatment, vessel shape, technique and motif of decoration), these may be independent variables within the total ceramic complex. It is frequently observed that gray or tan surfaces may occur with coarse or fine temper, or that a particular technique of decoration may be applied to polished plain or polished red surfaces, or that polished red surfaces may be plain or decorated. The problem is to decide which combinations of traits make convenient descriptive entities and useful categories for chronological and comparative analysis.

The principal subdivision we have made is between decorated and undecorated surfaces. Although this is an obvious basis for distinction, it is one that is often not made in ceramic classification. Failure to separate decorated from undecorated sherds is usually justified on the ground that it prevents sherds from a vessel decorated on only part of the surface from being divided between two pottery types. This argument can be ignored, however, if the purpose of the classification is to deal with the multitude of sherds recovered from habitation refuse and to show change through time. Failure to separate decorated from undecorated sherds has a serious disadvantage in that it makes it difficult or impossible to ascertain the exact proportion of the pottery that was decorated, or the frequency of certain kinds of decoration at any particular point in time, both of which can be used as a basis for inferences about level of competence in ceramic technology, which in turn provides clues to level of sociopolitical organization (Meggers and Evans, 1958). This, in our view, is an advantage outweighing the strictly puristic superiority of a classification that attempts to deal with complete vessels.

Looking first at the undecorated sherds, differences can be recognized in temper and surface finish. Preliminary classification makes as many distinctions as possible, first in surface finish (unpolished, striated polished, completely polished or red slipped) and then in temper (fine, medium or coarse beach sand, or crushed rock). Temporal variation in these categories was tested by classifying several levels from different depths in an excavation, and those features

that showed the greatest variation were selected as type diagnostics. In the case of Valdivia Phase plain types, surface finish is the principal classificatory criterion, with temper used to make a secondary distinction between two types with unpolished surfaces (Valdivia Plain and San Pablo Plain). Separation of the polished types into coarse and fine tempered varieties served to multiply the number of types and obscure the trend in surface treatment without adding to chronological information on temper differences illustrated by Valdivia Plain and San Pablo Plain.

Decorated types have been viewed as the occasional application of decoration to the surface of plain vessels. Technique and motif of decoration have been consequently selected as the primary criteria of differentiation. This approach is justified by the fact that decorated polished surfaces, for example, show the same characteristics of color, temper and surface treatment as do undecorated polished surfaces, the only exception being that decoration was often applied to surfaces at the better finished end of the range of variation. Surface finish is usually consistent within a decorated type. Temper is more variable, and reflects in general the trend of the Phase, in which fine sand is more characteristic in the early periods and coarse temper in the later ones. Since more than one decorative technique is sometimes present on a single vessel, a hierarchy of priority was established for classificatory purposes in which the rarer techniques were given preference. By this rule, a sherd bearing rocker stamping was classified as Valdivia Rocker Stamped, even if broad-line incision was incorporated in the design, since broad-line incision is common throughout the Valdivia Phase sequence whereas rocker stamping is both rare and temporally restricted. Such "cross-overs" are noted in the type descriptions where they occur, and serve to emphasize the associations between certain techniques to form a subcomplex characteristic of a particular time period. The alternative of separating out a third type, in this case one combining rocker stamping and broad-line incision, served to proliferate the number of minor decorated types without adding any new information of chronological or descriptive importance, and therefore was rejected. By the same criterion of decorative priority, a rare example aberrant in surface finish is considered a member of the decorated type, such as a polished plain surface in Valdivia Red Zoned Punctate or a red-slipped surface in Valdivia Nicked Broad-line Incised. Many types have no such deviant members, and this is in itself an interesting situation, reflecting a higher degree of standardization or perhaps closer agreement between the archeologists and the potters on definition of the type.

Differences in standardization can also be detected in vessel shape and rim profile. In Valdivia Phase ceramics, no two rims are alike, although they tend to cluster in groups with similar construction, shape and orientation. Certain forms are unique enough to be readily distinguishable, such as the folded-over rim. The majority, however, comprise a continuum in which subdivision may be arbitrary. Examples are the cambered jar rims of Forms 20 and 21, and bowls of Forms 5 and 7. Distribution about the norm may be relatively tight as in Form 4, or widely scattered as in Form 3, and rim profiles classified into these forms show these differences in range of variation. In ceramic complexes of later phases, standardization may be greater and rim profiles show little variation in form or diameter. The attempt to define vessel shape thus produces information useful for comparative analysis on different levels of interpretation.

Another assumption implicit in the point of view that the ceramic complex as a whole is a developing continuum is that each type will exhibit change through time. This can be measured most easily by tabulating the frequency of decorative motifs and vessel shapes according to stratigraphic levels of excavated habitation refuse. The pottery type description is thus an ideal average to which a majority of the sherds will conform in a majority of features, but which will not apply completely to all examples classified as belonging to the type.

It should be noted that pottery types recognized in the classification bear no necessary resemblance to any subdivision the potter himself might have made. The unpolished and polished variants of Valdivia Rocker Stamped, for example, may have been considered separate by the makers, while types that we have distinguished, such as Valdivia Incised and Valdivia Nicked Rib or Nubbin, may have been considered inseparable by them. In our view this is an inevitable situation. The archeologist can have no way of knowing what the potter's conception may have been, and any attempt to reconstruct it would certainly inject ethnocentric factors into the analysis that would distort the outcome as much, or perhaps more, than a classification developed independently by examination of the sherd remains.

The attitude just described applies not only to the analysis of pottery, but to all kinds of artifacts. It underlies the decision to recognize four types of pottery figurines in the Valdivia Phase rather than several dozen, which could have been isolated descriptively. From a developmental point of view, variation reflects an evolutionary process resembling that

labeled by biologists and linguists as "drift", and the classification attempts to recognize steps at which drift has proceeded far enough to produce a readily observed difference in appearance. A typology of the pottery figurines based on finer descriptive detail, such as specific forms of hair treatment, was attempted but variability was so great and occurrence so erratic that it was abandoned. With a different theoretical orientation, such factors would not have seemed detrimental to recognition of more minute classificatory distinctions.

Another consequence of the view that has just been expressed is selection of terminology. Since Valdivia Phase pottery is the product of unspecialized artisans and made principally for the producer's domestic use, it is highly variable in all aspects. Firing is poorly controlled, so that a small sherd may show a wide surface and paste color range. Polishing tends to be more complete on the upper wall than the lower. Rim profiles are unstandardized and curvature may not be consistent. In recognition of these facts, pottery type descriptions make liberal use of words like "generally", "often", "slightly", etc. Since surface color is the result of uncontrolled firing, it is not described with reference to a color standard. If a type description is to be useful for recording differences within the pottery complex, for indicating the quality of the ware, and for reflecting technological competence, then it can best do so by employing a terminology in accord with the level of competence of the makers. A highly standardized ceramic complex should be described with high precision; an unstandardized one is not made more understandable by being so described.

Another level of classification is the recognition of phases, or complexes of archeological materials that correspond to extinct societies or cultures. Although it is easy to recognize at certain times and places significant groupings of traits representing architecture, arts and crafts, burials and other kinds of remains, it is often uncertain whether such a complex equates with a tribal, political or linguistic unit on the ethnographic level, or is something altogether different. For this reason, the term "phase" seems preferable, since it has no connotation. From the standpoint of typology, definition of a phase in archeology might be compared with definition of a genus or even a family in biology. A genus is composed of a number of species, which are evolving at different rates. It may happen in the course of time that some species will become sufficiently divergent to be put into a new genus; on the other hand, an environmental change may cause extinction of the whole genus. Similarly, a phase is made up of a number of types of artifacts, some invariable and longlived, others changing rapidly or shortlived. In the course of time, change in all component types may be so marked as to require the recognition of a new phase.

The problem is to create categories that will allow recognition of significant disconformities as well as more gradual kinds of transformation. A fine breakdown or emphasis on small details may produce an unrealistic impression of lack of continuity. Categories should be suitable for historical reconstruction, for evolutionary investigation, and for comparative analysis. It cannot be decided in advance whether four phases or ten will describe adequately the historical sequence in any particular area, nor is it useful to proceed from the postulate that 100 years is too short, or 2000 years too long a duration for a particular phase. Change does not proceed at a uniform rate; what is too long in one context may be too short in another. The important qualification is cultural continuity or unity. Ideally, the early and late portions of a phase should show a homogeneity that sets them apart from other contemporary or subsequent phases.

Discussion of alternative approaches to establishment of the Valdivia Phase will illustrate some of the criteria employed to distinguish the phases that comprise the coastal Ecuadorian archeological sequence. The Valdivia Phase lasted some 2000 years. As would be expected, a great deal of change can be recognized particularly in pottery decoration, and figurine style. In fact, if decoration were employed as the principal basis of classification, as it commonly is in other areas (e.g., Rouse in Venezuela, and Rowe and students in Peru), the seriated sequence would undoubtedly be separated into three or four phases. However, continuity in plain types, vessel shapes, settlement pattern, and other features is so great that we have chosen to regard the Phase as a unity that can be subdivided into four time periods. This permits us to contrast the Valdivia Phase with the Machalilla Phase, from which it differs totally in ceramic complex.

The distinction between the Machalilla Phase and the succeeding Chorrera Phase is less absolute. A number of pottery types continue, others die out or make their appearance. In some respects, a Machalilla – Chorrera combined seriation chart is similar to that for the Valdivia Phase. However, here a division into two phases is justified by changes in settlement pattern and subsistence dependence, as well as in the ceramic complex. Alterations in vessel shape that are important horizon markers elsewhere in the New World include disappearance of stirrup spout jars and the introduction of annular based bowls. In short, a phase corresponds as far as

possible to a grouping of traits not only of pottery manufacture, but also settlement pattern, subsistence, sociopolitical organization, burial practice, etc., which forms a unique entity with temporal persistence and geographical range. This entity can be observed in relation to other entities, shedding light on trade relations, acculturative pressures and other interphase relations, and establishing a basis for cross-dating.

The technique of quantitative analysis of pottery fragments and seriation of surface collections or levels of stratigraphic excavations has been described in detail by Ford (1962), and it is of interest here to emphasize only two aspects of the process. First, every effort must be made to ensure the reliability of a seriated sequence on which interpretations are to be based. A combination of survey with surface collections, small stratigraphic tests and intensive excavation of deep deposits is most likely to permit recognition of disturbing factors of cultural or natural origin that may affect the outcome of analysis in some of the sites. Differences between the picture presented by a ceramic sequence derived from a site inhabited a long time and another derived from seriation of several sites of short occupation are discussed in the section on the seriated ceramic sequence of the Valdivia Phase (pp. 87–89).

Second, it must be understood that although pottery types because of their greater abundance are used as the primary indicators of change, the final seriation represents a compromise that does least violence to all kinds of chronological evidence available. The relative position of levels arranged first in terms of trends in plain types, may be slightly readjusted after analysis of decorated sherds to minimize disconformities that may appear. In general, such rearrangement alters the position of levels whose plain type frequency was too similar to suggest which should be placed earlier. Less frequently, further minor readjustments may be made after classification of rim shapes, figurines, or shell and stone artifacts. Disconformities must be analyzed in terms of the geographical proximity of the sites and of potential local factors that may cause deviation from the norm. A sequence finally arrived at is not readily susceptible to alteration. When several carbon-14 dates are available, it should be possible to reconcile them with the seriated sequence, as is the case in the Valdivia Phase. If it is not, the validity of the dates rather than of the sequence is open to question.

THEORETICAL APPROACH TO INTERPRETATION

Archeology is the science of reconstructing the development and spread of past cultures from incomplete and often random bits of direct and inferential evidence. It has frequently been pointed out that the data of archeology are a small and unrepresentative sample of the once functioning culture, the implication perhaps being that if surviving evidence were more complete the job of historical reconstruction would be greatly simplified. Less attention has been given to the fact, well documented by living cultures, that cultural change does not proceed at a uniform rate, either in isolation or in acculturation situations. Some traits are of fleeting popularity, while others endure for centuries; some diffuse rapidly, others diffuse erratically, popping up in widely separated regions; some spread with little modification, others take on drastically altered forms in different portions of the area of distribution. As a result, evaluation of archeological remains is not simply a problem of dealing with incomplete and unrepresentative evidence, but also of evidence modified to different degrees and in different ways at different points in time. Much of the lack of agreement between archeologists on the significance that should be attached to certain kinds of archeological remains results from absence of a uniform theoretical approach to evaluation of the effect of these variables.

The seriousness of the situation makes it worthwhile to look to biology, the scientific discipline whose subject matter is most comparable to anthropology, for possible clarification. Although biology and culture are two distinct categories of phenomena, the content and behavior of these phenomena are of a similar level of complexity. Biologists are confronted with a vast array of species, differing widely in structure and in capacity to react to the external world; anthropologists are confronted with a vast array of cultures of differing complexity. Biologists must classify living and extinct plants and animals into meaningful categories that shed light on the process by which this diversity arose; anthropologists have attempted to do the same for cultures. Biologists study the relations of fauna and flora with each other and the physical environment in order to understand some of the principles underlying extinction, survival or modification of species; anthropologists have under-

taken acculturation and cultural ecological studies for similar reasons. Our problems are thus much alike, but the material under study has one major difference. Anthropologists are unable to free themselves completely from anthropocentrism in dealing with cultural phenomena, with the result that they frequently resort to explanations like "genius" or "free choice" when confronted with an alternative implying cultural determinism. Biologists, on the other hand, do not feel impelled to attribute the development of the horse's hoof or a hawk's eye to anything but the operation of natural forces.

With their advantage of greater objectivity, biologists have made considerable progress toward unravelling the complicated fabric of evolution, thereby making it possible to suggest some of the techniques by which it was produced. Four basic or primary evolutionary forces are now recognized: mutation, gene flow (or recombination), selection and drift (Grant, 1963, pp. 149–151, 431). The first two produce variation by introducing new elements or by altering the combination of existing elements; in culture their counterparts are invention (discovery) and diffusion (acculturation), which are recognized as fulfilling a similar role in producing cultural variation (cf. Linton, 1955, pp. 661–2). The second two forces "sort out this variability and establish the variant types in new frequencies in a population" (Grant, 1963, p. 150); in other words, lead to the formation of subspecies, species and increasingly divergent forms of life. In cultural anthropology, these processes have received less attention, although drift has been recognized by linguists as an important mechanism leading to change in languages (cf. Vogt, 1960, 1964). Since three of the biological processes have cultural parallels, it is reasonable to suppose that natural selection may also operate in culture in a manner similar to its operation in biology, although anthropologists are concerned with the results of individual variability in capacity to behave in accord with the cultural ideal, while biologists deal with the results of genetic variability expressed in alternative genes and alternative combinations of genes.

Although generally thought of as a process of change, natural selection in biology is also a process for maintaining stability, with the result that a species may persist in nearly identical form (i.e., with so little alteration that it continues to constitute a single species) for millions of years. The survival value of this kind of selection is explained by Grant (1963, p. 213):

> Any population of organisms exists in a certain environment and must be fitted or adapted to live successfully in its particular habitat. If the environment remains stable and if the population has already arrived at a high state of adaptedness, the main effect of selection will be to eliminate such peripheral variants or off-types as arise by mutation, gene immigration, or recombination. A certain range of genotypes of proven adaptive fitness is thereby preserved from generation to generation. This form of selection, known as stabilizing selection, does not bring about evolutionary changes, but rather maintains an existing state of adaptedness.

The operation of a similar mechanism in culture would account for the stability of many primitive cultures under special environmental conditions, and the failure of such groups to accept new traits when exposed to opportunities. The failure of agriculture to substitute for shell-fish gathering on the southern coast of Brazil until almost the end of the aboriginal period (Silva and Meggers, 1963, pp. 126–7), and the long survival of nonmaterial traits such as myths among wandering groups (Meggers, 1964, pp. 514–5) may be cultural examples of stabilizing selection. If it is true that maize was introduced around 1400 B.C. on the coast of Peru without causing any important change in cultural pattern (Kidder II, Lumbreras and Smith, 1963, pp. 92–3), stabilizing selection may have been the reason.

The uniformity of a biological population depends on maintenance of a constant genetic composition. Because of random fluctuation by chance, the frequency of a certain allele at any given time will be greater or less than the statistical average. Such chance fluctuations are termed "genetic drift" and represent a potential source of great variation under certain circumstances. A biological example provided by Grant (1963, p. 278) shows how drift might operate to alter flower color:

> If the gene A controls flower color in a plant, and if the various alleles determine a series of shades from blue to white, like deep blue, light blue, pale blue, and white, the large and polymorphic parental population will comprise a variable mixture of individuals having the different shades. As a result of drift a fragment of this population may become homogeneous for one flower color. If drift occurs repeatedly in different segments of the original population, a series of derivative colonies might arise which are characterized by different flower colors in pure form. One daughter colony might be all white, another all deep blue, and still another all light blue.

In other words, drift may be responsible for "divergence between different contemporaneous colonies derived from a common ancestral population" (Grant, 1963, p. 286). Such divergence may be rapid and striking, even when the colonies inhabit similar environments (Grant, op. cit., pp. 288, 459).

The implications of such a theory for culture are intriguing. For example, attempts to relate the Valdivia Phase to other early ceramic complexes on the coasts of Peru, Colombia and Panama has brought out the fact that these differ widely from each other, although each possesses a few traits linking it with the

Valdivia Phase (fig. 105). The operation of a mechanism of cultural drift could account for such variety. As each biological population is made up of a pool of genes, each culture is made up of a pool of traits, and just as each gene has many alleles, each trait has many individual variations in expression. In a large population, individual differences become averaged out and their ability to effect marked alterations in the cultural complex is minimized. A colony, however, would be composed of a small group of individuals not likely to represent the total range of the parent culture. In pottery, this "sampling error" might result in rapid divergence either by selection of some decorative techniques and abandonment of others, or by diminution of the range of variation in surface treatment or vessel shape, or by a combination of changes decreasing the heterogeneity of the offshoot. The differences between the ceramic complexes of early Valdivia Phase, Puerto Hormiga, Monagrillo and Guañape are what might be expected to result from a process of cultural drift operating in a way similar to genetic drift in biology.

The existence of cultural drift not only helps to explain divergences between related but isolated cultural complexes, but the concept offers a guideline for assessing cultural connections by making differentiation rather than similarity the expected result. Complexes with common ancestry should share a certain number of general characteristics, but need not duplicate all or even most of their component traits. In other words, we should not expect to find even with complete preservation, reproduction of the parent complex in all its variety. On the contrary, existence of close correspondence can be interpreted as reflecting special circumstances, such as organized population movement, or a conscious effort to maintain the former cultural norm. Drift cannot be used to postulate cultural connections where there is no evidence, on the assumption that change has progressed to the logical extreme of complete alteration, but a combination of drift and selection can make understandable the "watered down" appearance of many cultural or ceramic complexes that have moved to new environments and become isolated from the parent group.

Another interesting and potentially relevant biological concept is that of parallelism, defined by Simpson (1961, p. 103) as "the independent occurrence of similar changes in groups from common ancestry and *because* they had a common ancestry." This is distinguished from homology, the sharing of traits derived from a common ancestor, and convergence, the independent development of similar traits by unrelated groups (Oschinsky et al., 1964). The strength of cultural tradition in determining acceptance or rejection of new traits and the necessity for new traits to be compatible with continuing function of the whole culture are propositions long recognized in anthropology. As in biology, the result is a tendency to channel changes in a certain direction (cf. Kroeber and Kluckhohn, 1952, p. 189). Since new elements result principally from modifications and combinations of old ones, the chances of duplication will be greater in groups sharing a similar background than in groups without this common heritage. Acceptance of the hypothesis that parallelism operates in culture as in biology consequently seems preferable to explaining resemblances as fortuitous, particularly when they appear in several groups with common ancestry. The appearance of nicked broad-line incision in Japan, Ecuador and Colombia subsequent to the presumed date of separation between the Jomon, Valdivia and Monagrillo ceramic complexes would fit such a hypothesis.

Although it is possible to trace the origin and development of many archeological complexes, in other cases new and striking cultures appear to spring up suddenly without clear antecedents. A similar situation in biology has led Simpson to the concept of quantum evolution (Grant, 1963, pp. 458–9; see also pp. 555–7):

> Simpson argued that the absence or rarity of fairly complete fossil series connecting new major groups of organisms with their ancestral stocks would be difficult to explain if their population size were as large in the period of their origin as it was in their later history, when the fossil representation becomes more adequate. Furthermore, the geological time available for the divergence of the new major group from its parent stock requires a much more rapid evolution during the period of origination than during the subsequent period of expansion. These facts can be accounted for on the genetically plausible hypothesis that the new major groups—genera, families, orders, etc.—originate from small isolated populations undergoing rapid shifts from the ancestral to a new adaptive state, that is, by quantum evolution.

Since cultures, like biological populations, must be adapted to the environment to be effective, and since cultural traits seem to be subject like genetic ones to drift, it can be postulated that cultural traits or complexes are also subject to quantum evolution. In biology, "quantum evolution is believed to be the normal process by which new major groups come into being" (Grant, 1963, p. 556) and the existence of a similar process in culture would account for events like the sudden rise of the Inca, or the rapid appearance of Mochica in Peru, or the quick florescence of the Bahía Phase on coastal Ecuador. Quantum evolution might also explain the absence of antecedents for the Machalilla Phase, although portions of the Pacific coasts of Mesoamerica and South America are too little known as yet to rule out the possibility

of future discovery. In such instances, something happened to give one small local group an advantage over others and when equilibrium was reestablished, the cultural result was markedly different. Such rapid shifts are characteristically followed in the paleontological record by long periods of much slower change resulting from normal interaction between the four primary evolutionary forces, and a similar situation is observable in the archeological record.

Cultural evolution has often been contrasted with biological evolution by picturing it as a tree of interconnected and reconnected branches while the biological tree is shown with divergent and redivergent branching (e.g., Kroeber, 1948, p. 260). This distinction is not completely accurate, however. Biological evolution is not a simple process of increasing divergence. Biological lines may diverge only slightly and then run parallel for millions of years, as has the skunk cabbage in Asia and North America (Grant, 1963, p. 443). Or diverging lines may reconverge if they have not progressed too far for hybridization (op. cit., fig. 79). Biological evolution is a vastly complicated process, not because the principles by which it operates are numerous or particularly complex, but because few organisms are subject to their unobstructed operation. Constantly changing environmental or ecological conditions are the rule rather than the exception, and change may alternatively favor one kind of adaptation and then another. The same evolutionary mechanisms may produce stability in one species, variety in another, and extinction in a third.

Since the essential element to biological survival is adaptation, the environment is the most influential "creative" force (Grant, 1963, pp. 117, 546–8). Although variation will arise in seemingly nonadaptive traits through chance fluctuation and drift, important or drastic alterations result from selection of traits made adaptive by changes in the habitat. These may be environmental (such as climatic change or transferral to a new environment) or social (such as competitive relationships with other groups). So important is adaptation to the survival of any organism that some biologists suspect that even traits of no obvious adaptive value may in fact have an undetected adaptive aspect if they persist. Maintenance of adaptation is a complicated process, as Grant (1963, p. 270) has explained:

> The environment to which an organic unit must adapt is a complex of many different factors, physical, social, and biotic. Each separate factor may carry out its own selective processes separately. The adaptations created by selection for one aspect of the total environment are not necessarily useful, and may even be detrimental, in relation to other facets of the environment. Furthermore selection is opportunistic in that it brings about adaptations to existing environmental conditions. Such adaptations may or may not be valuable to their possessors in future environments. The collective processes of natural selection, while they promote the formation of adaptations of diverse kinds, do not guarantee evolutionary success in the long run under what Darwin termed the complex conditions of existence. Indeed, for every gene allele, genotype, or species that is preserved by natural selection on account of its adaptive properties, many sister alleles, genotypes or species are exterminated by the same process.

Culture, being the principal instrument of man's adaptation to his physical, social and biotic environments, is subject to similar continued pressures. Cultural change can be seen as the result of selection of more adaptive traits, whether of technology, socio-political organization or other aspects of culture. From this point of view, social disorganization may be a reflection of loss of adaptive value for the cultural configuration, rather than a primary cause of cultural breakdown. "Choice" of one value system over another reflects its superiority in terms of integration with other aspects of the culture or in terms of adjustment to the physical world, rather than conscious or unconscious human preference. In fact, change is often in unpreferred directions, as is evident in organized resistance to automation, desegregation and socialized medicine in the United States today.

The differential survival of the two early Formative complexes on the coast of Ecuador can be analyzed in terms of their relative ability to adjust to a new environment, since two important changes appear to coincide approximately with the end of this period. One is the replacement of inlets and mangrove swamps by salitres, and the other is the introduction of a new subsistence basis in the form of productive agriculture. Both the Valdivia and Machalilla Phases were organized around a seafood gathering, hunting, and plant gathering subsistence pattern, possibly supplemented by incipient agriculture as it is known to have been practiced by contemporary groups on the coast of Peru. The Valdivia Phase had perfected its adjustment to the particular conditions of the southern Ecuadorian coast over nearly two millenia, and the relatively slight alteration in community size, settlement pattern, or technology that seems to have taken place during this time implies a high state of adaptation to existing resources, maintained by stabilizing selection. The Machalilla Phase appeared late on the scene, and may have been prevented by the time factor alone from developing as intimate an adjustment to local conditions. In addition, location of Machalilla Phase sites on the coast rather than adjacent to salitres suggests lesser dependence on whatever resources the former bays produced. Although such differences seem insignificant, and in terms of the competition between the two

Phases appear not to have given one an important advantage over the other, they (and perhaps others not evident in the archeological record) apparently allowed the Machalilla Phase to adjust to a changed environment whereas the less flexible Valdivia Phase became extinct. Valdivia Phase pottery, which might seem equally suitable for culinary purposes, disappeared almost completely, while elements of Machalilla Phase vessel shape and decoration can be traced in the subsequent archeological record of the Ecuadorian coast for hundreds of years. Since the people of the Valdivia and Machalilla Phases were apparently in friendly communication, it might be expected, other things being equal, that both would have participated equally in the transition to the new kind of life. Since they did not, the logical conclusion is that other things were not equal, and further that this inequality may have consisted in the differential ability of the two cultures to adapt to changed ecological conditions (cf. Simpson, 1964, pp. 250–251).

It should not be necessary to conclude by remarking that these ideas are expressed only as suggestions that appear to offer fruitful leads for archeological interpretation. Although facts are the foundation of any hypothesis, facts are meaningless in themselves. Meaning can be given to them only by an understanding of the processes of which they are the tangible manifestation. It is therefore of fundamental importance to attempt to discern the invisible patterns and processes that make facts meaningful. In suggesting that some of the hypotheses developed in biology may be applicable to cultural phenomena, we do not mean to imply that attempts to develop hypotheses directly from study of culture are worthless; on the contrary, it is only by this kind of analysis that the applicability of any hypotheses to cultural phenomena can be adequately evaluated. The great complexity of culture and our intimate involvement with it, however, makes objective appraisal tremendously difficult. It seems to us that objectivity can be increased by borrowing certain concepts developed by biologists, and fitting them to archeological data. To us, the fit looks very good so far, but as long as many things remain unknown, others may be misunderstood. Much work needs to be done before we can be sure that we understand what is happening in the present, much less what has happened in the past.

ENVIRONMENTAL CHARACTERISTICS

Known sites of the Valdivia and Machalilla Phases are limited to the coasts of Guayas and southern Manabí Provinces of Ecuador, a distribution that might be attributed to more intensive archeological survey were it not for the fact that it corresponds to a well defined environmental zone. Topography, climate, and consequently vegetation set it apart from adjacent zones on the north, south and east, and there is a good probability that the early Formative Phases were adapted to the specific resources limited to this part of the Ecuadorian coast. Its characteristics can best be understood in the context of the larger picture, and since inferences about the spread of the early complexes also derive to some extent from the geographical and environmental characteristics of western Colombia, it will be appropriate to sketch these briefly as an introduction.

The environmental characteristics of the southern Ecuadorian coast result from its geographical location between the excessively wet Pacific coast of Colombia and the arid desert coast of Peru. The transition is accomplished in a series of sharply defined zones created principally by differences in topography and rainfall. The northernmost zone, extending from Panama southward to Cabo Corrientes on the central coast of Colombia (fig. 1) is mountainous and densely forested. The Serranía del Baudó, a coastal range separated from the Andean chain by the valley of the Atrato, rises abruptly close to the shore to a height of 1000 or more meters. The irregularities of the coast resolve into one small and two large bays. The smallest and northernmost is Humboldt Bay, which together with the valley behind provides the "first extensive habitable and cultivable land along the shore" (Murphy, 1939, p. 8). Broad beaches in this bay contrast with the beachless condition of this segment of the coast, where forest typically extends to the water's edge.

Continuing to the south, forest gives way to beach again at the larger Golfo de Cupica. In addition to providing the best natural harbor on the Pacific coast of Colombia, this bay is at the point where the Atlantic drainage is closest to the Pacific. According to Murphy (1939, pp. 9–10):

> In March 1871, Selfridge walked from the beach of Limón Bay to the headwaters of the River Napipí in an hour and a half.

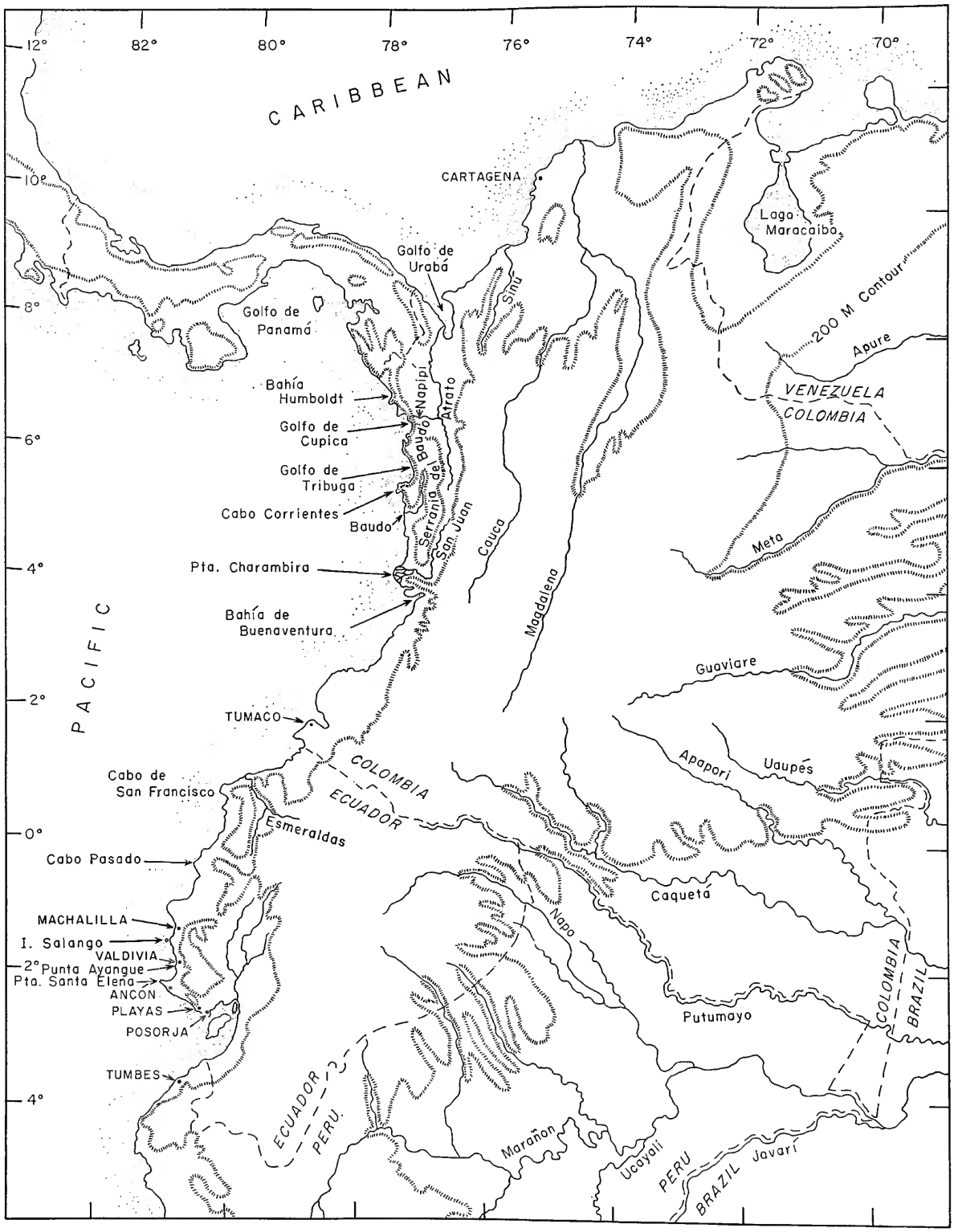

FIGURE 1.—Northwestern South America showing location of geographical features and selected modern towns.

> Restrepo reports, however, that the continental watershed between the River Chirichire and the Nemequedá, a tributary of the Napipí, can be crossed on foot in 20 minutes!

The Napipí is a tributary of the Rio Atrato, which flows northward through wet lowlands to enter the Golfo de Urabá and the Caribbean coast of Colombia (fig. 1).

Rounding another point leads to the Golfo de Tribugá, described as "filled with dangerous shoals, and studded with rocks" (Murphy, 1939, p. 12). Behind the shore, forested hills rise to 1300–1500 meters. Several short streams flowing from the highlands do not provide access to the Atlantic drainage since the southward flowing Rio Baudó intervenes between the coast and tributaries of the Atrato system.

Cabo Corrientes marks the boundary between the northern zone of high land and seasonal rainfall, and the central zone of low land and almost continual rainfall. Murphy (1939, pp. 13–14) describes this sector as follows:

> South of Cape Corrientes the mountains retreat from the sea and a broad, clayey, completely forested coastal plain, broken inland by transverse spurs, stretches all the way to northwestern Ecuador. Moderately elevated land at the coast is found at only few localities, such as Palmas Island, the adjacent mainland about the mouths of Magdalena and Buenaventura Bays, and the islands with bold red cliffs on each side of the entrance into Tumaco Road. This is the maritime Chocó, a flooded lowland of perpetual rains, of selva and morasses, of hundreds of streams, many or most of which pour into the Pacific through multiple mouths. The line between earth and ocean becomes tenuous, for the greater part of the shore is fringed with a maze of mangrove-covered flats and islands, separated by a network of esteros and grading into shifting bars and shallows, which in many places extend for miles offshore.

The largest river is the Rio San Juan, which fractionates the Punta Charambirá into a maze of channels and small islands. Navigable for several hundred miles, it follows a southward direction along most of its course, turning sharply westward at the latitude of its mouth. From its headwaters, it is a short overland trip to the headwaters of the Rio Atrato, the two river systems forming an inland waterway between the Pacific and the Caribbean (fig. 1). In addition to wetness created by the low elevation of much of the land, part of this zone boasts the highest rainfall in South America, in some places exceeding 10,000 mm. per year (Reichel-Dolmatoff, G. and A., 1961, p. 242).

Approximately at the Rio Esmeraldas comes a second and more abrupt change in topography and vegetation, as well as a marked climatic shift back to an annual cycle between rainy and dry season. Land elevation increases sharply, and vegetation takes on progressively xerophytic aspects toward the south. Murphy (1939, pp. 17–21) describes the transition thus:

> The general altitude of the land rises, and the shore becomes cliffy . . . . The trees are smaller than in Colombia; arborescent ferns, lianas, and orchids and other epiphytes thin out; Euphoribiaceae become prominent, and cactus makes its appearance . . . . As one proceeds past Cape San Francisco the transition from rain forest to aridity is at first gradual and then fitful . . . . From Cape Pasado to Salango Island the landscape becomes a patchwork of wet and dry areas, the latter either being at low altitudes or lying in the rain shadow of headlands that adiabatically extract the moisture of the sea winds on their southern slopes . . . . At Salango the verdant land ends, save for a few still smaller specks and gorges choked with rank and impenetrable tropical vegetation. Beyond Point Ayangue there are no more trees near the shore until the traveler has rounded the gaunt peninsula of Santa Elena as far as the mangroves, savanas and corridor forest of the Guayas . . . .

This zone extends to the vicinity of Tumbes, on the north coast of Peru, where there is another sharp transition to barren desert that extends in a strip between the foothills and the shore to about 30 degrees south latitude, near central Chile. In terms of floral and faunal resources, this zone probably differs more from the regions to the north than any of them do from each other. All, however, seem to offer particular advantages or disadvantages for human exploitation.

Before leaving this general survey, it is of interest to note that the Caribbean coast of Colombia is in certain respects very similar to the Guayas coast of Ecuador. Not only is the vegetation xerophytic, but the shore is in a similar stage of development, offering active mangrove flats as well as dried-up old bays. Seasonal alteration between rainfall and drought is likewise characteristic.

The southern coast of Ecuador, between the modern towns of Machalilla and Posorja, corresponds to the dryest part of the country. Aridity increases from north to south and from east to west until the Santa Elena Peninsula, where semidesert conditions prevail. Between Machalilla and Valdivia, low hills reach the shore, broken periodically by flat open plains at the mouths of rivers. Where subjected to pounding waves, hills are sliced off to produce nearly vertical towering cliffs (pls. 1, 2b) such as that occupied by the Machalilla Phase site of G–110: La Cabuya. Except at points, where fallen rocks cover the tidal zone, the beach at low tide is a broad expanse of firm brown sand with few stones or shells. Toward the south, cliffs are typically reduced in elevation and the beach becomes narrower, reflecting a steeper gradient offshore (pl. 2a).

Typical of this region is evidence of rising shoreline in the form of salitres of varying extent (fig. 2), the majority barren of vegetation (pls. 3b, 4, 13, 14). Dead and dying mangrove indicates this process is still under way, enlarging the already extant salitre of

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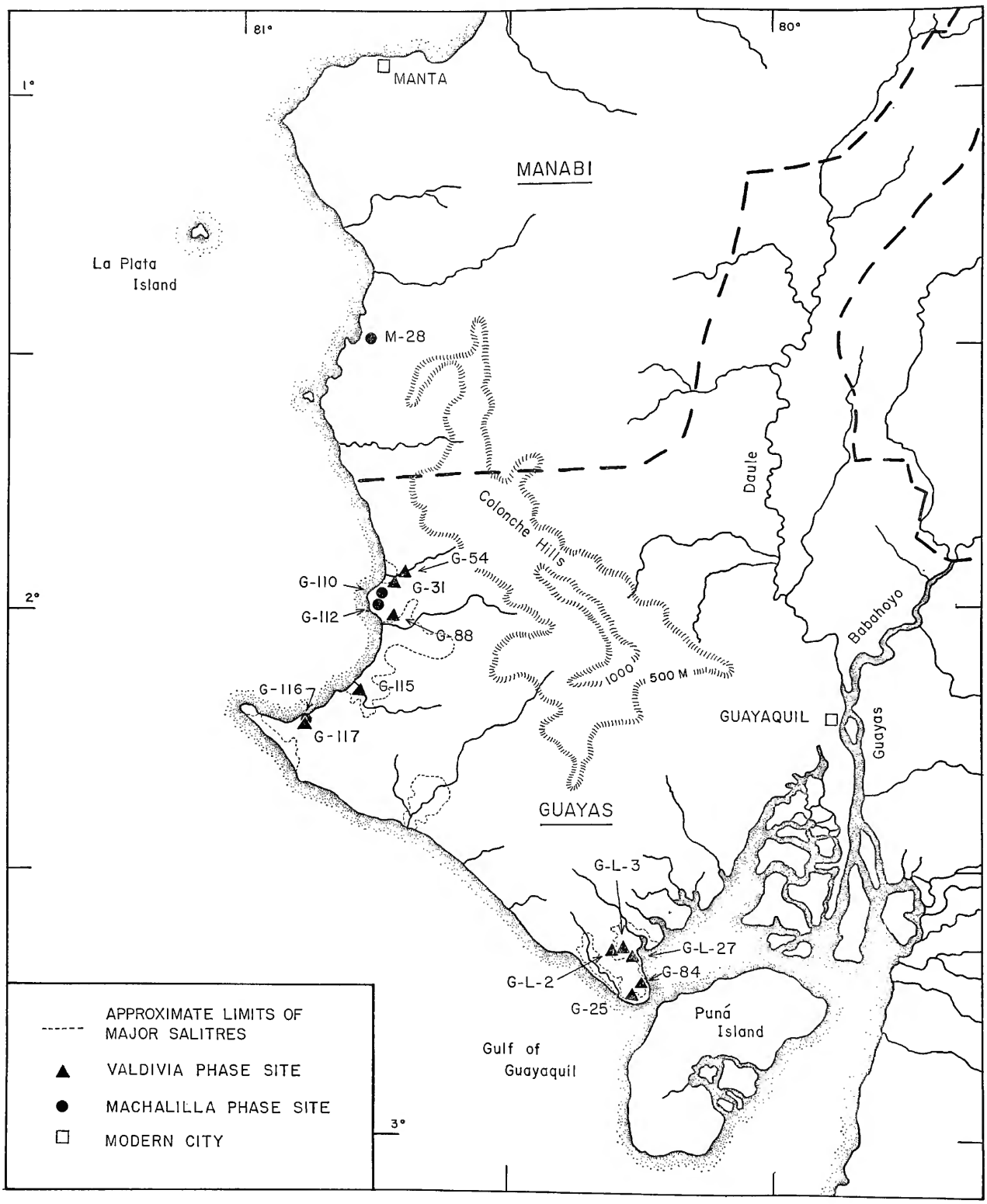

FIGURE 2.—Location of sites of the Valdivia and Machalilla Phases.

El Morro near Posorja. All of the known Valdivia Phase sites are on the margins of these salitres, suggesting that they at one time provided optimum conditions for a food collecting way of life. At present, they are firm surfaced during the dry season, becoming mucky or partly inundated in the rainy season as a result of their low elevation.

Within historic time, increasing aridity has been noted throughout this area of the Guayas Province, but it is not certain whether this is a progressive or cyclical phenomenon. Around Playas there were large cattle ranches before the turn of the century; now cattle find little to drink and less to eat during the dry season. Vegetation classifications agree in designating the southern Ecuadorian coast at the present time as xerophytic, although differing slightly in terminology. Eyre (1963, map 6), whose large scale analysis allows only two categories for the coast as a whole, shows a strip extending from Cabo San Francisco to the Peruvian border as thorn forest, noting in the text (op. cit. p. 231) that it represents the more arid type known as semidesert scrub. In a more detailed study, Miller (1959, fig. 1) divides the Ecuadorian coast into 8 vegetation belts. Two of these, coastal xerophytes and tropical subxerophytic bushwoods, extend from Machalilla to Posorja. From Machalilla northward to almost the Colombian border, the vegetation is classified as tropical suppressed forest. Among the constituents of the xerophytic vegetation are two species of particular interest. One is ceiba, or silk cotton, which produces pods filled with silky fibers; the other is a tall bush cotton with small bolls, which may have been collected for the manufacture of cord.

Rainfall is variable regionally and annually. For example, the station at Ancon near the Santa Elena Peninsula (fig. 1) recorded 1,144 mm. rainfall during 1934 and 153.7 mm. in 1940 (Ferdon, 1950, p. 31). On the average, however, variation from the wettest to dryest parts of this xerophytic coastal Ecuadorian zone during a single year is 125 to 875 mm. (Miller, 1959, p. 184). The dry season lasts 7–11 months, with duration decreasing generally from south to north. From the Santa Elena Peninsula northward, the rainy season terminates in 1–2 months of fine, misty precipitation known as garúa (ibid.). Average annual temperature range is 5.3 degrees Centigrade or less (Ferdon, 1950, p. 39).

Subsistence and commercial fishing are today the principal activities of coastal residents. Although farming is possible a few kilometers inland in southern Manabí Province and about as far southward as the Rio Valdivia, most of the area is too dry for cultivation without irrigation. Since most of the rivers cease to flow above ground in the dry season, irrigation is not yet feasible. Subsistence fishing is done close to shore in shallow water with nets played out to enclose a segment of water and gradually drawn toward the beach. This is supplemented by collecting a variety of mollusks at low tide (Appendix 1, table 1). Commercial fishermen go to deeper water to secure shrimp, white sea bass, sail and sword fish, robalo, Spanish mackerel, tuna and bonito. Crabs, lobsters and tortoises are additional potential sea food resources.

The most abundant variety of land fauna is birds, including doves and ducks which concentrate around water holes during the dry season. Pelicans, gulls, and white herons are common among larger varieties. These and other species must have been more abundant in the past, before the habitat was disturbed by inroads of civilization, and it is consequently noteworthy that bird bones are poorly represented in Valdivia Phase refuse (Appendix 1, table 4).

Deer can still be hunted and were undoubtedly more abundant before the introduction of cattle. Large iguana are excellent eating, as are their eggs If the hunting area extended inland to the tropical forests of the Guayas Basin and interior Manabí Province, a larger variety of small mammals would have been available. However, absence of such faunal remains from the refuse suggests that it was not necessary to go this far afield for food, at least until the latter part of Valdivia Phase Period C (see p. 25; Appendix 1, table 4).

The environment of the Guayas and southern Manabí coast was probably somewhat different 4000–5000 years ago than it is today, but there have been no geological or paleobotanical studies on which to base reconstruction of its characteristics. It would be of interest to know whether the increasing aridity observed during the past century is a recent trend, a cyclical and seasonal change, or one that can be projected farther back in time. In the latter case, it would be necessary to picture the climate during the Valdivia Phase as wetter, and the vegetation consequently more luxuriant. Of greater significance is the past condition of the salitres. Today, each rainy season adds a layer of fine silt, since the salitres offer the lowest place for the accumulation of runoff. Although they may be partially inundated at such times, the elevation is now out of reach of the ocean water. The absence of an escarpment along the shore, the gradual slope of the beach including the tidal shelf, and the slight elevation of the salitres above present sea level suggest that they were probably never under deep water. It would appear that they were in the past marine inlets that remained full at all times, or were inundated at high tide and exposed at low. Another alternative is that they were overgrown wholly or partly by mangrove as is

the case in many parts of the Guayas estuary today. The fact that shell refuse in archeological sites of the Valdivia culture lacks any species of mangrove mollusks but does contain many species of shell identified as intertidal in habitat tends to favor the reconstruction of the salitres as former shallow bays partly or entirely exposed by tidal action. Aerial photography of the region and detailed geological studies would help clarify many of these problems, which today remain incompletely solved.

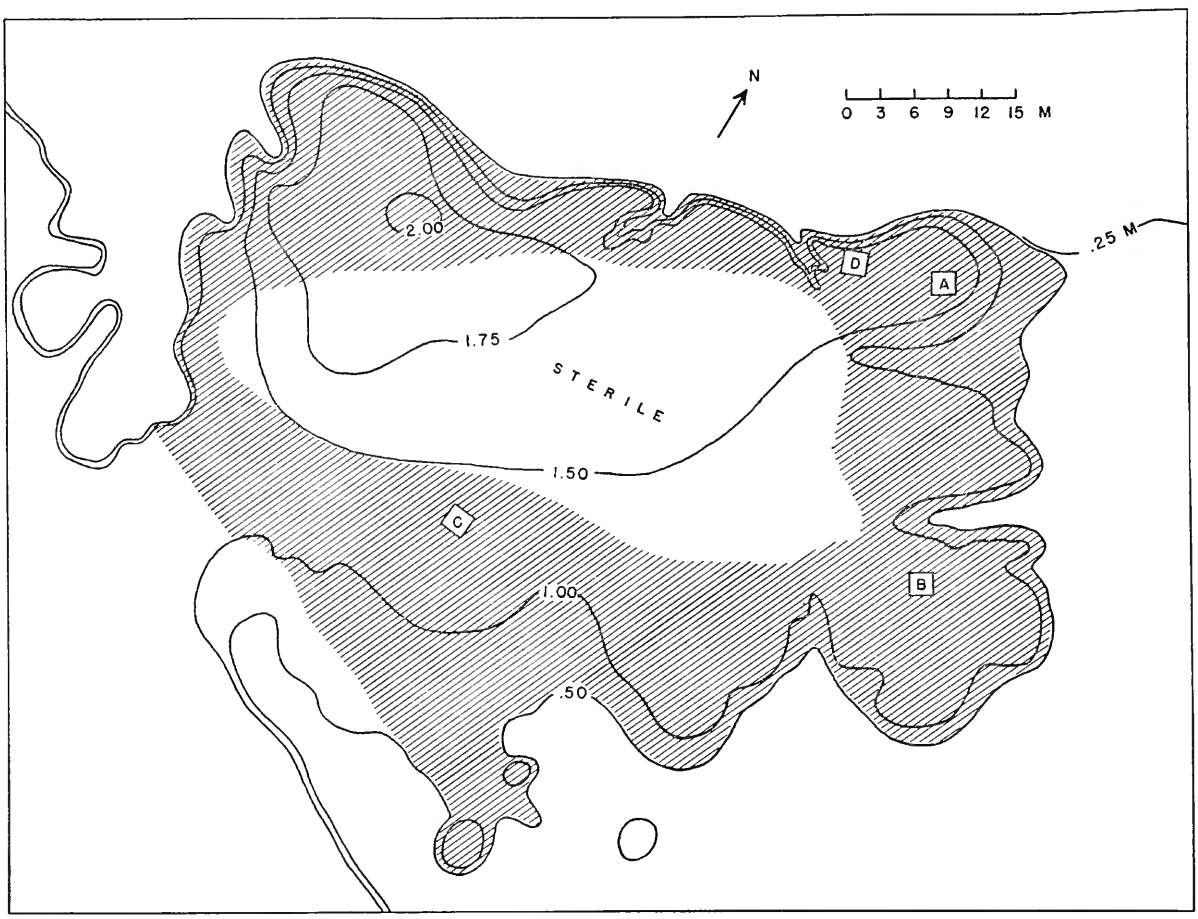

FIGURE 3.—Sketch map of G–25: Punta Arenas, a Period D site of the Valdivia Phase, showing extent of the refuse and location of excavations.

The Valdivia Phase

DESCRIPTION OF SITES AND EXCAVATIONS

Ten sites along the coast of Guayas Province have been identified with the Valdivia Phase (fig. 2). Eight of these have been examined by the present writers; two are described by other investigators. All are located close to the shore, typically at the margin of salt flats or salitres whose formation indicates an alteration in shoreline subsequent to the close of the Valdivia Phase. Depth of refuse was greatest at G–31: Valdivia, and least in the southernmost sites, where condition of the cultural remains was also poorest. Several sites produced skeletal remains, attesting to their use as burial grounds as well as habitation areas. The deposit typically consisted of powdery soil containing large amounts of shell, sherd and other kinds of natural and cultural refuse. No evidence was found of walls, floors, or other kinds of structures, and no significant natural stratigraphy could be identified at any of the sites.

Two of the sites, G–31 and G–84, were partly buried beneath refuse of later occupations, both dating from the Regional Developmental Period. The remainder produced only refuse of the Valdivia Phase.

G–25: Punta Arenas

G–25 is located on the peninsula formed by the intersection of the north shore of the Gulf of Guayaquil with the Pacific coast, reached by a trail off the main road between Playas and Posorja. The site is now separated from the beach by rough terrain, dissected by gullies and salt flats muddied from intermittent flooding during high tide in the dry season and under water during the rainy season. Where salt content is not too high, the surface is overgrown with a tangled mass of scrubby vegetation including cactus (pl. 5). Habitation refuse occupies a small natural rise connected by a narrow neck to a larger elevated area to the south (fig. 3), surrounded on the remaining sides by low mud flats. At the time of excavation in January, traces of rainy-season flooding were already evident along the north edge of the site, where elevation is about 25 cm. lower than on the east side (pl. 5a). On the opposite side of the flats, the terrain rises to higher elevation than that adjacent to the site.

The surface of the site is extensively eroded, producing irregular gullying of the sides and leaving the surface liberally sprinkled with small fragments of badly broken and bleached marine shells. Exposure is most marked at the north edge, where the bank is nearly vertical and rises 1.5 meters above the flats (pl. 5a). The summit, an area of about 50 by 80 meters, is relatively level except for a small rise to the west. Vegetation cover was limited to small scattered clumps of low scrub. Habitation refuse is distributed around the margins of the knoll, leaving a sterile zone at the center (fig. 3). Preliminary tests in 1956 had identified the occupation as belonging to the Valdivia Phase, and four stratigraphic excavations, each 2 by 2 meters, were undertaken in 1957 to determine the depth and composition of the deposit in more detail.

Cut A was placed in the north corner of the site, sufficiently inward from the bank to avoid the possibility of disturbance of the deposit by erosion or landslide and redeposition. Level 0–20 cm. contained hard gray clay that broke into compact lumps under the pick. Shell fragments were abundant but sherds were sparse and badly eroded. Level 20–40 cm. continued to produce shell and sparse sherds, but was damper and slightly more sticky in composition. Sterile gray clay was encountered at 45 cm., becoming yellowish at 60 cm.

Cut B was excavated 28 meters southeast of Cut A, in a section partly separated from the major portion of the site by erosional gullies. The soil was again heavy, compact, gray clay containing shell fragments. Sherds were infrequent and very badly eroded. The deposit became sterile at 35 cm.

Cut C was begun 43 meters southwest of Cut B. Refuse and soil conditions were similar to those in Cut B, but the deposit was shallower and became sterile at 30 cm.

Cut D was placed on the summit of the north bank, where conditions of refuse on the eroded slope suggested a greater concentration than in other parts of the site already tested. However, refuse proved to be equally sparse and sterile clay appeared at a depth of 40 cm.

The poor drainage at G–25 and the acid condition of the soil caused extreme erosion of the surfaces of most sherds, making it impossible to identify the plain types whose principal distinguishing feature is surface finish. Seriation of the site in the Valdivia Phase sequence (fig. 52) is based consequently on relative frequency of decorated types, supplemented by evidence from vessel shape. No figurine fragments were encountered.

G–31: Valdivia

G–31 occupies a low spur tapering from the west end of the range of hills forming the southern boundary of the Valdivia Valley. Flat sandy beach extends from the foot of the site to the shore, 125 meters away. The modern village of San Pedro lies immediately to the south of the site (pl. 7b), while Valdivia is adjacent to the north (pl. 6). The coast forms a gentle curve, but the sweep is so gradual that it cannot be termed a real bay at the present time. The Valdivia River, a small, meandering stream 100 meters to the north, provided the closest source of fresh water. At present it flows into a narrow lagoon paralleling the beach on the northeast side of Valdivia village, and cut off from the shore by a low sand bar across which water passes in either direction (pl. 6). The valley is about 2.5 kilometers wide at the shore, but constricts rapidly so that 2.0 kilometers inland it is little more than a narrow pass (pl. 7a). Above this, width is erratic, including a series of wide level areas that to judge from the frequency of sites were attractive agricultural terrain during the Regional Developmental Period.

The spur occupied by the site rises to a height of 12 meters above the adjacent level surface (fig. 4; pl. 8a). Except for a few small huts on the lower flank, the area is free of modern occupation. Aside from scattered brush, prickly pear cactus and scrub trees, the principal vegetation is agave planted in rows originally along property or field boundaries, but now run wild and completely covering some parts of the surface. Bare spots abounded with surface sherds, and it was possible to collect a large sample. This showed two occupations of the site, an earlier and more extensive one corresponding to the Valdivia Phase, and a later and smaller one representing the Guangala Phase (fig. 4). Valdivia Phase refuse extended from the foot of the hill southeastward over a 12 meter high knoll and continued eastward along the ridge and up the slope behind to an elevation of 15 meters. Overall dimensions of the deposit were approximately 160 by 150 meters, narrowing to 70 meters at the east end. Depth of refuse was greatest at the north edge, where it extended below the present surface of the adjacent level ground. The Valdivia portion of the refuse was 3.80 meters thick here. At the upper edge of the site, thickness was only 45–65 cm. In the intervening area, distribution was uneven, and apparently correlated to some extent with the contour of the underlying surface. In the area occupied by Cut E, for example, no Valdivia Phase refuse appeared in the 80 cm. deposit. Testing to the east of Cut E also produced only Guangala Phase refuse, to a depth of 20–30 cm. In the vicinity of Cut I, Valdivia Phase refuse reached a depth of 1.30 meters.

In 1956–57, nine small stratigraphic excavations were made: Cuts A, B, C, and D by Estrada in the northwestern part of the site, and Cuts E, F, G (pl. 6b), H and I, by Evans and Meggers in the eastern and southwestern portions (fig. 4). The results of Cuts A, B, F, and H formed the basis for the first ceramic sequence for the Valdivia Phase. Cuts C and D were in areas of shallow deposits, predominantly Guangala Phase in origin, and Cut E produced only Guangala Phase remains. Material obtained from Cuts G and I was deposited in the Museo Arqueológico "Víctor Emilio Estrada", where it was subsequently classified by Estrada (1958, Cuadro 2). A test pit near the summit, south of Cut I, and an extension of the south side of Cut F produced a large number of decorated sherds, which were added to the general site sample. None of the excavations showed any construction features or any evidence of disturbance with one exception. An intrusive Guangala burial was encountered at a depth of 60 cm. in Cut A, above the unmixed Valdivia Phase refuse.

Although the soil over the site varied slightly, at the time of excavation during the dry season, it was typically gray sandy clay of fine, powdery, flourlike consistency throughout the refuse deposit. Sterile soil at the bottom of the cuts was characteristically limey, very compact, hard clay containing 30 percent calcium carbonate by volume, which upon exposure

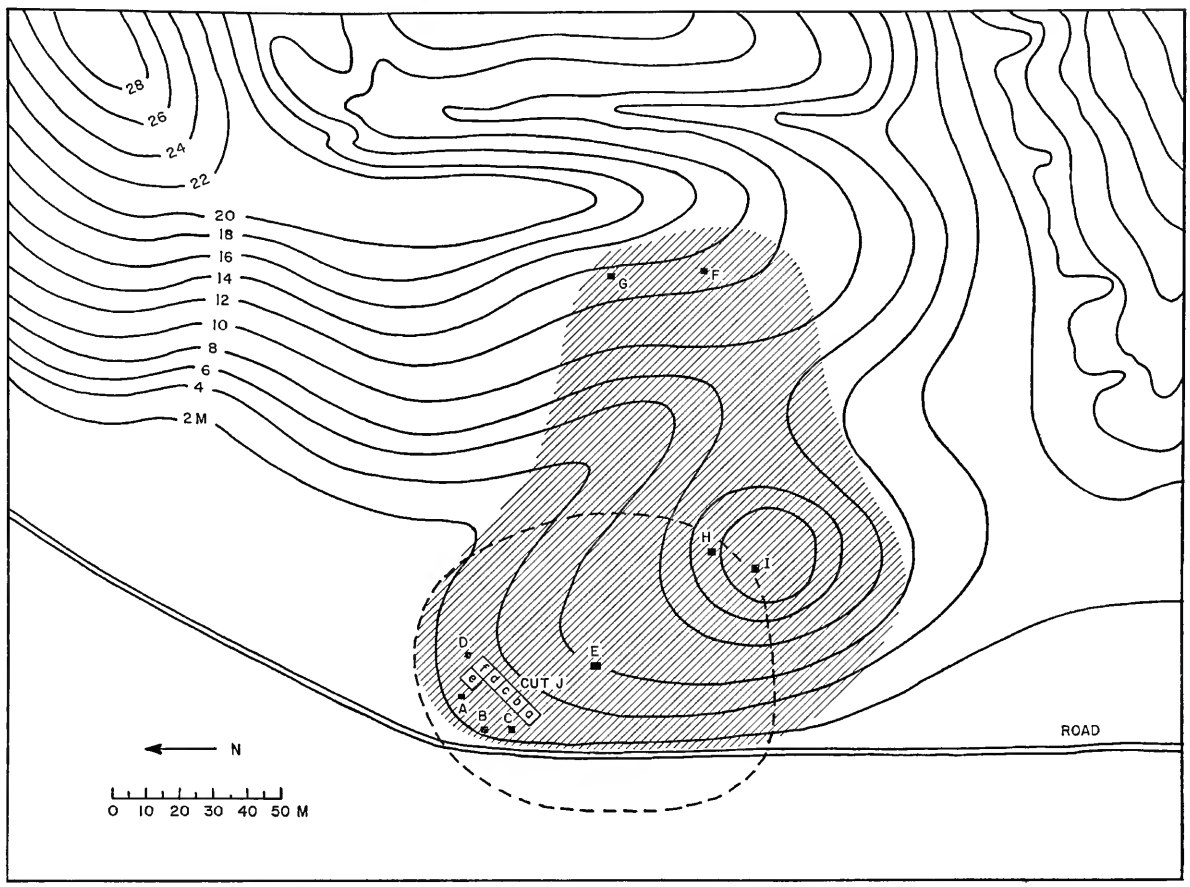

FIGURE 4.—Sketch map of G–31: Valdivia, occupied during Periods A–C of the Valdivia Phase, showing extent of the refuse and location of excavations. The dotted line delimits extent of refuse deposited by a later Guangala Phase reoccupation of the site.

dried into an indurated clay of the hardness of low-grade mudstone. Color varies from whitish to yellow or light brown (this deposit also underlays the refuse at G–54, and is easily recognized in the photograph of the bank profile, pl. 11a). All of the cuts produced large amounts of shell, fireburnt and unburned stones, sherds, fish and animal bones, crab claws and carapace fragments. Everything recovered from Cuts A, F, and H was saved for analysis and samples of shell and animal remains were kept from other excavations.

During January 1961, a large trench was excavated at the northwest edge of the site, where previous work had shown the refuse to be deepest and to represent the earliest part of the occupation. The excavation as a whole was designated as Cut J (fig. 4; pls. 8b, 9). It consisted of five squares 5 by 5 meters, designated as Sections A–E, excavated in arbitrary levels of 30 cm., making a trench 5 by 25 meters long. A sixth 5 meter square (Section E) was added at the northwest side of Section F in the hope of recovering additional fragments of a castellated rim vessel (pl. 103a, b) found near the northwest side of Section E. Each section was taken down to and into sterile dirt, and the completed trench clearly shows the sloping nature of the original surface (pls. 9a, 10). Refuse continued to a depth of 2.10 meters in Section A, 2.40 meters in Section B, 3.10 meters in Section C, 4.20 meters in Section D, and 4.40 meters in Sections E and F. The upper levels, containing Guangala Phase ceramics, were examined and only Valdivia Phase items or unusual objects were saved. The remainder of the deposit was sifted (pl. 9b), producing a tremendous quantity of sherds as well as shell, stone and other kinds of refuse. All sherds from Sections D and E were classified; from the remaining sections only decorated sherds were available for study. The field work was under the supervision of Julio Viteri who did not notice any unusual features in the deposit, except for rare small clusters of large rounded cobbles (pl. 9c, d), the significance of which is undetermined.

G–54: Buena Vista

Survey of the Valdivia Valley during the 1957 season revealed a site of the Valdivia Phase along the south edge, about one kilometer inland from G–31 (fig. 5). Brief testing suggested that the deposit was superficial, and classification of a surface collection of 480 sherds led to correlation of the occupation with the latter part of the seriated sequence (Evans, Meggers, and Estrada, 1959, Tabla B). In December of 1960, during large scale excavations at G–31, the site was revisited by Julio Viteri, who discovered and excavated a group of burials adjacent to the road (fig. 5; pl. 12). His investigations showed that the deposit was in fact rather deep, but masked by a 25–30 cm. thick sterile deposit, apparently washed down as talus from the adjacent hillside during flash flooding. In order to obtain more information on the characteristics of the site and its chronological position in the Valdivia Phase seriated sequence, several stratigraphic excavations and test pits were excavated during the summer of 1961, by Evans and Meggers.

G–54 is located at a bend in the river, where the 6 meter vertical bank is divided into two 3 meter high steps by a flat terrace 40 meters wide (fig. 5). The refuse extends from the edge of the upper terrace backward and up the flank of the hill for a distance of about 70 meters. Maximum lateral extent is about 50 meters. Recent distubance includes a road that runs from east to west across the widest part of the site, a house near the bank, and some agave hedges. A second house was constructed just outside the northwest limits. The surface is exposed on a large portion of the southern half, and cut by erosion where not protected by sparse xerophytic vegetation. Surface sherds occur only here. On the other side of the road, weeds and scrub growth obscure the ground, and surface materials were recovered only from the bank. At the end of the dry season in January, the Valdivia River was reduced to a broken series of

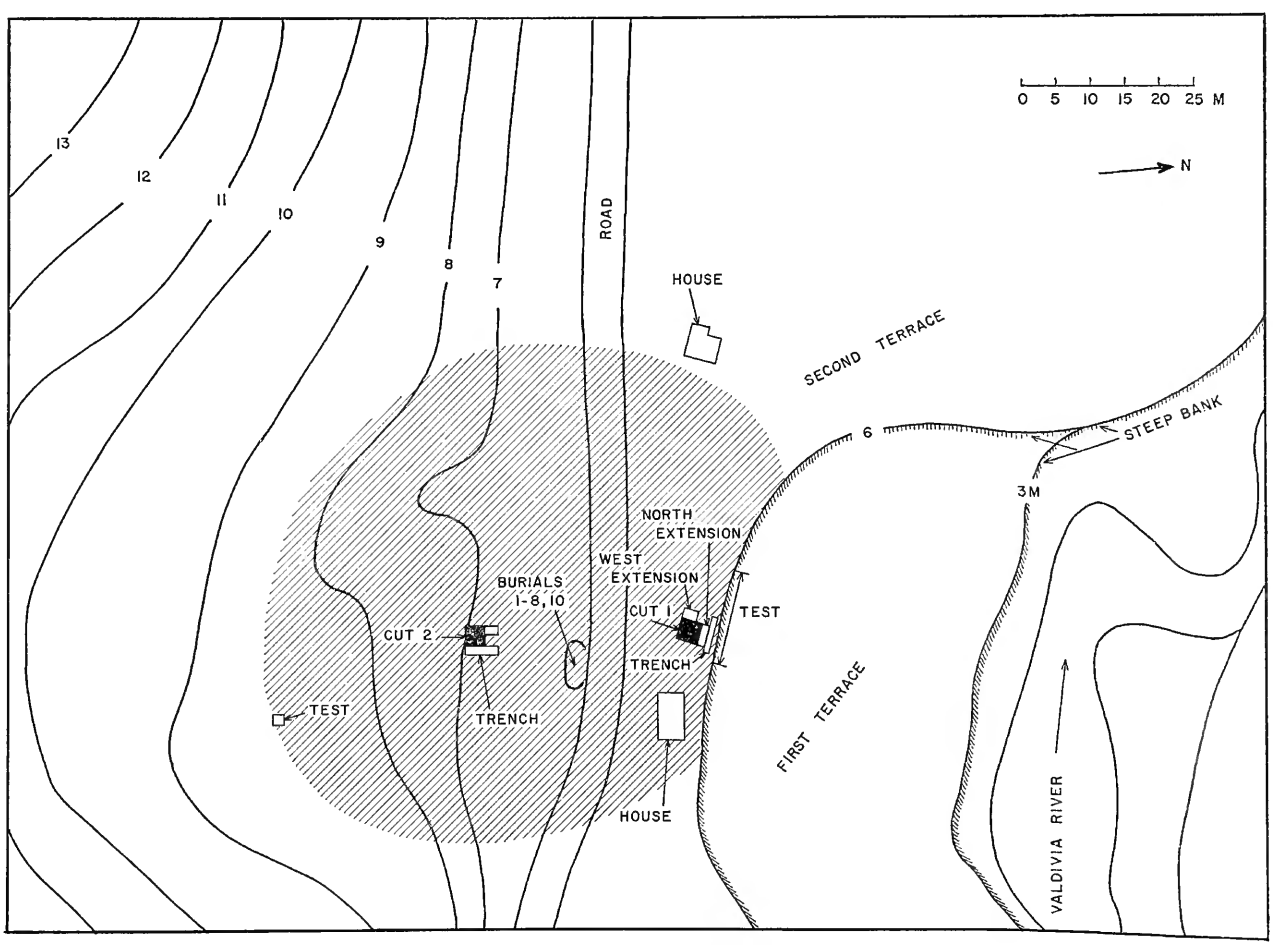

FIGURE 5.—Sketch map of G–54: Buena Vista, a Period C site of the Valdivia Phase showing extent of the refuse and location of excavations.

stagnant pools, and the local water supply was derived from wells dug in the riverbed.

Cut 1, 3 by 3 meters, was placed near the edge of the bank, approximately equidistant between the east and west limits of the site (fig. 5). Excavation was in 20 cm. levels. The dirt was sifted and only large, fire-cracked rocks and unworked shells were discarded in the field. Coarse, lumpy clay occupied the upper 30–34 cm. over most of the cut, dropping to 50 cm. at the east corner. This layer was largely the sterile talus wash (fig. 6; pl. 11a), but a few sherds and shells were discovered. Below, the soil became powdery in consistency, light tan to light gray in color, and contained abundant sherds. Shells were less common than at G–31, animal bones more frequent (Appendix 1, table 4). Granular medium gray clay appeared at a depth of 85 cm. at the north side, along a sloping surface that was 100 cm. below the original surface at the south side. The upper 20 cm. contained a few sherds. No unusual features were recognized in the refuse deposit. After completion of the stratigraphic excavation, the north and west walls were cut back to enlarge the sample of figurines, decorated sherds, and artifacts of shell and stone. Material from the northeast extension of Cut 1 was retained in two levels, the upper 0–85 cm., the lower 85–120 cm. The north side of this abutted the south side of the test trench (fig. 5).

Cut 2, also 3 by 3 meters, was located 18 meters south of the road (pl. 11b), behind the area where a group of burials had been removed earlier in the season. The upper 25–30 cm. were sterile, hard, medium-gray clay. Below 30 cm., excavation was controlled in arbitrary levels 10 cm. thick. The refuse deposit, extending to a depth of 1.20 meters on the east and 1.30 meters on the west, consisted of light tan to gray, powdery soil. A thin lens containing burnt rock extending laterally for a meter at the center of the south wall was the only feature encountered. Shells were less numerous than at G–31 and were identified as predominantly *Anomalocardia*, with a few oyster.

Cut 2 produced evidence of burial pattern at two levels. An inverted Valdivia Incised jar, encountered in Level 50–60 cm., contained badly deteriorated fragments of bone, apparently representing an infant. The remains of an adult appeared at a depth of one meter in the northwest corner. Details are provided below, designated as Burial 9. Subsequent to completion of the stratigraphic excavation, the west half of the north wall of Cut 2 was cut back to increase the sample of decorated sherds and other artifacts.

Additional excavations included two trenches and a test pit. One trench was located between the north side of Cut 1 and the edge of the bank and another at the east side of Cut 2 (fig. 5). A 1.5 by 1.5 meter test at the upper (south) edge of the site established the depth of the deposit here as about 75 cm. Only rims, decorated sherds and artifacts were saved from these excavations as the digging was not controlled by levels nor the refuse sifted. During the excavations, local residents and their children devoted considerable energy to digging into the face of the bank, and all decorated sherds and figurines from this activity were also saved. Subsequently, the bank was straightened and cleaned to reveal the distinct natural stratigraphy, corresponding to the sterile upper and lower layers and the refuse deposit (fig. 6; pl. 11a). A vertical column of sterile dirt 56 cm. in width, joining the upper and lower sterile layers near the center of the cleared zone, seems best accounted for as a disturbance subsequent to laying down of the Valdivia Phase deposit.

Seven burials were excavated in February 1961 by Estrada's field assistant, Julio Viteri, adjacent to the south side of the road. Details of position of the individuals and information on association is limited to what can be seen on the photographs (pl. 12). The bones were in poor condition and five of the skeletons were placed so close together that they are difficult to distinguish. Only three skulls were reconstructible, two adults (BV–1, 8) and one child (BV–14). Two (Burials 1 and 4) show the leg bones in sufficient detail to observe that they are tightly flexed. Both individuals are lying on the right side and facing toward the west. Arm position is less easy to recognize but in one case the right arm is extended, so that the hand is on or next to the thigh. A polished stone ax was adjacent to the lower arm (pl. 12b). Detailed description of the cranial characteristics is provided in Appendix 2 (pp. 219–224; pl. 192 a–c).

Burial 8 was encountered 1 meter east of the edge of the area occupied by Burials 1–7, 25 cm. below the present surface. Skeletal fragments were distributed over an area 1.00 (east–west) by 0.30 meters, and portions of the cranium were widely scattered. Careful examination showed them to represent four individuals (BV–5, 7, 9, 11). Original position could not be determined. No artifacts were associated, and the vicinity was free from habitation refuse.

Burial 9 (BV–6; pl. 193 d–f), lying on sterile clay in the northwest corner of Cut 2, occupied an area 50 by 46 cm. The individual was again lying on the right side with the legs tightly flexed and drawn up toward the chest, and the arms extended toward the hips. The skull was at the west end. Sherds, shells and fireburnt stones were intermingled with the bones, apparently having filtered downward from the refuse above rather than associated as offerings.

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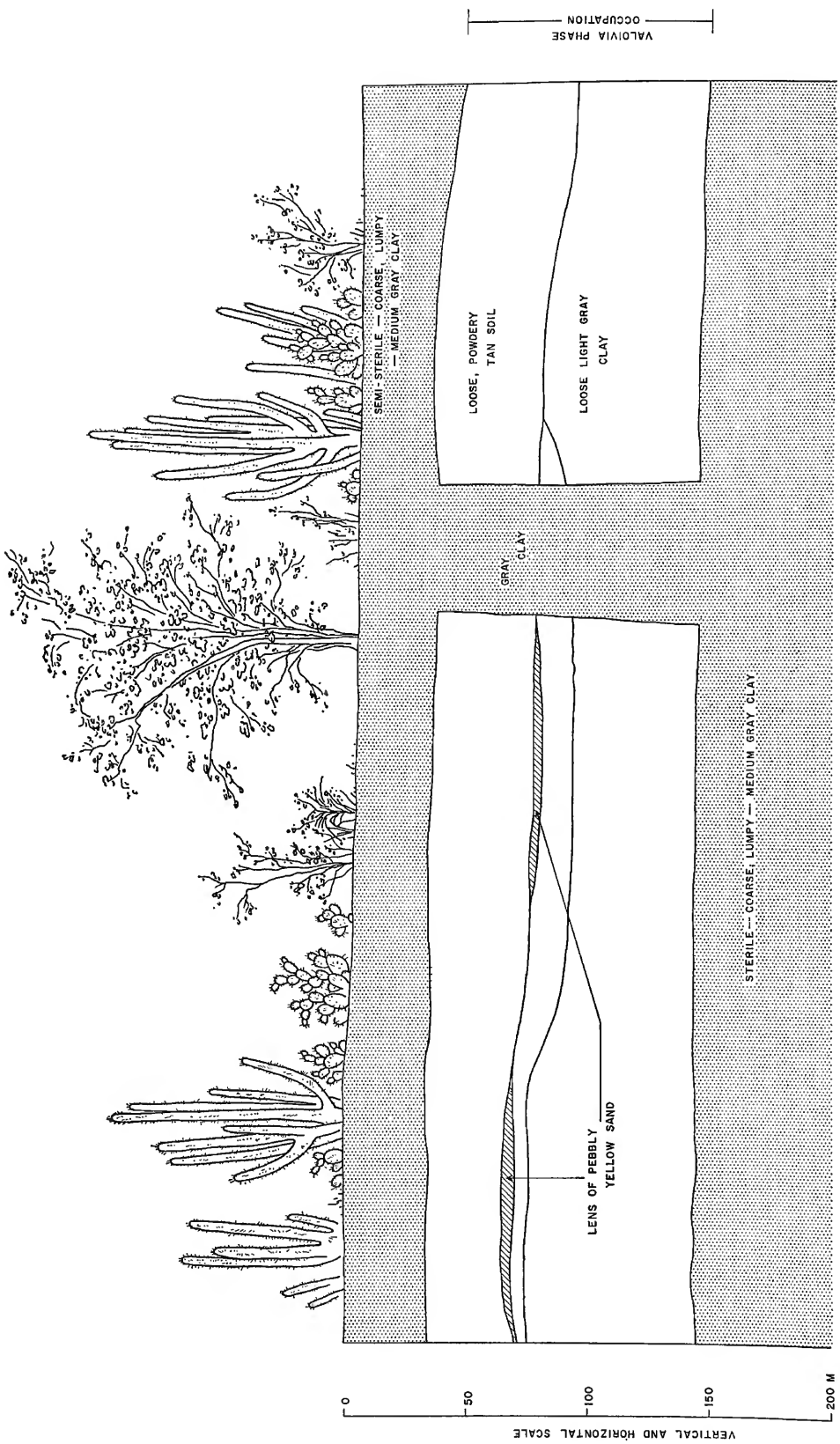

FIGURE 6.—Profile of the bank at the north edge of G–54, showing layer of sterile dirt overlying the refuse deposit (pl. 11a). The column breaking the continuity of the refuse appears to reflect an excavation subsequent to the Valdivia Phase occupation.

Burial 10 (BV–4; pl. 193 a–c) appeared 50 cm. northeast of Burial 8 at a depth of 40 cm. below the present surface, resting on sterile clay. Remains were badly scattered and deteriorated, and position of the body could not be ascertained. Sherds and rocks were intermingled with the bones, but appear to represent accidental rather than intentional association.

Burial 11 was encountered beneath a lens of brown coarse sandy soil during probing of the bank by local residents. Its position was not identifiable. A figurine found nearby was not clearly associated.

Burials 12 (BV–10) and 13 (BV–3; pl. 194 a–c) were adjacent at a depth of 1.00 to 1.10 meters at the west side of the west extension of Cut 1, again lying on sterile clay. Condition of the bones and proximity of the skeletons were such that a clear separation could not be made. Burial 12 appeared to be lying on the right side, legs tightly flexed, facing toward the west. Burial 13 appeared to be on the left side, also with the legs tightly flexed, and with the arms extended at the side. The body was facing toward the north. Sherds were again wedged around the bones, but no intentional offering appeared to be associated.

G–84: Posorja

Most of the buildings comprising the modern town of Posorja are on low ground, along the water's edge. Inland, the elevation increases rather abruptly (pl. 13). Valdivia Phase remains were concentrated on the summit of the hill, superimposed by refuse belonging to the Jambeli Phase of the Regional Developmental Period (Estrada, Meggers and Evans, 1964, p. 489) and by existing houses. A stratigraphic excavation was undertaken here by Estrada in January 1960. Arbitrary levels of 10 cm. showed Valdivia Phase refuse to extend from a depth of 0.40–1.30 meters. No further details are available on the site area, nature of the deposit, or size of the cut.

G–88: Palmar Norte

The Palmar salitre is a broad low area bounded by steep sided hills, resembling in general aspect the lower Valdivia Valley (pl. 14). G–88 occupies a flank at the north side, with refuse extending from the margin of the salitre up the steep slope and over the top of a small ridge projecting from the higher hill (fig. 7). Only a very small proportion of the site is level, and the steepness characteristic of most of the area suggests that houses must have been raised on posts. The site is shielded from the shore by a projection of the hill. The salitre surface is largely barren, salt content of the soil being too high to permit growth of vegetation. Beyond its limits, xerophytic growth including thorny brush and cactus is characteristic and often dense. Habitation refuse was distributed over an approximately circular area about 100 meters in diameter. Three stratigraphic excavations were made in July 1961 by Estrada, Evans and Meggers to determine the nature and depth of the deposit and to obtain a sample of the pottery and other artifacts.

Cut 1, 2.5 by 2.5 meters, was located on a terrace-like portion of the east slope, at an elevation 8 meters above the salitre floor (fig. 7). Sterile soil, reminiscent of the talus wash situation at G–54, occupied the upper 30 cm. of the deposit. Level 30–50 cm. contained very powdery, soft, light gray dirt with few shells. Shells became slightly more abundant farther down, but in other respects no difference was evident. Sterile medium-gray clay appeared at 90 cm. on the east side over an irregular surface that dropped to 115 cm. in a small pocket at the north edge of the excavation.

Cut 2, 3 by 3 meters, was placed at the sloping edge of the summit, about 6 meters above and northwest of Cut 1 (fig. 7), and was excavated in 30 cm. levels. Refuse was present from the surface, and also included fire-cracked stones and a variety of molluscs. *Anomalocardia* formed a lower proportion of the total shells than at G–54, and columella and conch shells were far more abundant. Soil was powdery and light gray, as in other Valdivia Phase deposits. Compact sterile clay appeared at 50 cm. below the surface on the downhill (southeast) side and at 85 cm. on the opposite side. Fragments of human bones were recognized just above the sterile zone on the southwest side, but nothing could be determined about conditions of burial.

Cut 3, on the top of the ridge near the point, was begun as a 2 by 2 meter square. Soil was lumpy, medium-gray clay containing sherds, but only to a depth of 20 cm., with sterile clay beneath. Since the sample included types characteristic of the earliest part of the Valdivia Phase, the excavation was enlarged to cover a 4 by 5 meter area to obtain a more adequate sample of pottery.

G–L–2

A low bank at the edge of Lagarto salitre (fig. 2; pl. 3b) produced badly eroded shell fragments and a few sherds, apparently of Jambelí Phase origin. In addition, half of a Valdivia Broad-line Incised bowl was discovered, of a style associated with Period D (pl. 42e).

G–L–3

Shells scattered unevenly over a rounded hill defined a habitation site about 18 meters in diameter, and 2 meters in maximum elevation above the salitre

floor. The presence of mangrove oyster and characteristics of the paste of most of the sherds identified the principal occupation as Jambelí Phase in origin. However, one area on the east side produced a few sherds of Valdivia Phase types. Shells in the vicinity were predominantly clam rather than oyster.

G–L–27

A few Valdivia Phase sherds came from a badly eroded knoll at the south edge of Lagarto salitre (fig. 2; pl. 3b), now reduced to 10 meters in diameter. Nothing could be determined regarding the original extent of the site.

Data from Other Investigations

Two Valdivia Phase sites have been reported by other investigators, both on the Guayas coast between the Valdivia Valley and the Santa Elena Peninsula. For convenience of reference, they have been incorporated into the site numbering system for Guayas Province.

G–115: San Pablo

A large Valdivia Phase site was discovered at the margin of the San Pablo salitre (pl. 4) in 1956 by a group of Ecuadorian archeologists including Francisco Huerta Rendón, Carlos Zevallos Menéndez and Olaf Holm. Extensive excavation during 1959 provided detailed information on the composition of the site and produced a tremendous quantity of pottery, figurines and other cultural remains. Final analysis is still in process, but a preliminary report gives information relevant to evaluation of the temporal position of the site in terms of the seriated sequence.

The site is located about 3 kilometers from the present shore, on the inner margin of the salitre. At present, fresh water is available only from wells except at the height of the rainy season. Refuse covers a relatively large area but nowhere exceeds 1.30 meters in depth. Its general composition duplicates that of other Valdivia Phase sites, including presence of marine shell.

A considerable number of burials were encountered during excavation, a situation most parallel to that at G–54. Metric data and indices of the skulls are included in Appendix 2 (p. 226). Condition of the skeletons is reported to be poor, but those from lower levels were sufficiently intact to show a flexed position. There were no burial goods (Zevallos and Holm, 1960, p. 11 and pl. 6, top). Fragments of human bones were also found scattered in the refuse closer to the surface, some of which are believed to show breakage prior to deposition (ibid.).

A feature not reported for other Valdivia Phase sites is isolated finds of inverted complete vessels (Zevallos and Holm, 1960, pl. 4, 5, and 7, bot.). These are said to contain a yellowish substance with high organic content and occasionally shell spoons or unworked shells of species used for manufacture of fishhooks. Groups of shell spoons or unworked pearl oyster shells were repeatedly encountered superimposed (op. cit., p. 10).

Tabulation and description of the large number of artifacts eventually will provide important additional information on the cultural inventory of the Valdivia Phase. Among objects mentioned in the preliminary report are shell fishhooks (Zevallos and Holm, 1960, pl. 25), spoons (op. cit., pl. 26), and disks (op. cit., p. 10), the latter possibly fishhook blanks. Stone artifacts include saws and reamers (op. cit., pl. 27); scrapers, blades and "Jaketown perforators" (op. cit., pl. 28); hammerstones, polishing stones, and grinding stones, some of the latter associated with manos (op. cit., pp. 7–9).

More than 2000 pottery figurine fragments were recovered, representing the Valdivia, San Pablo and Buena Vista types. These show variations not represented in the samples from G–31 and G–54, filling gaps in the evolutionary continuum on which the typology is based (pp. 104–106). There are also a few examples of stone figurines (op. cit., pl. 20), but the Period A Palmar types are absent. Decorated pottery types illustrated or mentioned in the text are: Valdivia Applique Fillet, Valdivia Brushed, Valdivia Excised, Valdivia Incised, Valdivia Broad-line Incised, Valdivia Modeled, Valdivia Nicked Broad-line Incised, Valdivia Nicked Rib or Nubbin, Valdivia Pebble Polished, Valdivia Punctate, Valdivia Red Zoned Punctate and Valdivia Rocker Stamped. A few rims represent jars of Form 14 with a folded-over, finger-pressed rim (op. cit., pls. 14–6, 7), and lobed bowls (op. cit., pl. 8–2, –5; 9–5, –8).

G–117: La Libertad

In 1951, Bushnell reported a small group of pottery, shell and stone artifacts from La Libertad, which he attributed to a post-conquest date on the basis of European objects presumed to be associated. Ironically, this material belongs to the Valdivia Phase, making it not the latest but the earliest on the Ecuadorian coast. The site is about 100 meters inland from the Engoroy cemetery, which produced remains of the Machalilla Phase (fig. 2). Details of the original refuse composition have been largely obliterated by later reuse, but the loose, dusty composition of the soil and inclusion of marine shells is in accord with the situation at other sites of the Valdivia Phase (Bushnell, 1951, pp. 123–4).

The pottery includes Valdivia Applique Fillet, Valdivia Red Zoned Punctate, Valdivia Pebble Polished and Valdivia Broad-line Incised (Bushnell, 1951,

fig. 51–52). One rim bears a motif characteristic of Punta Arenas Incised (op. cit., fig. 52c). The illustrated example of Valdivia Pebble Polished has broad-line incision superimposed on the pebble-polished upper wall, a rare treatment limited to the late part of the Phase. Rim profiles correspond to cambered jars of Forms 21 and 22 and a bowl of Form 8 (op. cit., fig. 54).

The single pottery figurine (op. cit., fig. 52d) is atypical in style, but similar to some examples of the Buena Vista type in hair treatment and body form. Other artifacts believed by Bushnell to be associated with the pottery are shell scoops or spoons and a pitted hammerstone (Bushnell, 1951, fig. 52 k–l), both of which are represented at other sites of the Valdivia Phase.

The Site Sequence and Its Implications

The only two sites so far reported for Period A are G–31 and G–88, at the northern limit of the Valdivia Phase area of distribution (fig. 2). G–88 shows a short occupation dating from the first part of the Phase, perhaps representing temporary removal of a portion of the populace residing at G–31. The pattern of refuse at G–88 differs from that at G–31 in depth as well as continuity, indicating that it was either occupied by a smaller group that moved around on the site, or that it was intermittently abandoned. Period B is also best represented at G–31 and G–88, with a suggestion that inception of settlement at G–115

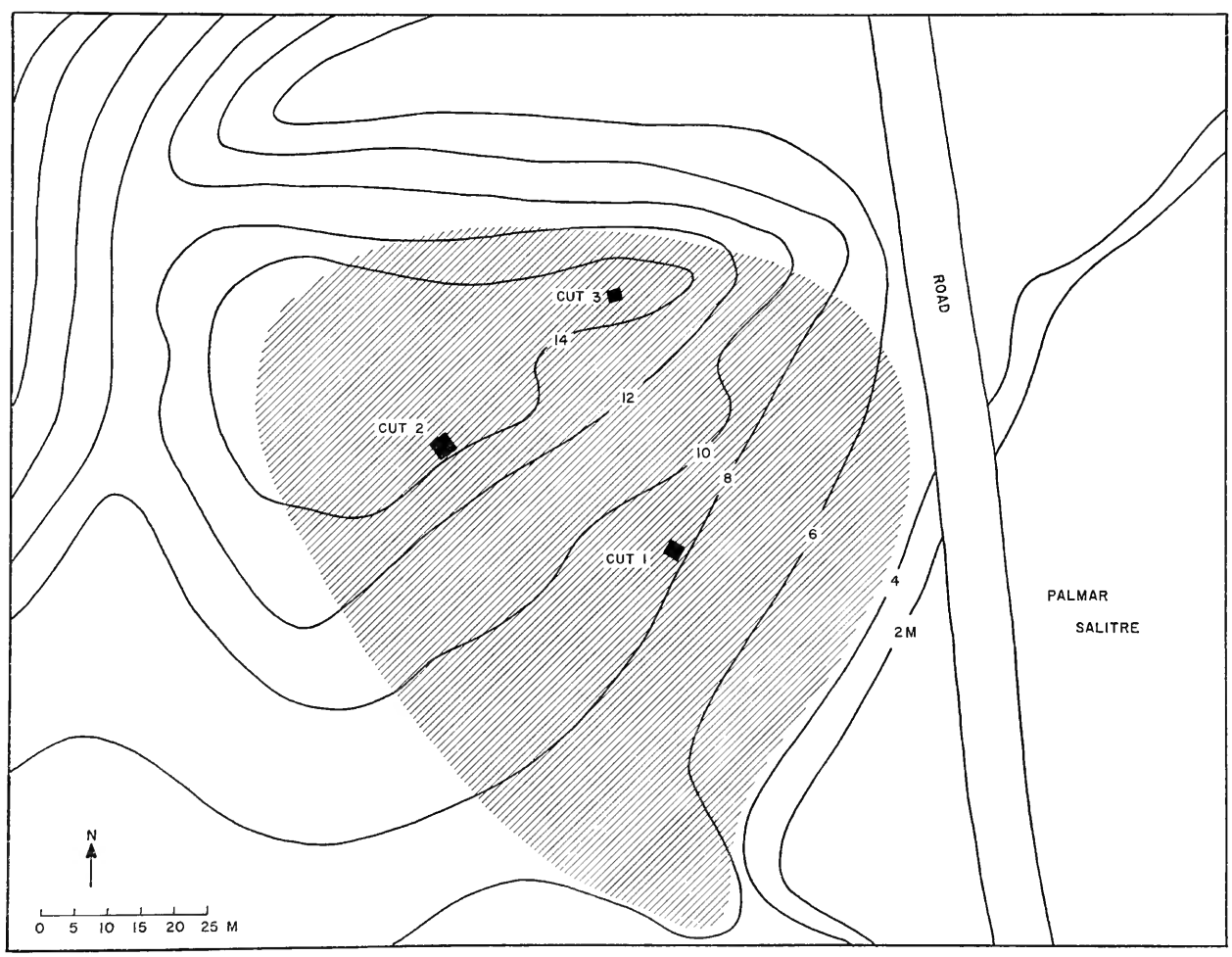

FIGURE 7.—Sketch map of G–88: Palmer Norte, a Period A–B site of the Valdivia Phase, showing extent of the refuse and location of excavations.

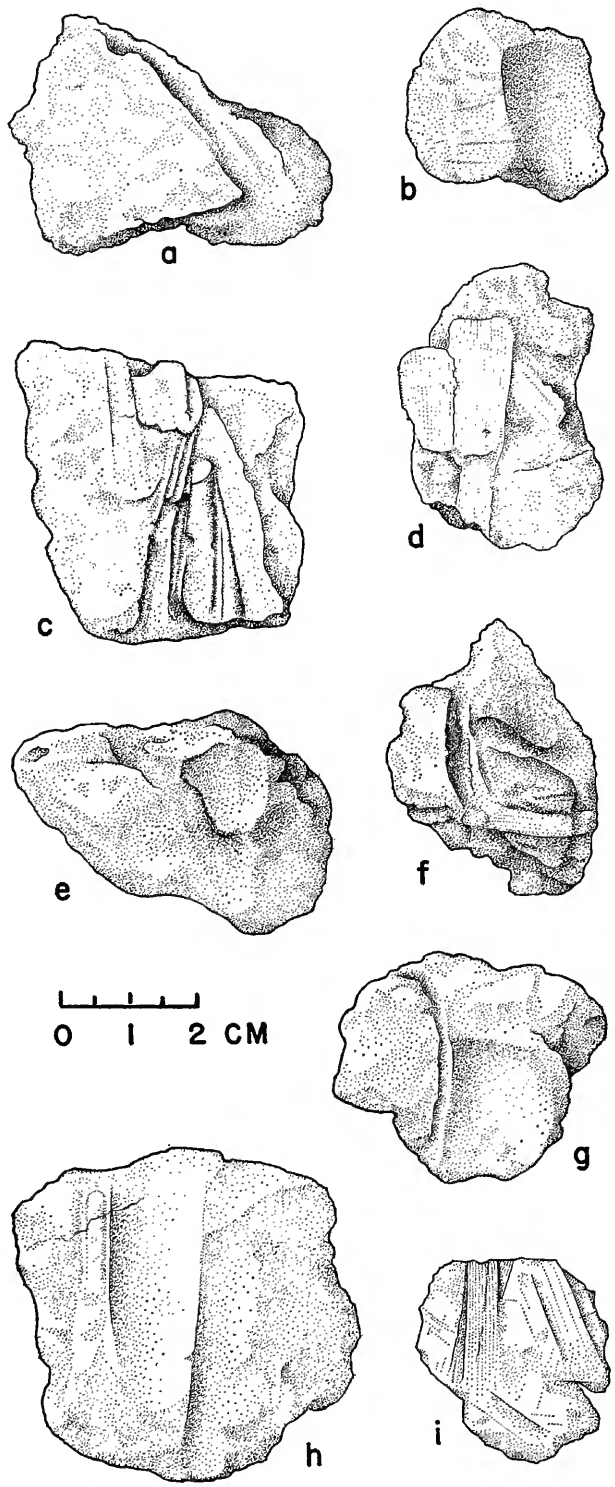

FIGURE 8.—Fragments of clay with twig impressions suggesting wattle and daub construction.

corresponds to the latter part of this Period. The bulk of the refuse at G–115, and all of that at G–54 belong to Period C, which is also represented by a brief reoccupation of G–31. G–117, on the Santa Elena Peninsula some distance to the south, appears to date from late Period C or early Period D. G–25 and the sites in the Lagarto salitre belong to Period D.

The area, depth of refuse and geographical distribution of known sites indicates that the initial appearance of the Valdivia Phase was in the vicinity of the Rio Valdivia Valley, possibly at G–31. During Period A, knowledge of pottery making did not spread more than a few kilometers, an expansion that may reflect enlargement and subdivision of the population of the original settlement. Period C, by contrast, seems to have brought a major alteration in both settlement pattern and artifact inventory. Sites are more extensive and slightly farther from the present shore, although not sufficiently distant to permit an inference that land food was becoming more important than sea food. Occupation during Period C expands southward and at the end of the period embraces the Santa Elena Peninsula. This represents the widest expansion of the Phase, suggesting further enlargement of the population. During Period C, Valdivia Phase isolation was broken by the arrival of people of the Machalilla Phase, with whom peaceful relations appear to have been maintained to judge from the closeness of the sites and the amount of pottery interchanged. Upset of this balance marks the end of Period C. Valdivia occupation shifts to the Playas-Posorja region of the southern Guayas coast, where it is represented by shallow sites with sparse refuse, and a ceramic complex markedly inferior to that of Period C. The physical location is the same as during Period C, that is, along the margin of a salitre several kilometers from the present beach.

Little indication of house type exists. Although the temperature is mild, there is a rainy season several months long, followed by a period of "garúa" or light mist, which would make some kind of shelter desirable. Small lumps of clay with twig, stick, and grass impressions (fig. 8) were identified in the refuse at G–31, G–54 and G–88, suggesting constructions with wattle-and-daub walls. The steepness of the slope at G–88 makes it seem probable that houses were raised on piles. Although large waterworn cobbles were occasionally encountered, they were too few and scattered to indicate use of subterranean structures like those reported from early sites on the coast of Peru (Bird, 1948, p. 23). At best, they may have been used around hearths, since fireburnt and broken cobbles are common refuse components. The only other evidence of hearths was in the form of

rare, small, thin lenses of finely powdered charcoal, appearing in the lower levels of G–31, Cut J, Sections D and E. Since there is abundant ethnographic evidence of dwellers of pile houses using a separate dirtfloored shelter for cooking, these two bits of evidence do not conflict.

No conclusive picture can be drawn of changes in subsistence emphasis because of incompleteness of the evidence. All shell, bone and other organic remains from G–31, Cuts A, F and H were saved for classification and identification (Evans, Meggers and Estrada, 1959, Tabla C). Samples of shell were retained from other G–31 excavations. All bone from G–54, Cut 1, and G–88, Cut 2 was preserved and identified. Unfortunately, no sample had been saved from the excavation at G–84, the only levels representing Period D, but it is probably reasonably safe to project most of the nonceramic characteristics of late Period C upward into Period D.

Shellfish remains are the principal organic component of refuse at all Valdivia Phase sites. Classification and analysis of species distribution by levels in cuts where the complete sample had been saved (Appendix 1, table 1) suggest little alteration in the pattern of exploitation of this food source (fig. 9). Shells fall into two classes: Pelecypodea and Gastropodea, the former including clams, oysters, arks, scallops and similar forms, and the latter including conchs, snails, cowries and other univalves. Of the 38 marine species represented, all but 8 inhabit mudflats or intertidal zones. The remainder can be found just below low tide or in tidal pools. Shellfish could thus have been collected by wading among rocks and exploring flats at low tide, a practice still observable along the Guayas coast today (Ferdon. 1950, p. 19).

Efforts to discern a change in emphasis on the species of mollusks collected are frustrating because of the erratic trends shown by many species (fig. 9). Most common throughout the sequence is the Venus clam (*Anomalocardia subrugosa* Sby), which constitutes more than 50 percent of the shells from all but the upper two levels. Second in frequency is the Horn shell (*Cerithidea valida*), which fluctuates wildly from level to level, but generally occurs in a frequency of about 14–18 percent. A few of the minor species show marked changes in popularity. One of the arks (*Anadara tuberculosa*) is more than twice as frequent during Period A as it is in Periods B and C, and even more marked decline characterizes one of the scallops (*Aequipectan circularis*). Spondylus (*Spondylus princeps*), on the other hand, is rare to absent in Period A, but relatively common during Periods B and C.

Several other species appear not to have been exploited during Period A, including two kinds of clams (*Panamicorbula inflata, Mactra velata*), two arks (*Arca pacifica, Glycymeris inaequalis*), a chama (*Chama echinata*) and three gastropods (*Cerithium adjustum, Natica chemnitzil unifasciata, Oliva peruviana*). Two gastropods (*Bulla aspera, Trivia radians*) are represented only in Period C levels. The land snail (*Porphyrobaphe iostoma*) appears in the upper level identified with Period A and shows a generally consistent increasing popularity to about 5 percent in Period C, but whether this can be interpreted as indicating any alteration either in environment or collecting habits is not clear. The habitat of the marine species covers the same range from intertidal to tidal pools or below low tide level throughout the seriated sequence, implying stable collecting conditions and suggesting that rise of the shoreline was probably subsequent to the end of the Valdivia Phase. Particularly interesting in this respect is absence of any mangrove oysters (*Ostrea columbiensis*), a species abundantly represented in later coastal sites.

Bone (including crab carapace) remains are less abundant, and consequently even more susceptible than mollusks to misinterpretation when subsistence trends are sought. Here, the time distribution is longer, covering all of Periods B and C (Appendix 1, table 4). The lower levels of G–31, Cut A were reduced in area because of excavation problems, and the sample from Period A is consequently very sparse. Fish and crab remains are abundant throughout, a situation that undoubtedly can be projected backward into Period A and forward into Period D. Sea turtle and reptilian remains occur in small amounts in levels corresponding to Period B and Period C, and their absence earlier may be accountable to reduced size of the sample rather than lack of exploitation. Deer bones, on the other hand, show such a marked increase in frequency during Period C as to suggest that more emphasis may have been placed on terrestrial hunting at this time. Restriction of small land mammal and cameloid remains to the same portion of the sequence lends support to this interpretation, although inadequacy of the sample from earlier levels cannot be ruled out of consideration. Bird remains were identified only from late Period C. A few bones tentatively identified as dog are also restricted to this part of the sequence. Again, the rarity of these kinds of fauna casts doubt on the accuracy of attaching significance to the chronological position of the occurrence. Against this reservation is the coincidence of these distributions with an apparent change in subsistence orientation reflected in other faunal remains. Data now available permit only highly tentative interpretations about what may have occurred, but they provide suggestions for examination in the light of other kinds of evidence.

DESCRIPTION OF ARTIFACTS

Stone Artifacts

The natural soil components in the region where sites of the Valdivia Phase are located are indurated clay (sometimes called mudstone), low grade shale, micaceous schist and sandstone conglomerate. All other kinds of rocks found intermixed in the various layers of refuse had to be brought from nearby rivers and streams, the beds of which are strewn with well rounded cobbles and pebbles representing a wide variety of quartzite, chalcedony, quartz, jasper, opal, diorite, chert, basalt, and porphyry.

At G–31: Valdivia, a source material for the pebbles and cobbles is the Valdivia River only 300–500 meters to the north, while at G–54: Buena Vista the same river is even closer. With such easy access, it is not hard to explain the wide variety of waterworn pebbles encountered in excavation, some to be used intact, others to be chipped and flaked into tools, and others to be discarded without evidence of use. Although cores, chips, and flakes occur in considerable quantity in the various refuse layers (Appendix 1, table 3), there are only a limited number of intentionally shaped artifacts. These have been classified into types and descriptions and are arranged in alphabetical order.

Abraders

Pieces of fine to coarse-grained sandstone, coquina and pumice have been roughly shaped and used as abraders. They are not naturally shaped, waterworn pebbles like the pebble polishers, but irregular fragments used for abrading or rubbing something that required a coarser and faster cutting action. In part, use has given the fragments shape; a few are roughly shaped by percussion. Form is variable and may be discoidal, rectanguloid, or irregular. Often several facets have been worn by extended use, and one side is usually slightly concave from serving as a whetstone. For comparison of cutting effectiveness, texture of the abraders can be rated in terms of size of particles in sandpaper. By these standards, range is from no. 0 to no. 4, with most of the abraders equivalent to no. 2 sandpaper. Size is highly variable, representative examples measuring as follows: 0.6–1.3 by 2.9 by 4.0 cm., 0.8 by 5.5 by 6.0 cm., 1.5 by 5.0 by 6.0 cm., 1.8 by 4.5 by 5.5 cm., 2.0 by 5.5 by 6.0 cm. The abraders were used to shape some of the worked shell and bone tools.

Blades or Knives

PLATE 15

Irregularly shaped flakes struck off from cobbles or pebbles of chalcedony, quartzite, opal, and chert* were used as knives or cutting blades and apparently discarded after use so that they show no clearcut evidence of wear (pl. 15). All except those of quartzite are naturally very sharp due to the concoidal fracture of the rock, a fact that was apparently taken advantage of, since it is easier to knock off a few flakes from a cobble, cut a piece of meat, fish or hide and discard the flake rather than shape a knife or blade for repeated use. A flake blade or knife is distinguished from a flake scraper by absence of fine pressure chipping on the cutting edge. There is no observable wear on the cutting edge of the flake knives or blades.

Flakes often preserve the natural waterworn area of the cobble or pebble on one surface. Shape is very irregular although many are clearly classifiable as long prismatic flake blades (pl. 15 q, r, u), struck off by percussion blows onto a striking plane on a core after a few percussion blows had cleaned off a face of the cobble or pebble for easy striking and fracture. Size ranges from 1.5 by 2.0 by 0.5–1.8 cm. to 4.5 by 7.8 by 1.5 cm.

Bowls

PLATE 16 A–B

Two well shaped andesite bowls, with flattened bottom, rounded sides and slightly incurving rim, were encountered during excavation of G–31, Cut J. One (pl. 16b), from Section B, Level 120–150 cm. equating with late Period B, is about 16 cm. in diameter and 11 cm. deep. The other (pl. 16a), from Section D, Level 270–300 cm. and representing middle Period A, is more symmetrical and has a more evenly ground and pecked surface. Diameter is about 23 cm., and depth is 7.8 cm.

Choppers

PLATES 16C, 17

Some quartzite and chalcedony pebbles or cobbles have had a few large flakes knocked off by percussion blows producing an edge that is irregular and uneven but would cut effectively with repeated pounding. The waterworn butt end fits neatly into the cupped palm. The cutting edge appears to have been used repeatedly until dulled from battering. Size varies according to how much of the pebble or cobble has

*Two obsidian flake blades mentioned in the first Valdivia report (Evans, Meggers, Estrada, 1959, p. 22) proved to be accidental intrusion from the superimposed Guangala Phase refuse when hydration rim thickness was measured (Friedman, Smith, Evans and Meggers, 1960, p. 508).

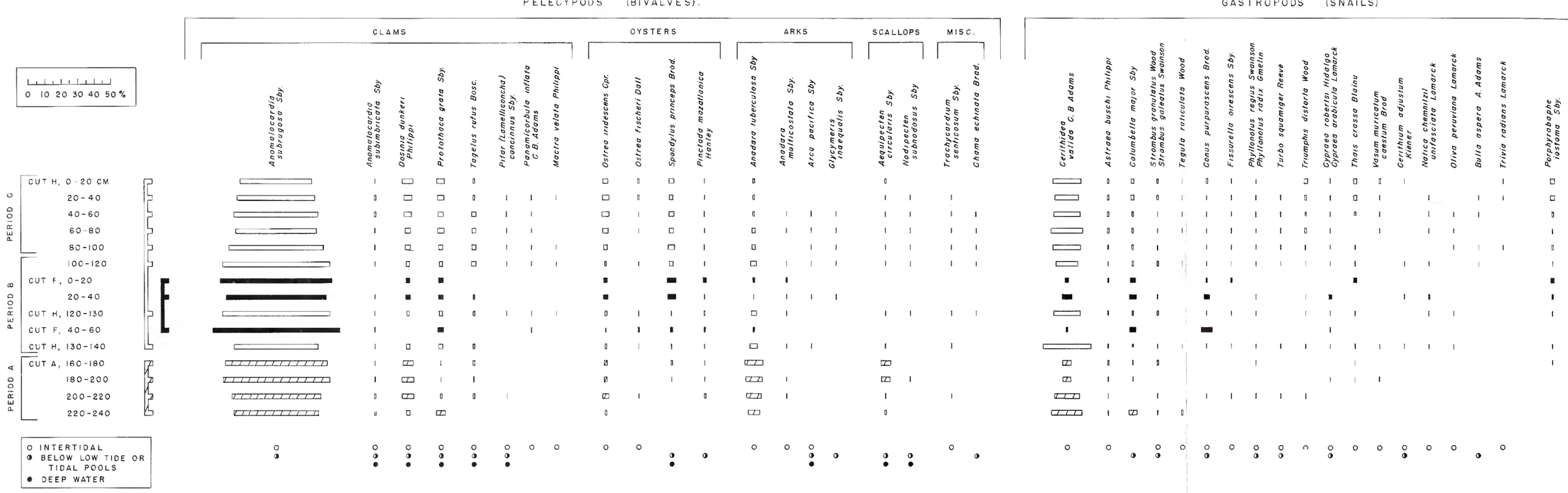

FIGURE 9.—Temporal distribution and frequency of species of mollusks in levels of G–31, Cuts A, F, and H. Seriated sequence is based on changes in pottery type frequency (fig. 49).

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been struck off to produce an edge. Diameter ranges from 3.0–7.0 cm., length 5.1–12.0 cm.

Cores

Cores can be divided into two varieties: 1) portions of waterworn pebbles and cobbles from which flakes have been struck off leaving part of the natural surface intact, and 2) prepared cores with a striking platform from which small prismatic flakes were removed to make scrapers, blades and other cutting tools. Stone materials in the first category include quartzite, fine-grained andesite, chalcedony, opal, jasper; but the second category is restricted to chalcedony and opal. Cores range in length from 3–10 cm. Flake scars along the faces measure 2–5 cm. long and 0.8–2.0 cm. wide, with most of the scars under 1.5 cm. wide. The stone working technique was not sufficiently standardized so that the striking platform was made at any regular angle. Rather, it resulted from knocking off several flakes to rid the pebble of its waterworn smooth edges and give a clean face and platform from which to strike flakes. The number of clearly identifiable cores was small compared to the total quantity of stone in the refuse (see Appendix 1, table 3).

Gravers

FIGURE 10; PLATE 18 A–J

Small flakes of chalcedony, opal and fine-grained quartz of nondescript shape have a small point on one edge, usually opposite the bulb of percussion, suggesting use as an engraving tool. Examination of the points under high magnification binocular microscope shows wear along one side in all cases, and in half the cases wear along both sides of the small point. Some specimens also show wear on a longer edge suggesting additional use as a cutting or scraping tool. None of the flakes are large and none show regular shaping. The smallest are 2.0 by 2.8 by 0.3 cm., 2.0 by 2.5 by 0.5 cm., 3.0 by 3.0 by 1.0 cm.; the largest 1.0 by 5.2 by 1.5 cm., 4.8 by 3.3 by 1.3 cm., 3.8 by 5.5 by 1.1 cm., 6.0 by 2.5 by 1.3 cm. All of them have one or two short nibs or points, measuring 1.0–3.0 mm. long, with the length reaching 5.0 mm. on three specimens.

Grinding Stones

FIGURE 11; PLATE 16 D–F

Since all but one specimen are incomplete, and worn surfaces are either too small or too variable in contour (slightly concave to flat to convex) to permit reliable classification, fragments are all grouped together in a single category of grinding stones. Amount of wear suggests grinding was a method of food preparation of the Valdivia Phase.

The mano and metate fragments are of sandstone, quartzite, sandstone conglomerate, indurated clay, and coquina. The edges or back of several fragments have been shaped by percussion blows giving the artifact an ovoid or rectanguloid outline with rounded corners. One complete mano is a waterworn sandstone conglomerate pebble slightly shaped by battering around the edges and on upper surface so that it is oval. One side has a well-smoothed, convex surface from use as a mano. It is 11.0 by 9.0 cm. and 3.8 cm. thick at the center, tapering to 3.0 cm. thick at the edges. The remaining specimens are too fragmentary for measurement, but contours suggest that neither the grinding slab (metate) nor the hand-held stone (mano) were large and both were generally rectanguloid.

Hammerstones

FIGURE 12

Hammerstones can be divided into two types: 1) unworked waterworn cobbles, and 2) cores. In the first category are natural pebbles and cobbles of quartzite, andesite, diorite, chalcedony, diabase, shale, sandstone and indurated clay (mudstone) used for battering or pounding. Mudstone and sandstone pebbles, so soft that a few blows broke them, probably represent hearthstones used because of accessibility and discarded after use. Repeated pounding sometimes knocked off large spalls, creating a blunt cutting edge, and such tools have been classified as choppers although their first use may have been as hammerstones. Some hammerstones were battered on one end and then turned over or around so that several parts of the surface show pitting from use (fig. 12f). The pebbles vary considerably in natural form, from flattened to spherical to egg-shaped to irregular, but all fit conveniently in the hand or between the fingertips. Diameter ranges between 1.7–5.0 cm., length between 4.0–15.0 cm., with the majority from 5–8 cm. long.

Core hammerstones are pebbles that have had most or all of the natural surface removed by percussion flaking before being used for battering. The smallest in this group measures 1.3 by 2.2 by 3.2 cm. and is battered on both ends; the largest is 3.0 by 7.5 by 11.5 cm. Form is generally rectanguloid to trianguloid, and the absence of consistent shape or size suggests that rather than a delibertately shaped tool, this variety is a secondary result of the manufacture of flakes for knives or scrapers, in which the residual core was sometimes used for hammering.

"Jaketown Perforators"

FIGURE 13

Several microflint specimens that looked like drills were so classified in the original Valdivia report (Evans, Meggers, Estrada, 1959, p. 22; fig. 13 a–d, 14 a–d). However, additional excavation at Valdivia Phase sites produced enough artifacts for reanalysis of the type. In the light of experimental work done by Ford and Webb (1956, pp. 76–79, fig. 25) on the Poverty Point materials, all the Valdivia artifacts originally classified as drills (*perforadores*) were examined under a high-magnification binocular microscope (fig. 13 c, f, i, l, m). Only two showed circular polish striations on the tapering sides and point indicating use as a drill; on all others shape was the end product of use in cutting or working a material like bone or antler. The edges of the larger flake were chipped off from use creating a specimen shaped like an awl or perforator. The description of the experiment is so vividly expressed by Ford and Webb (ibid.) that it does not need repetition here except to indicate that the Valdivia Phase specimens are so much like the used microflint blades of Jaketown and Poverty Point in southeastern United States that the term "Jaketown perforators" has been applied to the Valdivia specimens.

The "perforators" are all flakes of chalcedony or opal, of colors ranging from mottled brown and white, to white, to creamy white, to gray, to black, to rusty rose. Length is 2.2–4.6 cm. The butt end, unmodified from use, is 0.8–1.8 cm. wide and 4–8 mm. thick; and length of the modified section, creating what looks like a tapered point, ranges from 1.0–1.8 cm.

The two specimens that show polish striations resulting from circular motions that might reflect use as a drill deserve additional comment. In both cases the form of the tool suggests shaping from use as a "Jaketown perforator". However, after the tool had acquired a long tapering point, it was secondarily employed as a drill. If all of the specimens had been shaped consciously for use as drills, the majority should show striations resulting from circular motion of drilling.

Paint Stones

Irregular, angular fragments of hematite are probably the source of the red slip color. All the fragments are a brick red, rub off easily on the fingers, and crush easily. Pieces recovered from the refuse (see Appendix 1, table 3) measure 1.0 by 1.2 by 3.0 cm.; 1.0 by 1.0 by 2.4 cm.; 0.6 by 0.8 by 1.8 cm.; 1.0 by 1.0 by 1.5 cm.; and 4.0 by 5.0 by 3.0 cm.

Pebble Polishing Stones

PLATE 19 A–J

Well-rounded, smooth, waterworn pebbles of a variety of rock materials were probably used for polishing pottery. Shape may be hemispherical, spherical, egg-shaped, rectanguloid or irregular. Those clearly showing use were classified as polishing stones; others that could have been used a few times but not sufficiently to produce polishing planes were classified as natural waterworn pebbles (Appendix 1, table 3). Quartz, chalcedony, jasper, diorite, shale, mudstone, and even a petrified bone, are represented, suggesting selection for smoothness and convenience of shape. Several specimens have been used so much that a highly polished beveled edge has formed. The smallest polishing stones are egg-shaped to spherical quartz pebbles 1.5–1.8 cm. in diameter; this group usually measures 2.5–3.0 cm. in diameter, with some as large as 5.3–4.0 cm. The largest examples are flat waterworn pebbles measuring at the large end of the range 1.5 by 3.0 by 6.5 cm.; 0.9 by 4.0 by 7.5 cm.; and at the lower end of the range 1.0 by 1.5 by 3.0 cm.; 1.0 by 2.5 by 2.5 cm.; and 0.8 by 1.5 by 2.0 cm.

Polished Axes

PLATE 19 O–R

Three complete specimens were found in stratigraphic excavations at G–31 (two from Cut J, Section E, Level 3.00–3.30 meters, one from Cut J, Section B, Level 2.70–3.00 meters) and one in association with Burial 1 at G–54 (pl. 12b). Although no additional fragments or complete specimens appeared in any of the other Valdivia Phase sites excavated by Estrada Evans and Meggers, several are reported from G–115: San Pablo (Zevallos and Holm, 1960, p. 8, and personal communication). All the examples are pecked and then polished from gray-black diorite. The two smaller axes are wedge shaped with a slightly flattened, oval outline, battered poll and a fairly sharp, straight bit. One measures 5.5 cm. long, 4.8 cm. wide at bit, and 3.0 cm. wide at the poll (pl. 19p); the other is 6.0 cm. long, 3.5 cm. in maximum width, 3.0 cm. wide at bit and 2.5 cm. wide at poll (pl. 19o). One specimen shows incipient T-shaped form produced by slightly flaring nubbins at the poll, which would have provided grips to affix the ax to a handle. The bit is convex. This specimen (pl. 19q) measures 6.8 cm. to 7.5 cm. long, 4.5 cm. wide at bit, and 5.5 cm. wide at poll, decreasing to 5.0 cm. at a point 1.5 cm. below the expanded flattened poll. The fourth specimen (pl. 19r), from G–54: Buena Vista, is a clearcut T-shaped ax with tapered sides and a flattened poll

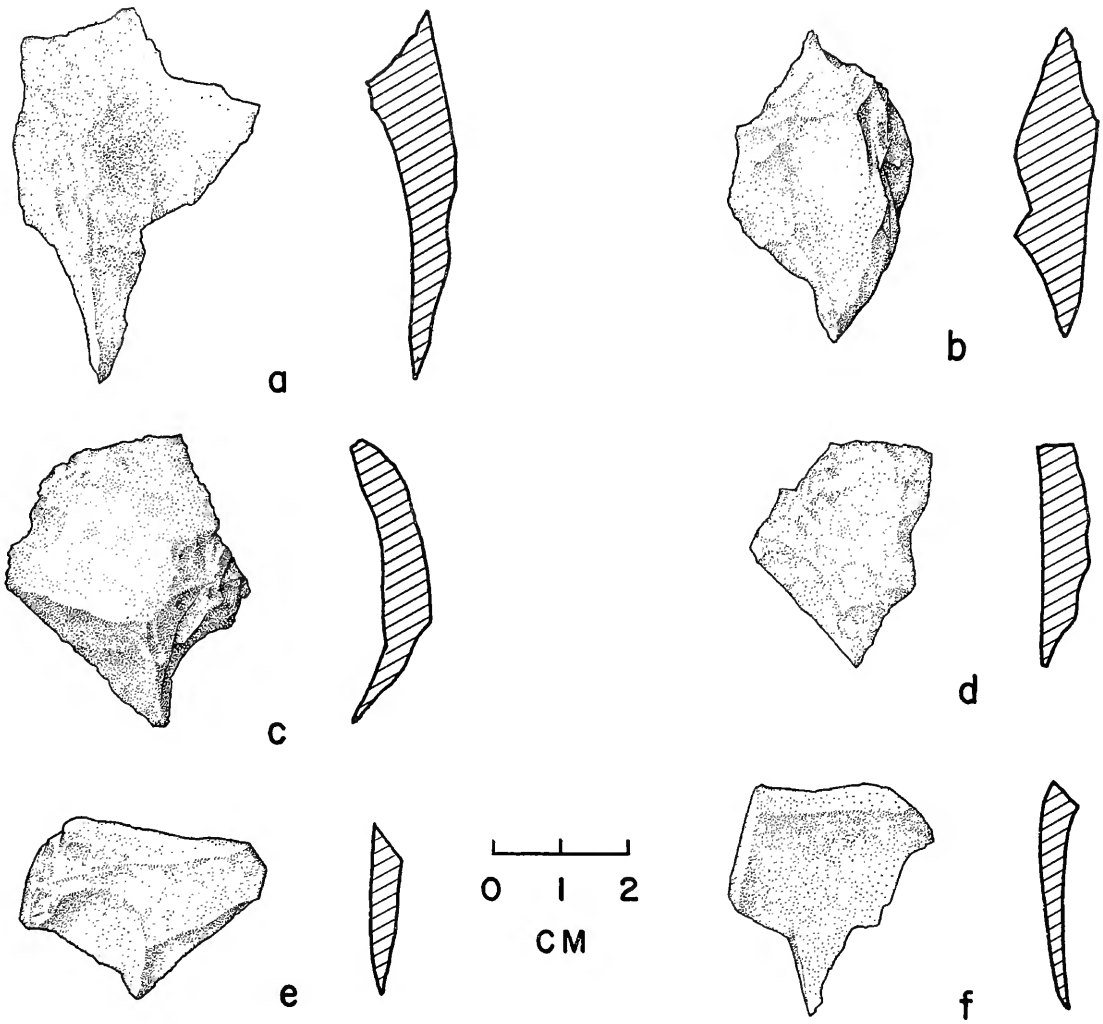

FIGURE 10.—Gravers from Valdivia Phase sites.

similar to the previously described specimen but a less strongly curved bit. It measures 5.5–6.0 cm. long, 8.0 cm. wide at poll, 4.8 cm. wide at bit, and 5.5 cm. wide at a point 2.5 cm. below the poll where the sides of the T are distinctly formed.

Reamers

FIGURE 14; PLATE 20

A series of artifacts identifiable as reamers for the manufacture of shell fishhooks, all show the same type of concentric wear from a circular motion. The specimens are of two materials, fine-grained sandstone and coquina, the latter composed of coarse, compacted waterworn shell particles cemented together. The majority resemble a plumb bob in shape, but a few are egg-shaped. Complete specimens range in length from 4.0–6.5 cm., with the majority between 5.0–5.5 cm. A cross section through the area of largest diameter of the specimens presents two distinct shapes: circular or oval with flattened sides. The end is always circular. Diameters of circular bodies range from 2.5–3.5 cm., oval ones measure 1.5 by 2.5 cm., 1.2 by 2.0 cm., 1.2 by 2.7 cm., 1.2 by 1.7 cm., and 1.3 by 2.0 cm.

Saws

FIGURE 15

Thin slabs of fine-grained sandstone have been ground and polished to produce flat surfaces and one or more tapered edges that could have been used for sawing, especially such soft materials as shell. The slabs are the result of natural cleavage of sandstone,

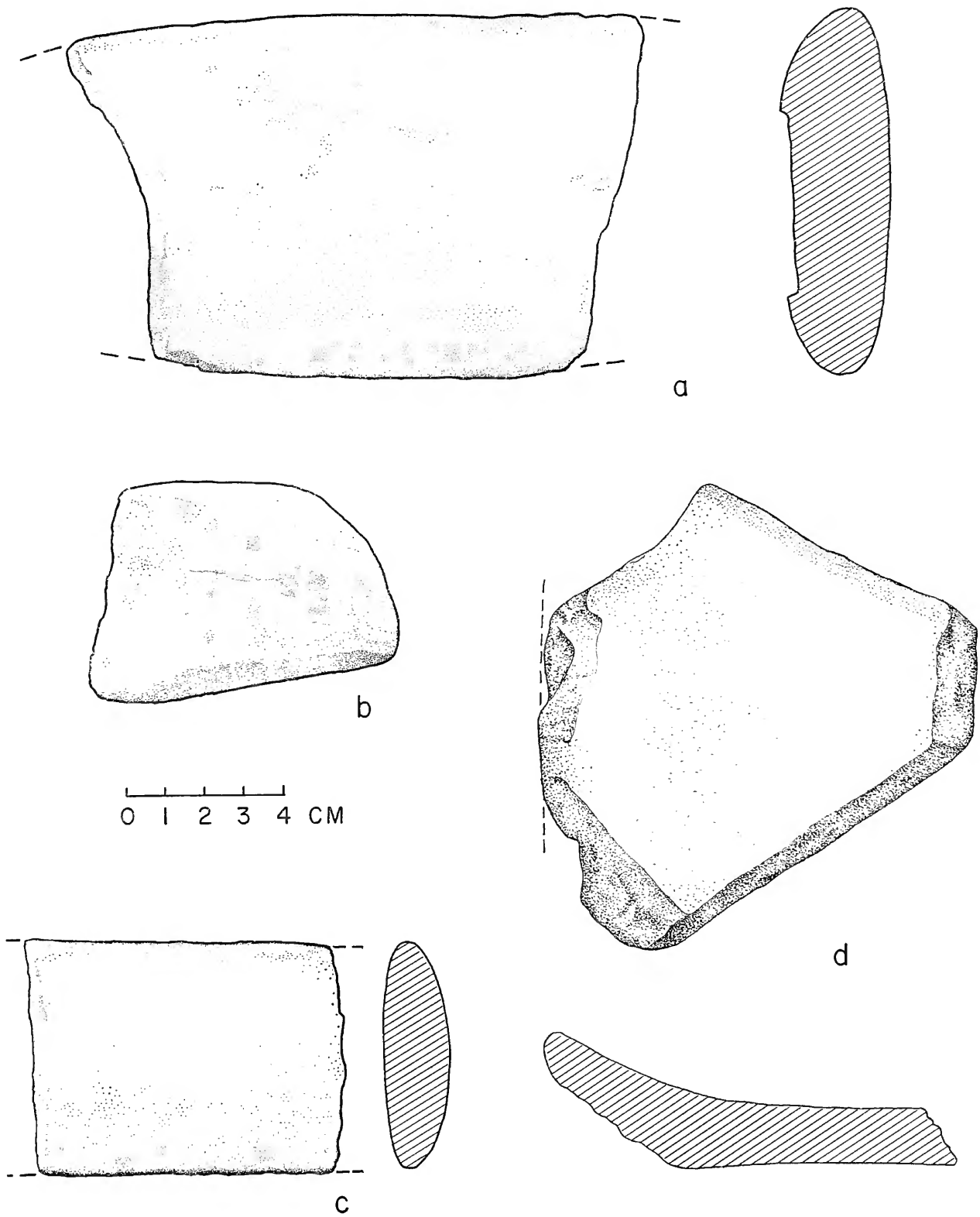

FIGURE 11.—Grinding stone fragments from Valdivia Phase sites. *a–c*, Mano fragments. *d*, Metate fragment.

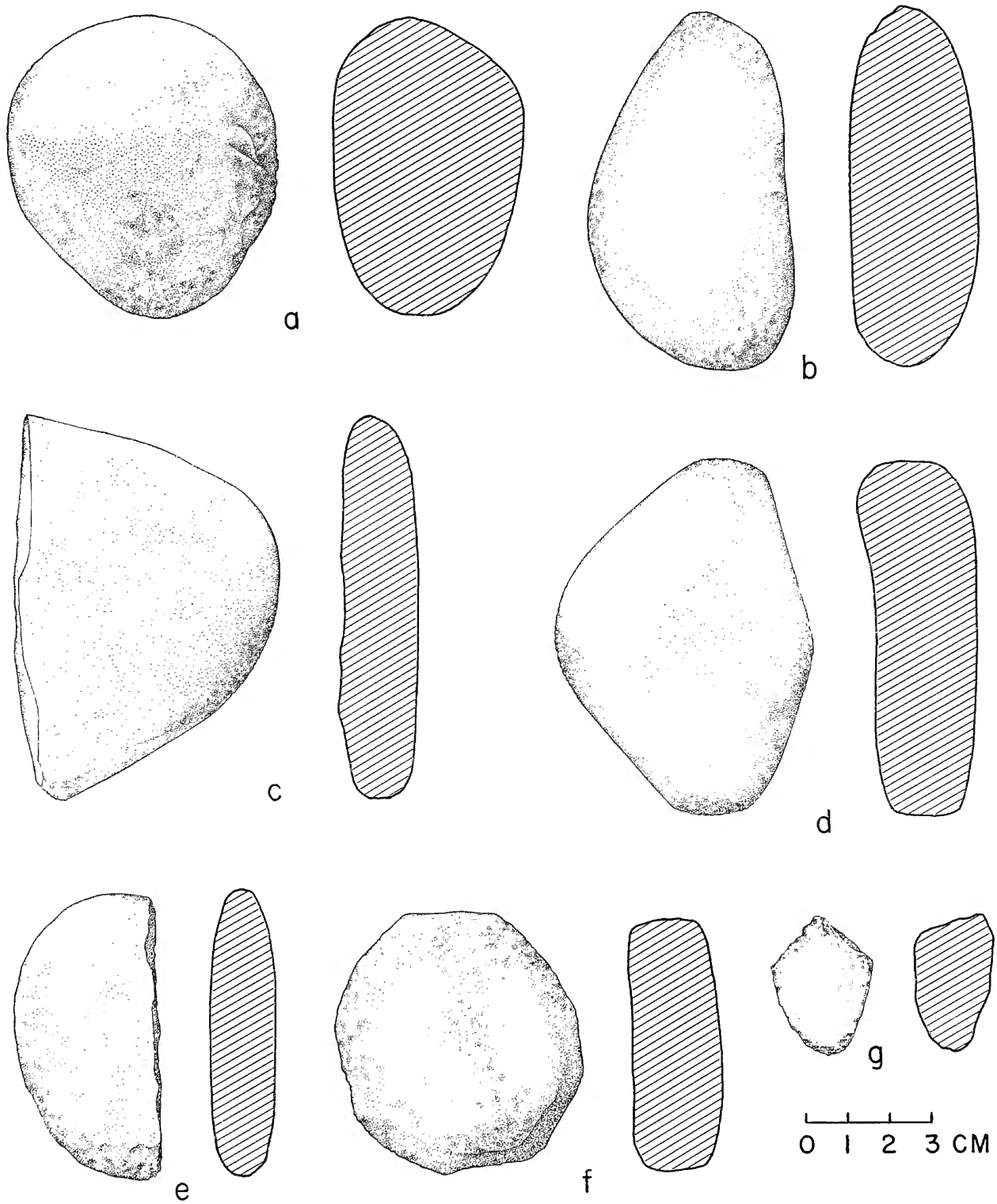

FIGURE 12.—Hammerstones of the Valdivia Phase.

which divides in flat parallel planes. In some cases a minimum amount of grinding was done to smooth the surfaces, in other cases cleavage marks are totally obliterated by abrasion. Thickness of the slabs ranges from 3–11 mm. with the majority 5–6 mm. thick. Many of the saws are fragmentary but they all appear to have been rectanguloid, with the upper edge or back sometimes battered with percussion blows used to work the slab into a more convenient shape. Of the more complete artifacts, the smallest and thinnest is 3.0 cm. long, 2.2 cm. wide at one end and 2.0 cm. wide at the other, and 3 mm. thick (fig. 15e). The largest is 6.5 cm. long, 7.0 cm. wide and 6 mm. thick. The best proportioned saw is 5.4 cm. long, 1.0 cm. wide at the one end, 1.4 cm. wide at the other, and 5 mm. thick on the back. The upper edge is roughly battered and pecked into shape. Cutting edges are typically straight, with bevels ranging from a sharp long taper to a blunt wide angle (cf. cross sections fig. 15a and 15b). One specimen has a slightly curved edge (fig. 15c). Many of the fragments of cut shell have grooves that could have been made by these saws and experiments with some of the saw fragments showed that they will cut shell as rapidly as a modern steel file or slightly used hacksaw blade.

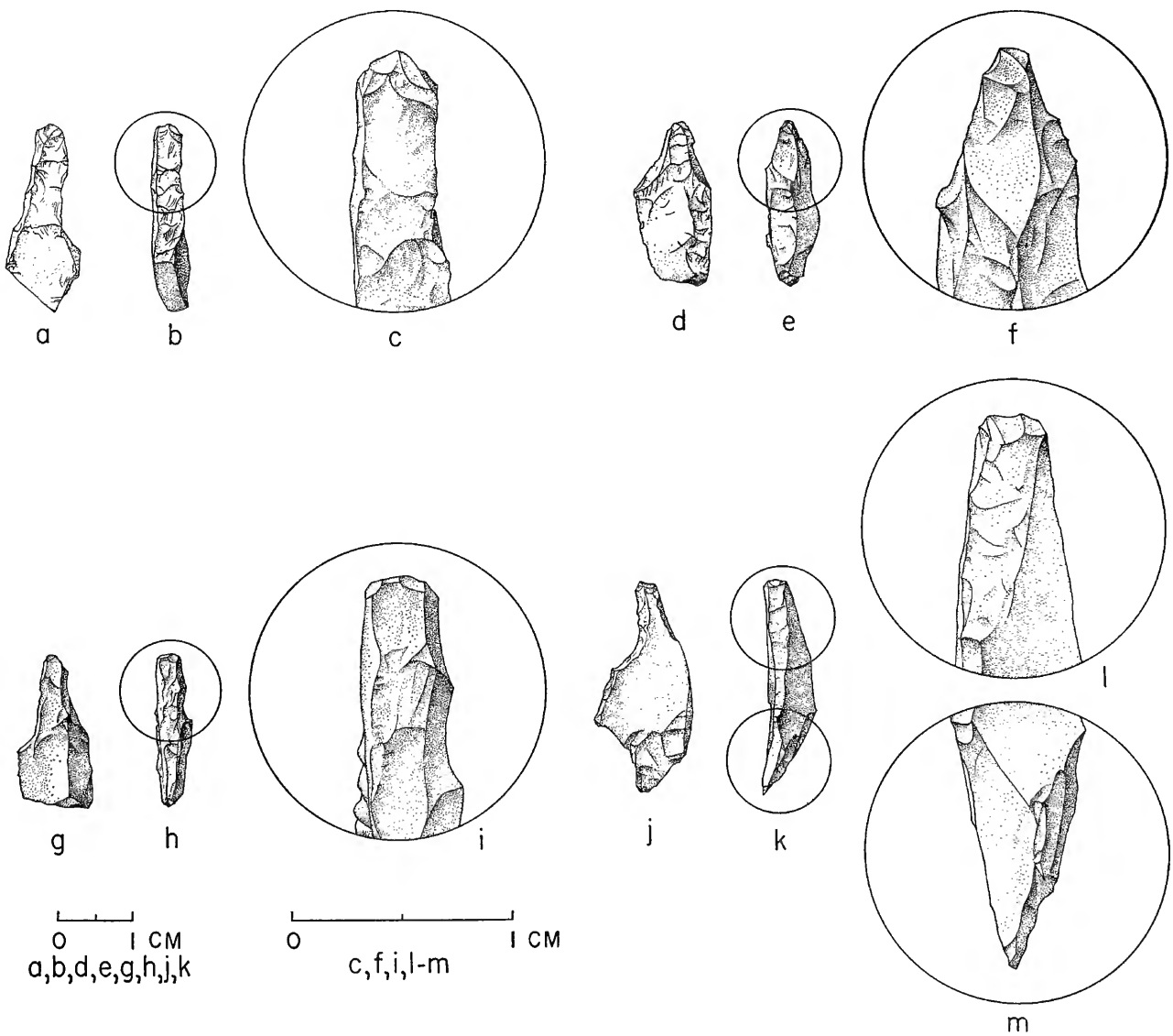

FIGURE 13.—"Jaketown perforators" from Valdivia Phase sites. Worn end has been enlarged to show chipping resulting solely from use.

Scrapers

FIGURE 16; PLATE 18 K–W

Scrapers are usually made from cores or large flakes of quartz, quartzite, chalcedony, opal or chert. They are irregular in shape and show no consistent form. Core scrapers are made by reshaping a wedge-shaped core, usually ranging in size from 3.3 cm. long by 3.0 cm. wide by 1.2 cm. thick to 3.5 cm. long by 6.6 cm. wide by 2.2 cm. thick, a series of percussion blows along one side producing a rough concave or slightly curved cutting or scraping edge. Viewed in cross section, most core scrapers may be called plano-convex, humpbacked, or snubnosed (fig. 16 a, b, e, g). In many examples, the curved face is the result of part of the natural surface of the pebble remaining after large flakes were struck off. The cutting edge varies in width from 1.8 to 5.5 cm.

Flake scrapers represent unretouched flakes chipped by use so that the scraping side of the flake has an indentation or rounded notch (fig. 16 c, d, f, h). The classificatory distinction between the flake scraper and the flake blade or knife is the presence of fine chipping along one edge resulting from its use as a scraper, a feature clearly observable under a microscope. Flakes may show scraping wear on a single edge or several edges over a length of 2.5–5.5 cm. Notches are 8–12 mm. wide and 2–5 mm. deep. Flakes show considerable range in size, from 1.5 by 2.0 by 0.5–1.5 cm. to 4.0 by 7.5 by 1.5 cm.

Sinkers

FIGURE 17

Mudstone cobbles of similar size and shape have notches or grooves in the sides and/or ends suggesting that they were tied to fish nets or fish lines as sinkers. All are ovoid, flattened and thickest at the center, tapering toward the edges. Percussion-made notches typically occur near the middle on two or three of the four sides. On two examples, a narrow groove connects the end notches. In one case the end of the cobble shows battering as if it had been used as a hammerstone before it was notched and used as a sinker (fig. 17c). A groove 1 mm. wide has been worn beside the notch on one example from friction of the cord into the soft stone (fig. 17a). Sinkers range from 4.5–8.0 cm. in length, 3.2 to 6.0 cm. in width, and 1.0–2.5 cm. in maximum thickness.

Fireburnt Rocks

Scattered throughout the refuse of all Valdivia Phase sites is a large number of stone fragments burned or cracked from exposure to fire. These fire-burnt and firecracked stones are of three materials: sandstone and sandstone conglomerates, indurated clay (mudstone) and coquina. In excavations where all materials were saved and tabulated, sandstone and sandstone conglomerate was from two and a half to three times more common than mudstone, with only an occasional occurrence of coquina (Appendix 1, table 3). Sandstone and sandstone conglomerate fragments are all very friable and burntout, bright orange to red-orange in color, with angular irregular cleavage. Size ranges from large pieces

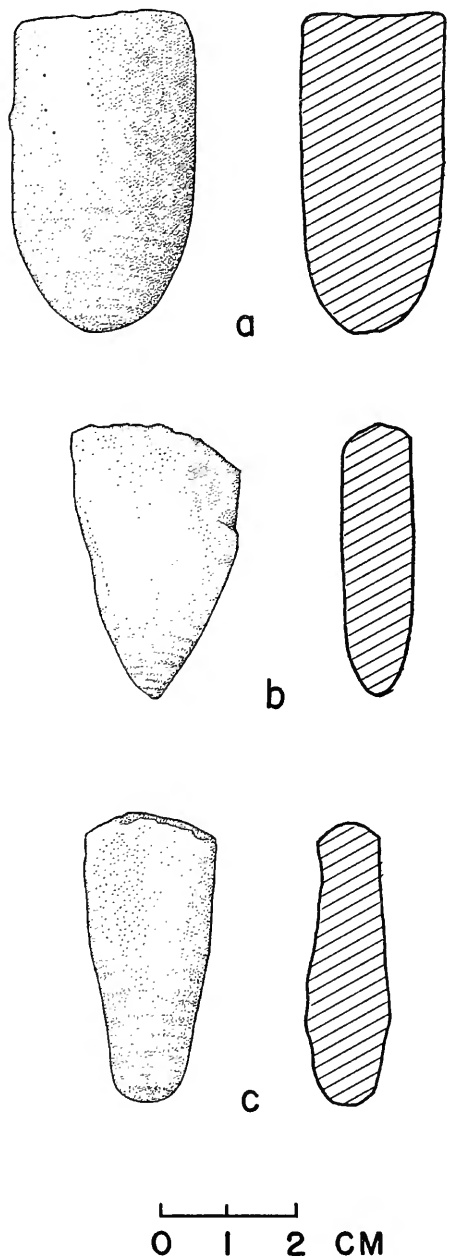

FIGURE 14.—Fishhook reamers from the Valdivia Phase.

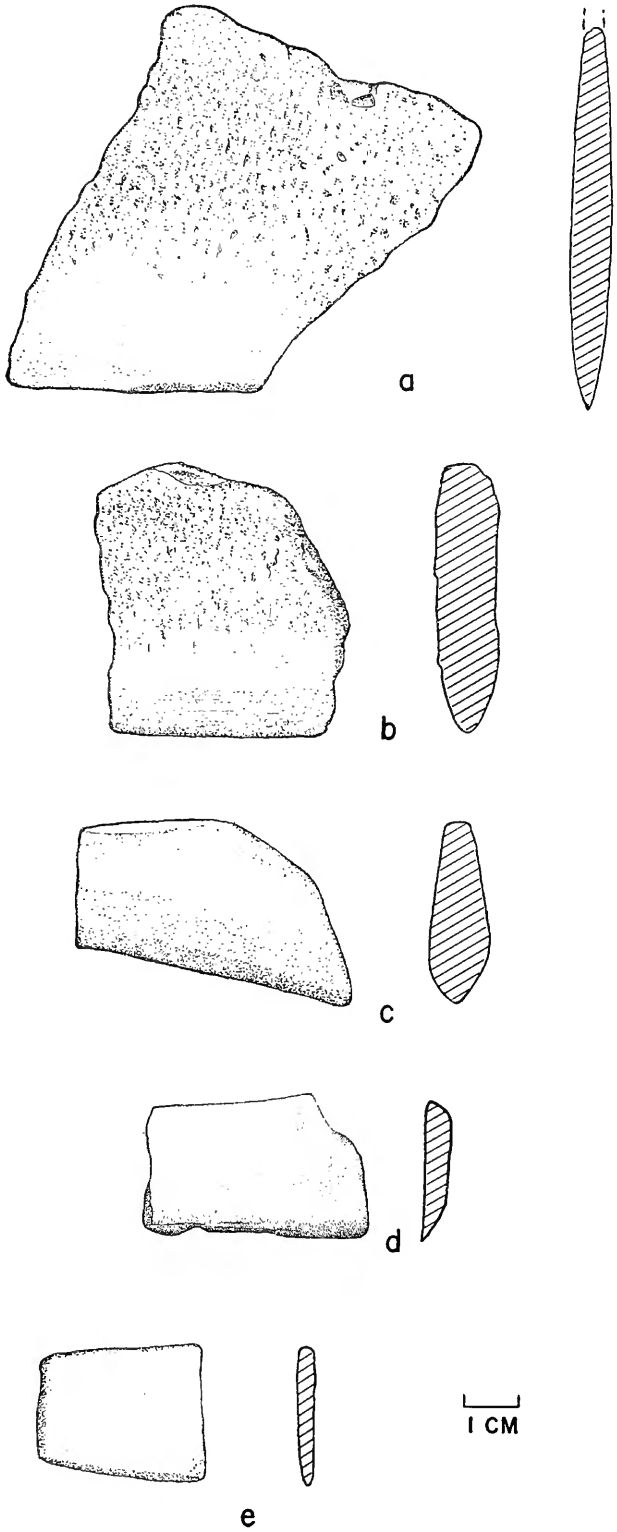

FIGURE 15.—Sandstone saws from Valdivia Phase sites.

15–20 cm. in diameter to smaller pieces 1–2 cm. of diameter. This situation suggests that hunks in sandstone and sandstone conglomerate were used around a hearth, where they broke as a result of repeated heating and cooling. Further crumbling probably occurred from trampling during daily living activity at the site.

The indurated clay fragments are either broken-down waterworn cobbles brought from the riverbed or angular rocks from talus slopes nearby. Fire has turned the light gray-tan natural color to a light orange or orange-tan. The high calcium carbonate content of the mudstone (30 percent by volume) has produced an effect of slackening, creating a brittle and crumbly residue. In contrast to the irregular fracture of the sandstone, mudstone cobbles and fragments tended to spall off conchoidally as the heat penetrated inward. Fragments range from large hunks 20–25 cm. in diameter to smaller pieces 1–3 cm. in diameter.

The coquina fragments are all from larger waterworn pieces with well rounded edges, but none show grinding abrasion. One side is fireburnt changing the natural white to cream color into orange, red or tan. Texture is very open and porous with particles of fine gravel and shells up to 1–3 cm. in diameter. Fragments vary in size from 1–15 cm.

Chronological Distribution of Stone Artifact Types

The attempt to analyze the chronological distribution of stone artifact types is hampered by the relatively small size of the classified sample and its limitation primarily to Periods B and C of the Valdivia Phase (Appendix 1, table 3). There are several reasons for this situation. Most important is the failure of nonceramic refuse material to be saved from excavations at G–84, which represents Period D, and from G–31, Cut J, Sections D and E, which provided the best pottery samples for Period A. The lower levels of G–31, Cut A, which extend into Period A, provided a very small sample because of constriction in the size of the excavation with increasing depth as the walls were sloped to prevent collapse. Interdigitation of levels from G–31, Cut B added some information, but principally to Period B. Because of the small size and consequently somewhat sporadic distribution of the various types by levels, attempts at graphic presentation by percentage occurrence were not illuminating. An idea of the temporal duration of different types can be obtained, however, by joining in a vertical bar the earliest and latest occurrences of each artifact type as indicated by the seriated sequence of levels derived from pottery type analysis (fig. 18).

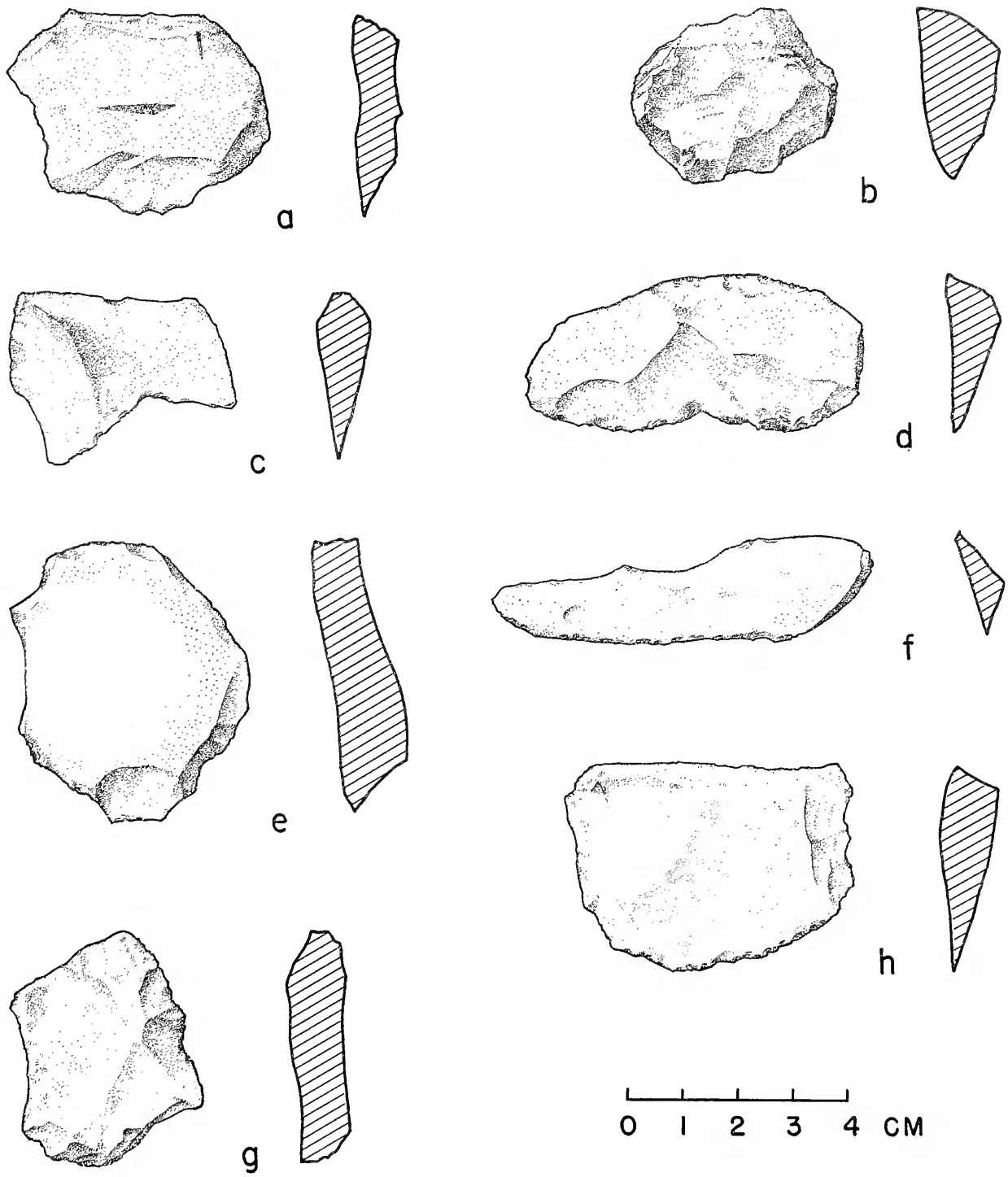

FIGURE 16.—Scrapers from Valdivia Phase sites.

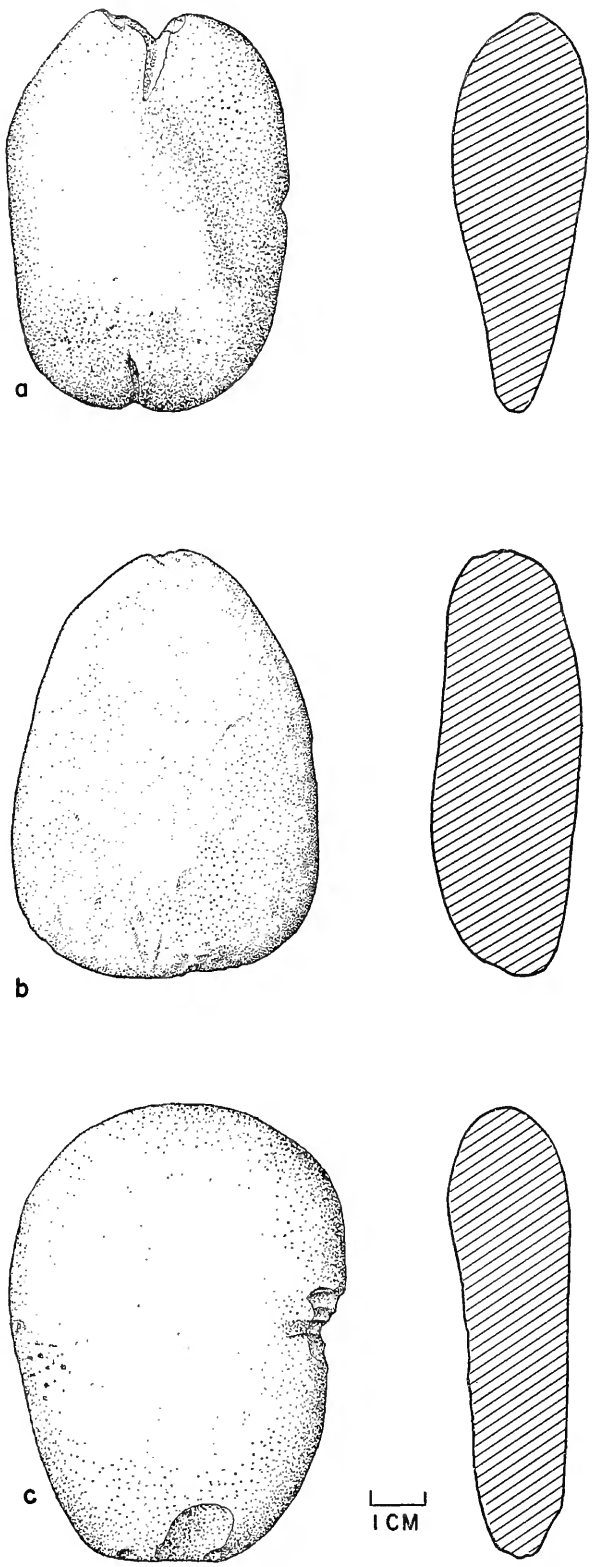

FIGURE 17.—Valdivia Phase pebble sinkers.

In spite of the small representation of most stone artifact types, the graph produces a picture of nearly total stability throughout the duration of the Valdivia Phase. The apparent inception of many artifacts near the middle of Period A rather than at the beginning can be explained as the result of inadequate samples from the earlier levels, and there is no reason to doubt that all extending this far back were present at the beginning of Period A. Sinkers, paint stones, saws, and choppers may be more recent additions, in view of their somewhat later appearance, but there is an alternative possibility that this more limited distribution may derive from greater rarity of these objects in the refuse. Since fishing was important from the beginning of the Phase, it seems improbable that saws, which are used in fishhook manufacture, and sinkers, which are associated with nets or lines, would have been absent from the early inventory. There is no change in the appearance of fishhooks in Period B that might correlate with alteration in their method of manufacture by introduction of saws at this time. The widespread occurrence of saws in preceramic sites of adjacent Peru and Chile also argues for their existence at the beginning of the Valdivia Phase.

The restriction of paint stones to Period B may be also accidental. However, since this is the time of greatest use of red slip on both figurines and pottery vessels, it is possible that their occurrence reflects more intensive collecting of this raw material with resulting increased likelihood of some being lost in the refuse. It is also possible that paint stones had some other use during Period B, but at present this is only a matter of speculation.

Choppers appear toward the middle of Period B and occur throughout Period C, probably continuing in Period D. Again, this distribution may be an accidental product of the small sample from early levels. On the other hand, it may be correlated with the increase in deer and other large mammal bones in the refuse during Period C, since choppers might have been a useful addition to blades for dismembering the carcass of a large animal.

The chronological distribution of polished axes is not definitive. The sample is limited to only 4 specimens—three from Period A levels of Cut J at G–31 and one T-shaped ax associated with a skeleton at G–54, a Period C occupation—hence the bar on the graph (fig. 18) extends from Period A through C. This distribution suggests the possibility of evolution from a parallel-sided and slightly expanded form to a T-shape. The extreme rarity of polished axes in Valdivia Phase refuse in comparison with unshaped or slightly shaped stone tools may indicate they are of trade origin. On the other hand, polished stone

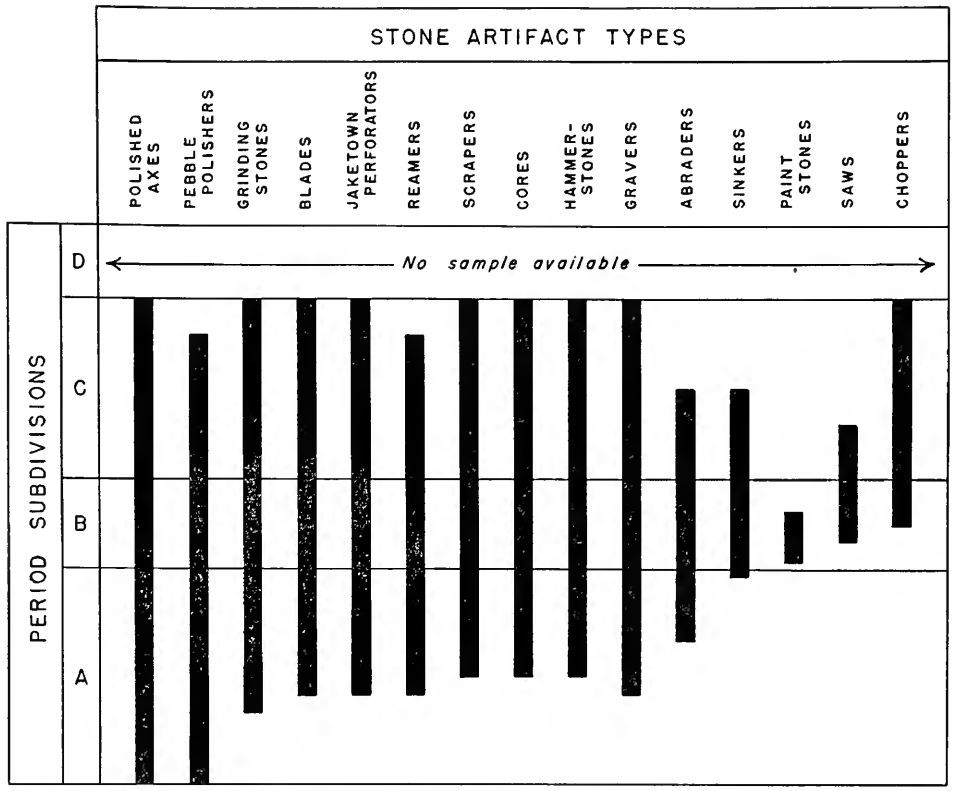

FIGURE 18.—Temporal distribution of stone artifact types during the Valdivia Phase. Bars connect earliest and latest occurrence of each type when levels are arranged in the seriated order indicated by changes in pottery type frequency (Appendix 1, table 3).

tools are often less abundant than cruder kinds in refuse deposits simply because they were more carefully made and less readily discarded. Some of the alternative possibilities of interpretation that cannot be evaluated on the basis of evidence from G–31 and G–54 alone may be resolved when the larger sample of polished stone axes from G–115: San Pablo has been described.

In summary, the Valdivia Phase stone artifact inventory can be characterized as an assemblage of crude and undistinctive implements persisting with rare exceptions throughout the seriated sequence without modification either in the form of individual tools or in the types represented. Since stone implements had specific practical applications, this consistency implies that the forms were well adapted to the functions they served, and that these functions did not change in any major respect throughout the Valdivia Phase.

Shell Artifacts

Shell was rarely used for the manufacture of artifacts, although abundantly available as a raw material. Of 17,612 shells collected during excavation of G–31, Cuts A, F and H, only 23 were worked. The majority of these are utilitarian objects such as fishhooks; beads, pendants and other kinds of ornaments are rare. For description, shell artifacts have been classified into types. Frequency and provenience are given in Appendix 1, table 2.

Abraders and Polishers

PLATES 21 M–P, 22 A–B

This category can be divided into two groups: A) artifacts cut from a thick piece of *Spondylus princeps* Broderip or conch (*Strombus granulatus* Wood or *Strombus galeatus* Swainson) and then abraded and polished into ovoid or rectanguloid form; and B) fragmentary or whole waterworn shells picked up from the beach and used for polishing or rubbing.

GROUP A.—The consciously cut and abraded specimens show striations on all sides left by shaping and finer polish on several facets or edges resulting from use as a polishing tool. Several of the pieces are rectanguloid or ovoid (pl. 21 m, n), measuring in their maximum dimensions 3.0 by 2.8 cm., 2.5 by 2.5 cm., and 4.5 by 3.3 cm. Thickness is 1.6, 1.0 and 0.8–1.2 cm. One irregular fragment from the hinged end

of a *Spondylus* from G–31, Cut B, Level 3.00–3.20 m., shows clearcut evidence of cutting by a sandstone saw (pl. 21o). One edge is abraded, suggesting that shaping had not been completed. This specimen measures 4.7 by 4.0 cm., with the thickness varying according to the natural thickness of the shell from the hinge area to the back. A similar fragment, also of *Spondylus*, from the same Cut, Level 3.40–3.60 m. shows distinct saw marks on two sides (pl. 21p). It measures 1.0 by 1.2 by 4.0 cm.

GROUP B.—Some of the waterworn shells cannot be identified as to genus and species, while others retain the distinctive colored lip of *Spondylus*. Except for one complete *Olivella* (pl. 22a), examples appear to represent bivalves. Outline is oval (pl. 22b) and measurements vary from 5.8 by 2.5 by 0.8–1.7 cm. thick to 4.0 by 1.5 by 0.7 cm. Use for polishing is suggested by the existence of higher polish on the tips and edges rather than on the rest of the waterworn surface.

Beads

PLATES 23 M–R

Eleven perforated disks probably represent beads. Eight are cut from flat portions of large shells, two from pearl oyster (*Pinctada mazatlanica* Hanley), one from *Spondylus*, and the remaining six insufficiently diagnostic for identification of species. Diameter is 1.1 to 2.8 cm. and thickness 1.5–3.0 cm. Perforations are biconical, decreasing from 3–4 mm. in diameter at the surface to 1–2 mm. in diameter in the interior. Three examples were made by cutting off the upper, spiral end of the Olive shell (*Oliva peruviana* Lamarck) and grinding the inside until some of the spiral channels were removed. The apex of the spire was rubbed until a perforation was produced. Diameter of this variety is 1.5–3.0 cm., thickness 4–6 mm.

Bowl or Cup

PLATE 22 F

A large waterworn fragment of a pearl oyster (*Pinctada mazatlanica* Hanley) was suitable for use as a shallow bowl or cup without further reworking. It measures 10 cm. in diameter and 1.5 cm. deep. The shell is 1.0 cm. thick.

Disks

Several disks of pearl oyster (*Pinctada mazatlanica* Hanley) appear to be too evenly smoothed and well shaped on all edges to be classified as shell fishhook blanks. They may be blanks for pendants or beads. Thickness ranges from 1.5–2.5 mm., diameter from 1.9 to 3.5 cm.

Drilled Clam Shell Pendants

PLATE 23 A–B, D–H

Ten clam shells, nine belonging to the species *Dosinia dunkeri* Philippi and one to *Mactrella clisia* Dall, have a perforation 1–4 mm. in diameter at the hinge end produced by grinding the beak, or umbo, sufficiently to break through to the interior. This process flattened the beak area and on several of the shells grinding extended to the adjacent surfaces, removing some of the natural ridges. Only one fragment does not have the beak completely worn through. However, this specimen and four others have perforations 1–3 mm. in diameter on the body, drilled conically from the exterior. On the specimen with no hole in the beak, the perforation is 1.0 cm. below the beak. On the others perforations are near the lower rim of the shell, 0.8–1.2 cm. inward from the edge. One specimen has two such perforations instead of one. Although for purposes of classification these objects have been called pendants, the extra perforations on the body of the shell in 5 of the 11 specimens suggest they may have been fastened to something. Overall size is controlled by the natural size of the clam shell; complete specimens measure 4.5 by 5.0 cm., and several fragments suggest a maximum of about 5.5 by 6.5 cm.

Drilled and Shaped Pendants

PLATE 23 C, I–K

Pendants shaped from shell blanks or waterworn fragments and drilled at the upper end for suspension occur scattered throughout various levels of all periods of Valdivia Phase refuse (see Appendix 1, table 2). They are of three general shapes: rectanguloid, ovoid and trianguloid.

The rectanguloid group is represented by two specimens. One, made of a fragment of *Spondylus* shell from G–54, Cut 1, Level 60–80 cm. measures 3.0–4.0 mm. thick, 4.0 cm. long, 2.1 cm. wide at the upper end and 1.2 cm. wide at the lower edge. The biconical perforation, 3 mm. in exterior diameter and 2 mm. in diameter at the center, was drilled 9 mm. from the upper edge. Another rectanguloid specimen from G–54, Cut 1, Level 80–100 cm. is of conch shell (*Strombus*) with the edges well rubbed and rounded. The natural contour of the shell creates a pendant that curves outward and inward sharply. It is 3.5 cm. long, 1.5 cm. wide, and 3 mm. thick. The hole, drilled from the exterior 5 mm. from the top edge, measures 4 mm. in diameter at the surface, tapering to 3 mm. on the interior.

Two ovoid pendants from G–31, Cut J, Section D, Level 3.00–3.30 meters, are waterworn fragments of conch shell (*Strombus*) that have been further shaped by rounding the edges. They are 2.5 cm. long, 2.0

cm. wide, and 3 mm. thick. A biconical perforation 3 mm. in maximum diameter is 7 mm. from the upper edge. Several other ovoid pendants from Cut J, Section E, Level 0.90–1.20 meters are waterworn fragments of shell without further working except for perforations 5–8 mm. in diameter at the upper end. Dimensions are 2.0 by 1.5 cm. and 2.5 by 1.5 cm.

A unique pendant (pl. 23i) is a cutoff beak of a conch shell (*Strombus*) worked into a triangular shape that takes advantage of the natural contour of the shell to produce a pendant with a beak or nose projecting from the exterior surface. The object is 5.3 cm. long, 4.6 cm. wide at the top, tapering to a rounded lower edge 1 cm. wide. The beak protrudes 3.7 cm. A single hole, drilled from the exterior on the lower part of the beak, measures 2 mm. in diameter at the surface, decreasing to 1.5 mm. at the opening. Layers of shell flaked off on the inside around the hole as a result of drilling. All edges are well rounded and vary in thickness according to the natural contours and thickness of the shell.

Drilled Pecten Pendant

PLATE 23 L

The flat valve of a small scallop (*Pecten*) is drilled from both sides near the beak, creating a perforation 2.5 mm. in diameter. No shaping or polishing was applied to surface or edges.

Fishhooks

FIGURE 19 E–G; PLATE 24, H–Q

Seventeen fishhooks or fishhook fragments came from Valdivia Phase excavations, eleven from various levels in the seriated sequence (Appendix 1, table 2) and three from the Northeast extension of G–54, Cut 1. All are of pearl oyster (*Pinctada mazatlanica* Hanley) and similar in general size, proportions, and method of construction. The few complete hooks and almost complete fragments give details of shape. Outline is not perfectly circular but slightly oval with a difference of 2–5 mm. between the diameter from shank to point as compared with the diameter from point to back (see fig. 19g; pl. 24 h–j). The contour on the interior is more truly circular. The point is well smoothed and sharp, while the shank is flattened slightly to offer a better grip for the string. Thickness of the hooks ranges from 1.5–3.5 mm., with the majority 2 mm. Maximum width of the back is 5–7 mm., tapering gradually in one direction toward the sharpened point and in the other toward the shank 3–4 mm. in width.

Exterior diameters of complete hooks are 1.8 by 2.0, 1.8 by 2.2, 2.0 by 2.5, 2.3 by 2.5 and 2.5 by 2.8 cm.

Fishhook Blanks

FIGURE 19 A–D; PLATE 24 A–G

Worked pieces of pearl oyster (*Pinctada mazatlanica* Hanley) range in shape and size from roughly squared pieces showing the beginnings of careful shaping to circular discs with the center either unworked or

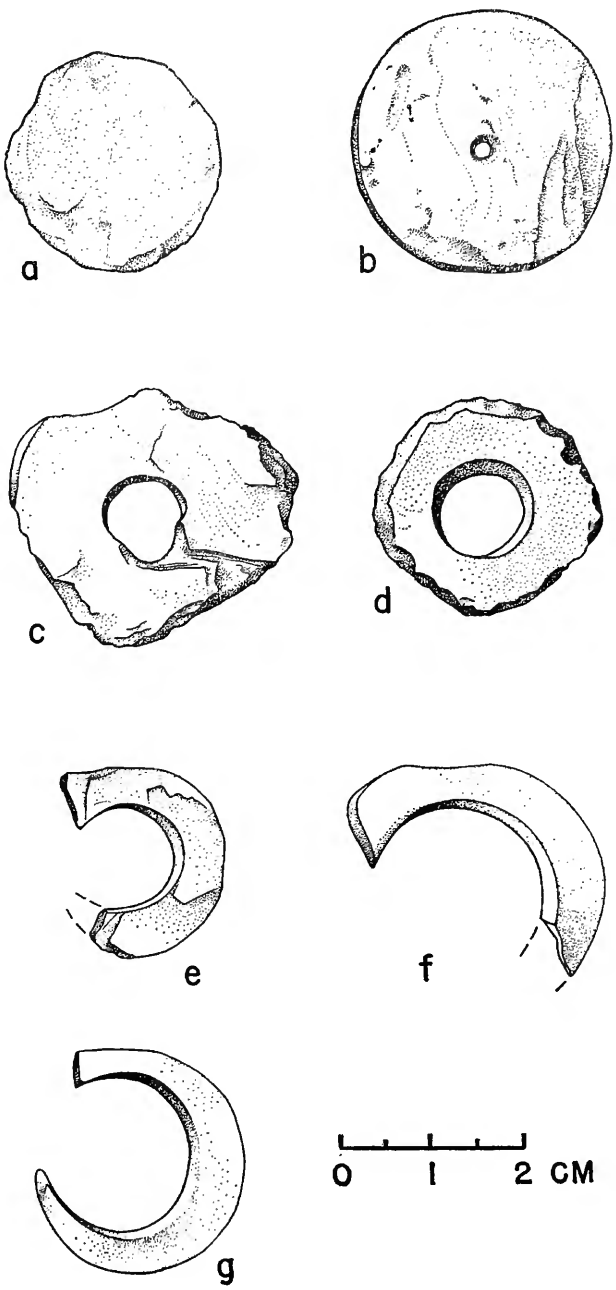

FIGURE 19.—Stages in shell fishhook manufacture. *a*, Roughed out blank. *b*, Initial perforation. *c–d*, Enlarged perforation. *e–f*, Nearly completed hook. *g*, Completed hook.

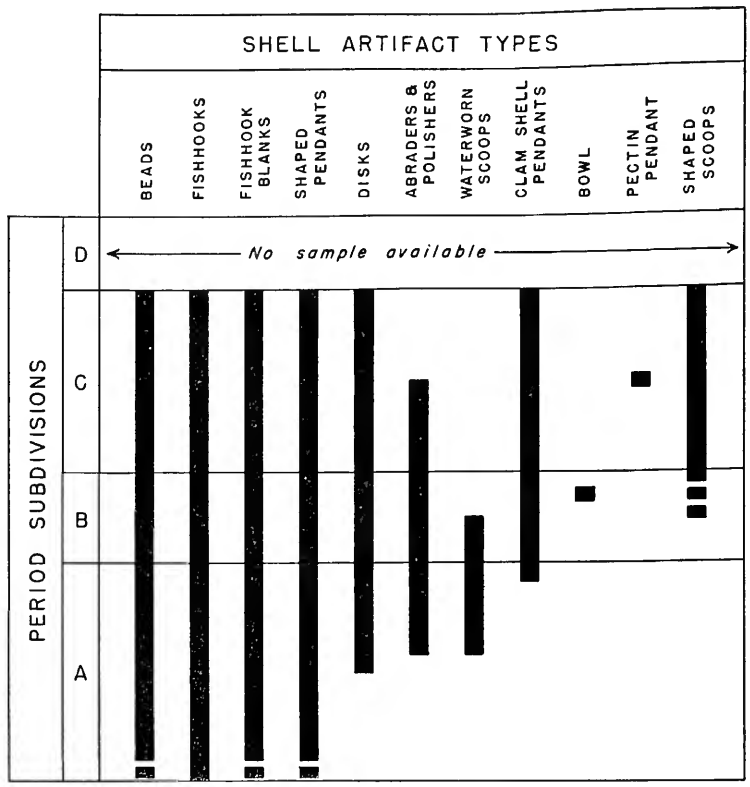

FIGURE 20.—Temporal distribution of shell artifact types during the Valdivia Phase. Bars connect earliest and latest occurrence of each type when levels are arranged in seriated order according to changes in pottery type frequency (Appendix 1, table 2).

partially drilled or reamed out. The blanks show beveled edges from cutting with sandstone saws. Sometimes cuts overlap each other, other times they are separated by jagged broken edges indicating that the shell was broken after a few cuts were made. The roughed out blanks measure 1.7 by 2.5 cm., 2.5 by 4.0 cm., 2.5 by 2.5 cm., 3.3 by 4.0 cm., up to 3.0 by 6.0 cm. Thickness is 1–4 mm. Circular blanks without perforations in the center or with perforations not completely reamed out range in thickness from 2–4 mm. and in diameter from 2.5–4.5 cm. The perforations are 6–15 mm. in diameter.

Scoops, Spoons or Spatulas

PLATE 21 Q–T

Waterworn fragments of shells of various types were selected for their natural shape and brought to the habitation sites (Appendix 1, table 2). One specimen shows chipping along the edges to produce a more spatula-like form, but others are not worked and derive their scoop or spoonlike appearance from the natural curvature of the shell. Complete specimens measure 7.2 cm. long, 2.0 cm. wide at spoon end and 1.0 cm. wide at upper end, and 7.3 cm. long, 3.0 cm. wide at spoon end, and 1.3 cm. at upper end. The widest fragment is 5.0 cm. wide but only 6.8 cm. long. Although use is inferential, these objects have been singled out for description because they appear to be restricted to Period B refuse in spite of availability on nearby beaches at all times.

Shaped scoops or spoons, cut from the shell of a large gastropod, are reported by Zevallos and Holm (1960, lám. 26) from extensive excavations at G–115. Similar objects are reported (Holm, pers. commun.) to have come from G–31 excavations, but none were included in the shell samples subjected to systematic analysis.

Unclassified Worked Shell

PLATE 22 C–E

Most of the unidentified objects of shell are pieces of the waterworn central spiral core of conchs (pl. 22 c–d) brought to the site but showing no evidence of working or use.

An eccentrically-shaped piece of pearl oyster is part of a larger object of unknown shape, possibly a stylized figurine (pl. 22e). Most of the surface and edges show cutting and abrasion, although waterworn spots remain from the original shell surface. Length is 12.5 cm., width 5.5 cm., thickness 1.0–2.0 cm. The "leg" end is 6.8 cm. long, tapering from the "thigh" 2.3 cm. wide to the "foot", 1.5 cm. wide. It comes from G–31, Cut J, Section E, Level 2.70–3.00 meters.

Chronological Distribution of Shell Artifact Types

Description of shell artifacts from the Valdivia Phase must be considered preliminary because unfortunately little of the material from the large excavation at G–31, Cut J, dating from Periods A and B was preserved for classification and analysis. Although refuse from earlier excavations at G–31, and from G–54, Cut 1 and G–88, Cut 2 was screened and searched for artifacts, the extreme rarity of worked shell ruled out the possibility of obtaining a good sample from these small cuts.

When levels of the various seriated sequences producing shell artifacts are interdigitated according to the trends in pottery types (Appendix 1, table 2), and period subdivisions are drawn, it is possible to gain an idea of the temporal distribution of the different kinds of shell artifacts by connecting earliest and latest occurrences in a vertical bar (fig. 20). Although the result suggests somewhat more chronological differentiation than was evident in stone artifacts (fig. 18), this may be a reflection of the rarity of some of the types rather than restricted occurrence.

As would be expected, fishhooks and blanks for fishhook manufacture are present from the beginning of Period A, a distribution paralleled by two kinds of ornaments: beads, and drilled and shaped pendants. Disks seem to begin only near the middle of Period A, but since they probably represent incompleted beads, absence earlier can be interpreted as accidental. Bowls, represented by a single example from the end of Period B, and drilled pecten pendants, represented by a single example from the middle of Period C, can be viewed as unique objects without cultural importance.

The absence of abraders and polishers from the first half of Period A is of interest because of the similar temporal distribution shown by stone abraders (fig. 18). In both cases, this may be the result of unusually small samples from early Period A; on the other hand, the coincidence of distribution may reflect introduction of a new item in the perishable material culture inventory, or a new technique of manufacturing. Restriction of clam shell pendants to Periods B and C may represent adoption at the end of Period A of this type of ornament, requiring less work for production than shaped pendants.

Although distributional evidence is again inconclusive, it is possible that shaped shell scoops are a refinement of the unworked waterworn shells of similar contour present in refuse of Period B. While no shaped scoops were included in our classified shell sample, they are reported to occur frequently at G–115 (Zevallos and Holm, 1960, p. 8, lám. 4, 7), which can be dated by pottery type and figurine style as principally belonging to Period C.

Bone and Teeth Artifacts

Bone fragments were rare in the refuse of all Valdivia Phase sites, and pieces showing working or use even rarer. A few of antler or fish were identified, suggesting that with better conditions of preservation a large number of implements of this relatively perishable material might have been found.

Deer Antler Awls

PLATE 25 A–D

Eight worked antlers come from stratigraphic levels and miscellaneous tests at G–54. The short antler has been abraded to remove the rough natural surface and to form a flat, chisel-like blade. Degree of abrasion and polish varies considerably on fragments scattered in the refuse; only those with clearcut evidence of shaping of the point were classified as awls. The base of the awl, corresponding to the root of the antler, was not reshaped; several specimens show hack marks near the base where the antler was cut out of the deer skull. Complete specimens measure 10.5 and 10.8 cm. long, and one fragment 11.2 cm. long would reconstruct to about 13.0 cm. long. The worked area of these three specimens is 8.0, 6.5 and 6.0 cm. long respectively. The chisel-like tips show a high polish, some of which must be the result of use.

Antler Tip Projectile Point

PLATE 25 E

One antler was cut 2.5 cm. from the tip and then drilled conically from the cut end to a depth of 1.2 cm., producing a hollowed cone. Diameter at the cut end is 1 cm. Shape and size suggest this may have been the tip of a projectile. It is from G–54, Northeast extension of Cut 1, Level 85–125 cm.

Fish Bone Awls

Five fish bones have polishing striations on the tips and sides suggesting use as awls (called punches or drills in original report; Evans, Meggers, Estrada, 1959, p. 17). They show no working to change the natural shape. Length is 2.5, 3.2, 3.8, 4.0, and 4.8 cm.

Fish Vertebra

A large fish vertebra has had all the spinous processes cut off, the edge nicked in several places, and the center hole enlarged. The resulting disk is 3.0 cm. in diameter and 1.7 cm. thick, with a central perforation 6 mm. in diameter. The use of this worked bone is uncertain, but it might have been either a spindle whorl on an eag plug.

Awls of Teeth from Sawfish

PLATE 25 F–J

Five objects were identified as the teeth from the sawfish, *Pristes*. Although the points of two are

broken off, the others have been slightly abraded and shaped into awl points. One fragment clearly shows dressing down on the shaft area. The one complete specimen measures 8.2 cm. long, 1.2 cm. wide and 0.6 cm. thick.

Chronological Position of Bone and Teeth Artifacts

The scarcity of worked bone and teeth in seriated levels corresponding to Periods A–C, and the absence of any sample from Period D (Appendix 1, table 5) makes it difficult to recognize significant chronological differences. Awls are the principal artifact type. Fishbone awls are present in Period B, and probably missing from Period A only because this part of the sequence is inadequately represented in excavations where the nonceramic refuse was subjected to careful analysis. The addition of antler and sawfish tooth awls during Period C can be correlated with other evidence of greater emphasis on terrestrial mammal hunting during this period, and suggests increased use of skins.

The only object identifiable as a possible projectile point is the hollowed-out antler tip from Period C at G–54. It is impossible to judge whether this reflects the introduction of this artifact in Period C, or the accidental find of a type of object which, because of its relatively perishable nature, rarely survives in the refuse. The use of antler projectile tips would account for failure to identify stone points among the chips and flakes.

Pottery Artifacts

Pottery Type Descriptions

The classification and description of Valdivia Phase pottery types is the result of intermittent analysis over a period of six years of hundreds of thousands of sherds. The basic typology was established from materials excavated at G–31 (Cuts A through I) during the first season, supplemented by a badly eroded sample from G–25 (Evans, Meggers and Estrada, 1959). More extensive excavations at G–31 (Cut J) brought to light several rare early decorated types not represented in the original small sample. Unfortunately, the unpolished plain types from Cut J were classified in Ecuador by an assistant, who did not follow the criteria previously established for separating Valdivia Plain and San Pablo Plain, and none of the rim forms were recorded and tabulated. The final season of fieldwork, including tests at G–88 and more extensive excavations at G–54, suggested the usefulness of making some new distinctions in decorative technique. Since only type samples of sherds from excavations classified in Ecuador were shipped to Washington, it was not possible to recheck the occurrence of these new types in certain cuts and levels. The situation is most unfortunate in regard to G–31, Cut J, which provides the most extensive sample for Periods A and B. Some of the problems resulting from this incomplete information will be discussed in the section dealing with interpretation of the seriated sequences and the reconstruction of Valdivia Phase ceramic evolution (pp. 87–95). All sherds from G–31, Cuts A, F, and H had been retained and this material was reclassified.

Pottery type descriptions have been arranged in alphabetical order. Since many have appeared in publication in Spanish, the Spanish equivalent of the type name is provided to facilitate identification and future reference. The scale of hardness is Mohs', but the word is not repeated in each description. Colors of paste and surfaces are given in generalized terms because it can be shown that over a surface area 5 to 10 cm. square as many as 10–15 Munsell or a similar type of color designations can be identified, all the result of poorly controlled firing.

Appendix 1, table 6 gives the number and provenience of sherds subjected to detailed classification, providing the basis for the seriated sequences; in some cases additional selected samples from test trenches or pits are also tabulated. The unselected sample used to establish the sequence of Periods A, B, C and D of the Valdivia Phase (see pp. 89–90 for breakdown by periods) totals 219,488 sherds, of which 40,829 or 18.5 percent represent decorated pottery types and 178,659 or 81.5 percent plain pottery types.

The pottery type descriptions that follow are based on sherds recovered from all Valdivia Phase sites. Vessel shape data and decorative motifs are less complete, lacking the tabulations of sherds left in Ecuador from G–31, Cut J, G–88, Cut 1 and G–54, Cut 2.

Although the ceramic sample for the Valdivia Phase runs to over a quarter of a million classified sherds, the number of complete vessels is less than two dozen. Vessel shapes have been reconstructed from rim profiles and body sherds of diagnostic curvature, and their general validity can be checked to a slight extent by reference to illustrations of complete vessels. In each reconstructed vessel shape, the drawing was made in the middle of the size range to offer a common unit for comparison.

In spite of considerable variation through time, it is possible to describe certain general characteristics of Valdivia Phase pottery. Technique of manufacture is by coiling, with coil-junction fractures common in the early part of the Phase. The use of short segments rather than long coils seems indicated by a tendency toward a steplike break. The pottery is not fragile or friable. Surfaces are generally well finished, and

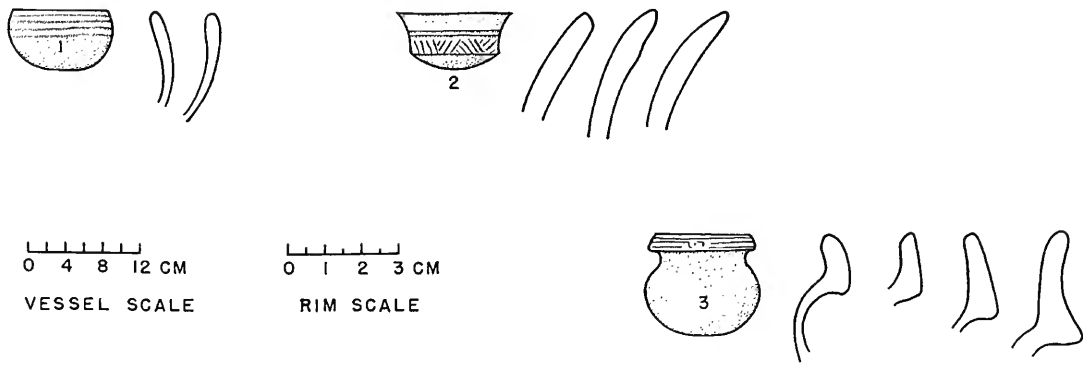

FIGURE 21.—Rim profiles and reconstructed vessel shapes of Punta Arenas Incised.

in the polished types equal in excellence to the best products of later periods. Regularity of vessel shape varies with the pottery type, lips of plain types being markedly unlevel and noncircular whereas those of polished or decorated types are often level and circular. Wall thickness is not uniform. Decoration is by incision, excision, applique, finger grooving and punching, pebble polishing, punctation, and rarely, stamping. Painted decoration is totally absent, but red slipping on one or both surfaces is common. The proportion of decorated vessels is very high, with decoration typically being limited to the neck on jars and a band between rim and shoulder on bowls, but sometimes covering the bottom of bowls. The ornamentation generally has an attractive appearance, although close inspection shows unequal spacing and other evidence of lack of care or control in execution. In general, Valdivia pottery is competently made and pleasing in form and decoration—far removed from what might be expected of people just beginning to learn the pottery art.

Punta Arenas Incised
(Punta Arenas Inciso)

PASTE: Similar to Punta Arenas Plain; see that type description for details.

SURFACE:

Color: Medium to dark gray; rarely, orange or brown.

Treatment: Polished; surface, on the whole even but some flaws present. Temper grains not visible.

Hardness: 3.5–4.

FORM:

Rim: Direct, cambered, slightly everted or expanded, with tapered, rounded or flattened lip.

Body wall thickness: 3–6 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Small bowl, rounded bottom, slightly incurving upper wall, expanding rim, rounded lip. Rim diameter 6–10 cm. (fig. 21–1). Decoration on exterior.
2. Carinated bowl with rounded bottom, low shoulder, slightly concave upper wall, everted rim, flattened or tapered lip. Rim diameter 10–12 cm. (fig. 21–2). Decoration on exterior above carination.
3. Cambered jar with rounded body, constricted neck, angular cambered rim, rounded lip. Rim diameter 8–12 cm. (fig. 21–3). Decoration on rim exterior.

DECORATION (pl. 26):

Technique: Shallow, rounded incisions, 1–2 mm. wide, on polished surface. Depth varies from faint to well defined, but not exceeding 0.5 mm., and the bed of incision is typically unpolished. Edges are not dragged or thrown up. Execution is moderately good, with lines generally parallel but not equally spaced, and with junctions sometimes overlapping or falling short. Termination of incision may taper to a point. Red color added to the incision after firing is retained on one example, and may once have been more common.

Punctates of irregular form occasionally occur. Outline is elongated, narrow to ovoid. Some were apparently made with the fingernail; others with a pointed object applied at a strong slant. In two examples, some of the punctates are V-shaped (with curved arms) as though the fingernail had been rocked once (pl. 26 v, x).

Motif: Straight parallel lines, 2–6 mm. apart, running horizontally, vertically or diagonally, filling bands or zones of irregular form. Occasionally, gashlike punctation is substituted in some of the bands or zones (pl. 26 v–y), or a small rectangle or stepped element is incorporated (pl. 26i).

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Restricted to Period D of the Valdivia Phase sequence (figs. 52, 53).

Punta Arenas Plain
(Punta Arenas Ordinario)

PASTE:

Method of manufacture: Coiling.

Temper: Medium waterworn sand, with scattered grains up to 3 mm. in diameter; majority around 1 mm. Abundant, producing a more sandy paste than characteristic of Valdivia Plain.

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Texture: Sandy, more granular than Valdivia Plain. Breaks are jagged but not friable.

Color: Dark gray throughout the cross section, or fired orange at the surface to 1 mm. inward, leaving a gray core. Occasionally, orange throughout the cross section.

Firing: Typically incompletely oxidized.

SURFACE:

Color: Typically, light orange or light tan; less commonly light gray; rarely, medium or dark gray. Both surfaces typically of similar shade; rarely, one may be orange and the other gray.

Treatment: Poorly smoothed leaving unevenness, pits and other defects. Smoothing tracks are usually visible. Interior of bowls is smoother than the exterior.

Hardness: 3.5–4.

FORM:

Rim: Direct, expanded, exteriorly thickened or cambered, with rounded, tapered or flattened lip. Lips are very unlevel.

Body wall thickness: 3–6 mm.

Base: Probably rounded or slightly flattened.

Common vessel shapes reconstructed from sherds:

1. Jar with rounded body, slightly constricted concave neck, everted rim with rounded lip. Wall thickness may expand slightly on the everted portion of the rim. Rim diameter 12–16 cm. (fig. 22–1).
2. Rounded jar with constricted mouth and everted expanded rim with tapered lip. Rim diameter 10–16 cm. (fig. 22–2).
3. Rounded jar with constricted mouth and everted,

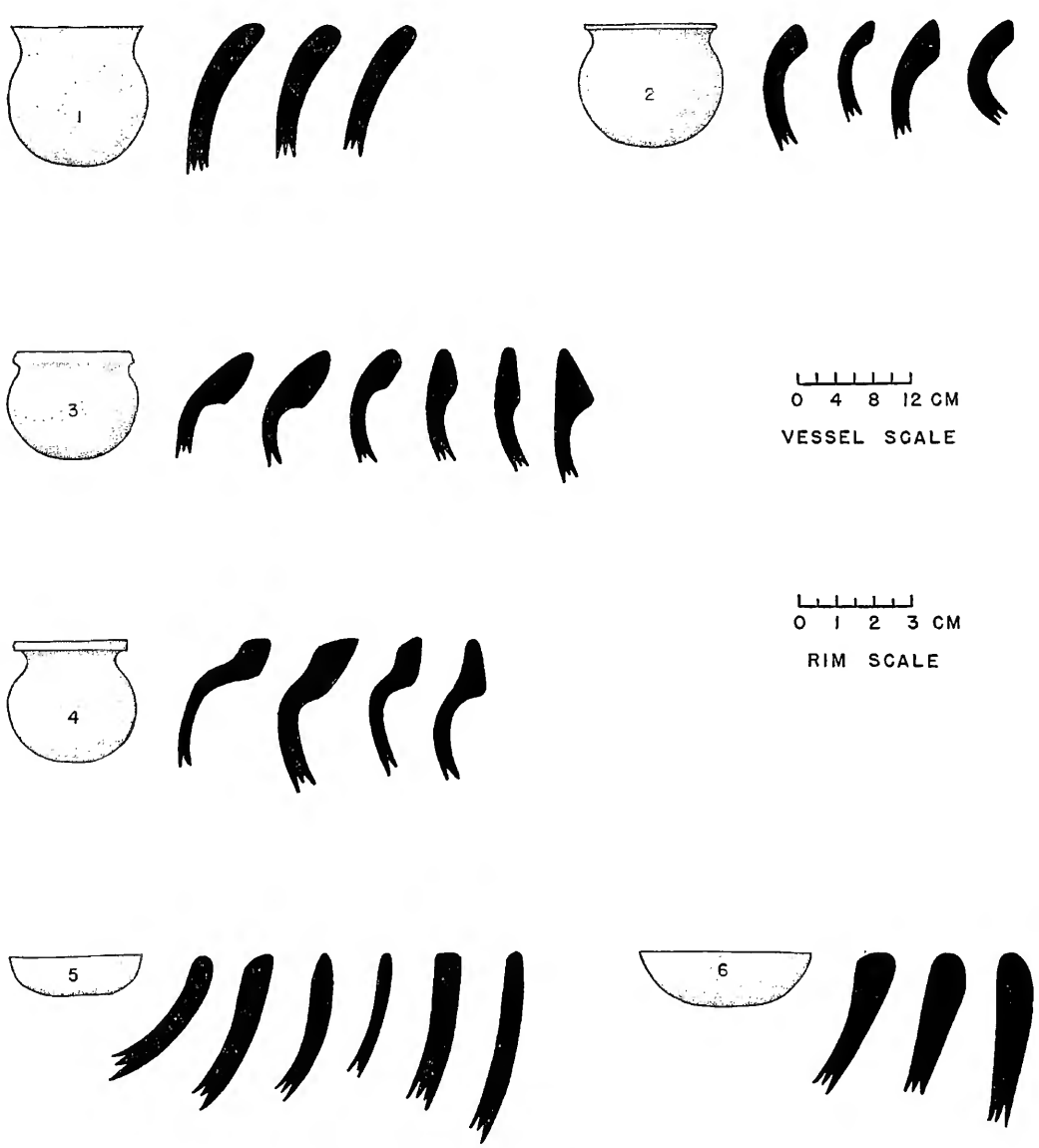

FIGURE 22.—Rim profiles and reconstructed vessel shapes of Punta Arenas Plain.

exteriorly thickened rim with rounded or tapered lip. Rim diameter 10–16 cm. (fig. 22–3).

4. Rounded jar with short concave-sided neck, angular cambered rim, flattened or tapered lip. Wall thickness is typically increased at the camber and may continue to the lip. Rim diameter 10–14 cm. (fig. 22–4).
5. Bowl with flattened bottom, walls curving upward to direct rim with rounded, tapered or flattened lip. Rim diameter 8–20 cm. (fig. 22–5).
6. Bowl with flattened bottom, walls sloping upward to expanded rim with rounded lip. Rim diameter 16–18 cm. (fig. 22–6).

TEMPORAL DIFFERENCES WITHIN THE TYPE: None.

CHRONOLOGICAL POSITION OF THE TYPE: Beginning in a minor frequency during Period C, Punta Arenas Plain becomes the dominant pottery type during Period D of the seriated sequence (figs. 52, 53).

San Pablo Plain
(San Pablo Ordinario)

PASTE:

Method of manufacture: Coiling.

Temper: Coarse, waterworn sand, particles up to 5 mm. in diameter, but typically 2–3 mm. Large particles are not common but abundant enough that at least one appears in a small sherd (pl. 95, a–g). Except for a small proportion of sherds during Period C, white quartz and feldspar grains are not characteristic. Temper appears to have been derived from decomposed granitic rock rather than beach sand.

Texture: Poor mixture resulting in uneven distribution of temper grains, layered appearance and numerous air pockets. Fracture is irregular, but edges are not friable.

Color: Complete range from tile orange to gray, including brown, gray-brown and orange-brown. Some sherds are fired tan or orange 2–3 mm. inward from both surfaces leaving a thin gray core.

Firing: Incompletely to completely oxidized.

SURFACE:

Color: Red-orange to tan to brown-orange to gray-orange to gray-brown. Fire clouds occur most frequently on the exterior.

Treatment: Hand smoothed, sometimes slightly scraped or pebble polished, but typically uneven and irregular, with unobliterated pits. Polishing striations occasionally occur on the neck interior of jars. Crackle lines radiate from the large temper grains.

Hardness: 3.5–4.

FORM:

Rim: Folded-over, exteriorly thickened, expanded, direct, or cambered, with rounded, tapered or flattened lip. Lip may be lobed, nicked or finger-pressed (pl. 95 a, b, d), and typically is markedly unlevel, especially on jars.

Body wall thickness: Range 6–10 mm., majority 7–8 mm.

Base: Flattened, unthickened or thickened; rarely concave.

Common vessel shapes reconstructed from sherds: With the exception of Form 3, which is absent in San Pablo Plain, all vessel shapes are the same as those associated with Valdivia Plain (p. 72); see that pottery type for detailed description and fig. 41 for rim profiles and reconstructed vessel shapes.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Between 1 and 3 percent of the sherds from the latter part of Period C have very abundant whitish quartz and feldspar temper particles, resembling the paste of Valdivia Brushed.

Forms 4, 6 and 7 are absent during Period A; Forms 1 and 2 are absent during Period D. Form 8 is restricted to Period B; Form 9 to Periods C and D, and Form 10 to Period D.

CHRONOLOGICAL POSITION OF THE TYPE: San Pablo Plain occurs throughout the seriated sequence, attaining its maximum popularity during Period C, when it constitutes the dominant unpolished plain pottery type (figs. 49, 52, 53).

Valdivia Applique Fillet
(Valdivia Tiras Sobrepuestas)

PASTE:

Method of manufacture: Coiling.

Temper: Beach sand composed of water-rounded particles of various sizes and composition, including occasional particles of shell. Majority are cream or white and contrast strongly with the orange or gray clay. Large grains, with the majority 1–4 mm. and a few up to 7 mm., are very prominent; smaller ones are less obvious but equally or more abundant. Tendency of large particles to cluster gives the appearance of poor mixture, but 10 X magnification shows that the intervening areas are filled with smaller particles so the distribution of temper in the paste is not markedly uneven. Temper is abundant, estimated at around 30 percent of the mixture.

Texture: Compact, fine-grained clay contrasting with coarseness of the temper, giving a "peanut brittle" effect. Sherds break with irregular edge because temper grains either protrude or leave a depression. Tiny air pockets are occasionally present.

Color: About 50 percent are bright orange or brown-orange through the cross section. Most of the remainder have a pale gray to medium gray core, fired tan or orange 1–3 mm. inward from both surfaces in a uniform band. A few are gray-brown or gray throughout the cross section, and rare sherds have a brown core, fired medium gray along both surfaces.

Firing: Incompletely to completely oxidized.

SURFACE:

Color: All shades from light orange-tan to dark gray. Differential firing and fire clouding can produce a wide range of shades on a single sherd, but this is not typical. Exterior and interior may be the same or different hues.

Treatment:

Exterior: Unpolished and typically somewhat uneven as a result of superficial smoothing. About 20 percent

have distinct brush marks like Valdivia Brushed. Temper grains are prominently visible but do not project above the surrounding surface.

Interior: Typically better finished than the exterior, with treatment varying from brushed to smooth to striated polished. In all cases, pits, scars and unsmoothed areas remain. The interior of jar necks is frequently red slipped and polished, with the slip ranging from an even coating to striations that reveal between them the underlying tan surface.

Hardness: 3.5–4.

FORM:

Rim: Cambered, with rounded or flattened lip.

Body wall thickness: Range 4–11 mm., majority 5–7 mm.

Base: None identified; probably rounded or slightly flattened.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, constructed neck and curved cambered rim, the wall forming a continuous curve from the lip to the neck. Rim diameter 18–22 cm. (fig. 23–1).
2. Jar with rounded body, constricted neck and angular cambered rim. The wall above the camber is vertical to outsloping and joins the curve of the neck at a angle of 90–120 degrees. The wall at the camber may be interiorly thickened producing a smooth

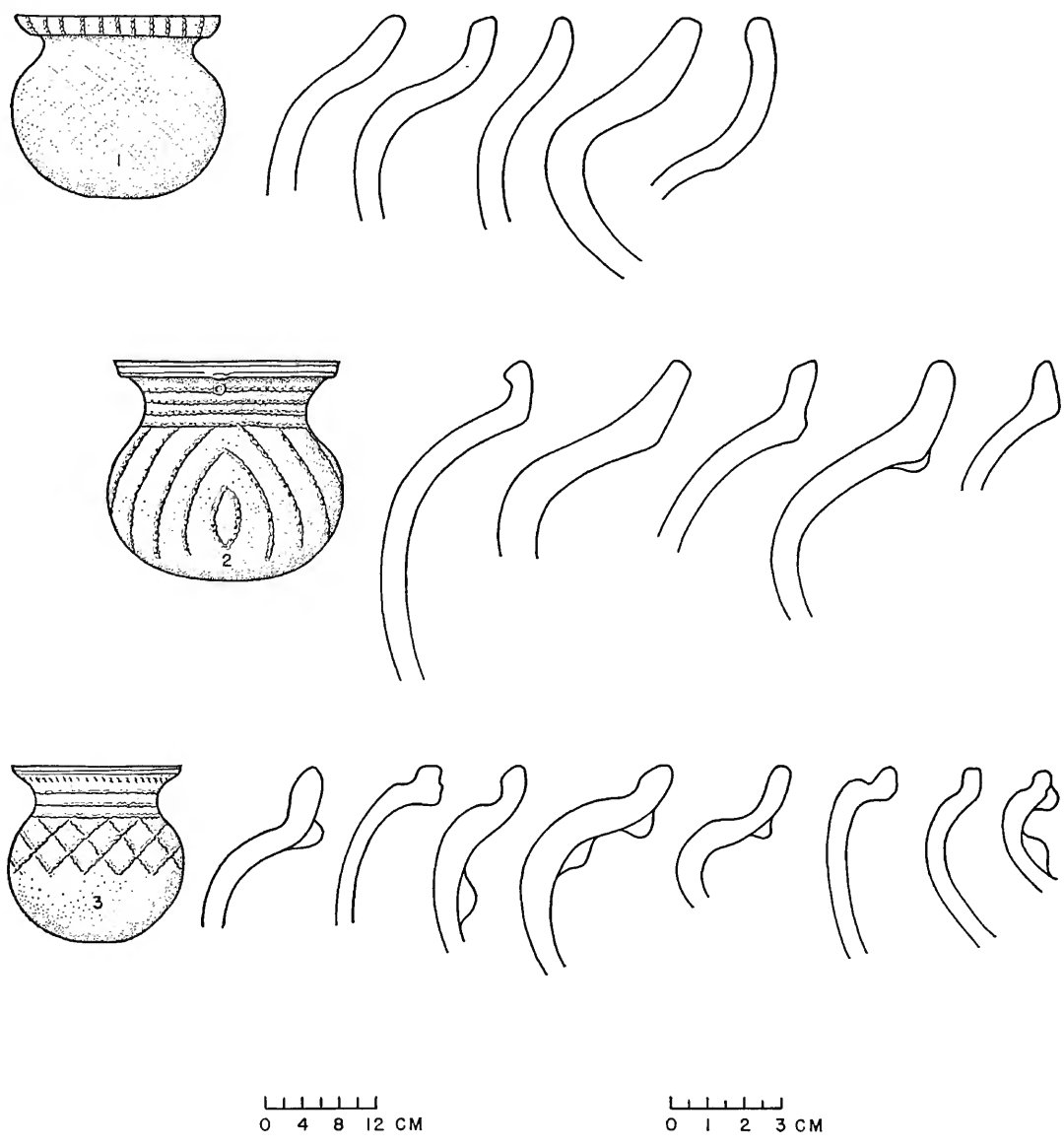

FIGURE 23.—Rim profiles and reconstructed vessel shapes of Valdivia Applique Fillet.

curve. Rim diameter 24–26 cm. (fig. 23–2).

3. Jar with rounded body, constricted neck and short curved or angular cambered rim with a groove on the interior near the lip. The red slip typically is applied above and below the groove, leaving it unslipped. Rim diameter 10–24 cm. (fig. 23–3).

DECORATION (pls. 27–29, 116a):

Technique: Narrow, thin strips or fillets of clay were applied to the exterior surface and pressed with the finger to produce good adhesion. The strips appear to be of the same clay as the vessel, but lacking the larger temper grains. Color is identical to that of the underlying surface. Fillets range from 2–5 mm. in width, with the majority 3–4 mm. Fillet width on a single sherd varies little. Elevation is 1–2 mm. where not altered by flattening. Flattening may depress the top of the fillet without destroying its form, or may obliterate a section of the fillet by mashing it into the underlying body wall surface. Centers of undepressed sections vary from 5–15 mm. apart, depending on the closeness with which the depressions are spaced. Fillets occasionally slough off cleanly, but the bond with the surface is typically good.

Motif: On the majority of sherds, straight fillets are arranged in parallel rows, spaced 0.2–3.5 cm. apart. Spacing varies somewhat on each specimen, but a single sherd does not exhibit the entire range. On some examples, fillets are curved and arranged to produce concentric ovals. Other variations include intersecting fillets, areas covered with parallel fillets running in different directions, and crossed fillets or latticework.

Associated techniques: The rim exterior typically is ornamented by two broad parallel incisions or grooves, interspaced with occasional small crude nubbins. The angle of the camber may have a row of nicks or shell stamping. Rare sherds have incised lines or bands of red paint interspersed with the applique fillets on the body.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Form 1 is limited to Period C.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Applique Fillet appears in Period B, but is most characteristic of Periods C and D of the seriated sequence (figs. 49, 50, 52, 53).

Valdivia Broad-line Incised

(Valdivia Inciso Línea Ancha)

PASTE:

Method of manufacture: Coiling; breaks along coil lines are discernible on many sherds.

Temper: Sand grains measuring 0.25–1.00 mm. in diameter are typical, with some as large as 5–6 mm. All particles are rounded and waterworn. In a few sherds, the additional presence of fine particles of waterworn shell confirm the use of beach sand for tempering.

Texture: Sandy, with very irregular fracture resulting from poor kneading of the clay.

Color: Majority light orange to tan through cross section; a few are fired orange 1 mm. inward from both surfaces, leaving a gray core; a few are gray throughout the cross section.

Firing: Ranges from incompletely to completely oxidized with considerable variation on a single sherd; occasional fireclouds.

SURFACE:

Color: Varies from tile-orange to brick-red to tan to brown to gray to black, with the majority in the gray-brown range. A few are red slipped.

Treatment:

Exterior: Well polished to striated polished and even to uneven. Surface is sometimes floated producing a layer about 1 mm. thick of very fine clay; more typically the surface is polished when fairly dry so temper grains may remain visible. Red slip, occasionally applied to cover the exterior, is typically even and polished.

Interior: Polished, striated polished or smoothed, with polishing typically less complete than on the exterior.

Hardness: 4.

FORM:

Rim: Direct, expanded, interiorly thickened, exteriorly thickened, cambered or carinated, with rounded, flattened or tapered lip. Undulating or lobed lip (pl. 181h–k) may occur on bowls of Forms 3 and 4, and rarely on Forms 1 and 5.

Body wall thickness: Very variable on a single sherd, differing as much as 2 mm. in a short distance. Range 4–10 mm., majority 7–8 mm.

Base: Flattened or slightly rounded.

Vessel shapes reconstructed from sherds:

1. Bowl with flattened bottom, walls curving upward to nearly vertical or slightly constricted rim with rounded lip. Between 1 and 2 cm. below the lip, the body wall expands rapidly to a thickness approximately one and a half times that of the lower body wall, with the range of variation including examples with greater and lesser amounts of expansion in thickness. Rim diameter 20–32 cm. (fig. 24–1).
2. Bowl with flattened bottom, outsloping wall and rim thickened on the interior 1.5–3.5 cm. below the lip, producing a sloping surface. Rim diameter 18–23 cm. Decoration limited to interior rim thickening (fig. 24–2).
3. Bowl with flattened bottom, rounded shoulders and constricted rim, typically direct, but occasionally slightly expanded near the lip. Mouth diameter 10–30 cm. (fig. 24–3).
4. Open bowl with flattened bottom, outsloping wall, direct rim and rounded or flattened lip. Rim diameter 10–22 cm. (fig. 24–4).
5. Deep bowl with flattened bottom, curving walls, cambered rim and tapered lip. Interior of camber is typically thickened producing a smooth curve in contrast to the angular contour of the exterior. Rim diameter 12–18 cm. Decoration limited to rim above camber (fig. 25–5).
6. Bowl with flattened bottom, outcurving lower wall forming an angular junction with the incurving upper

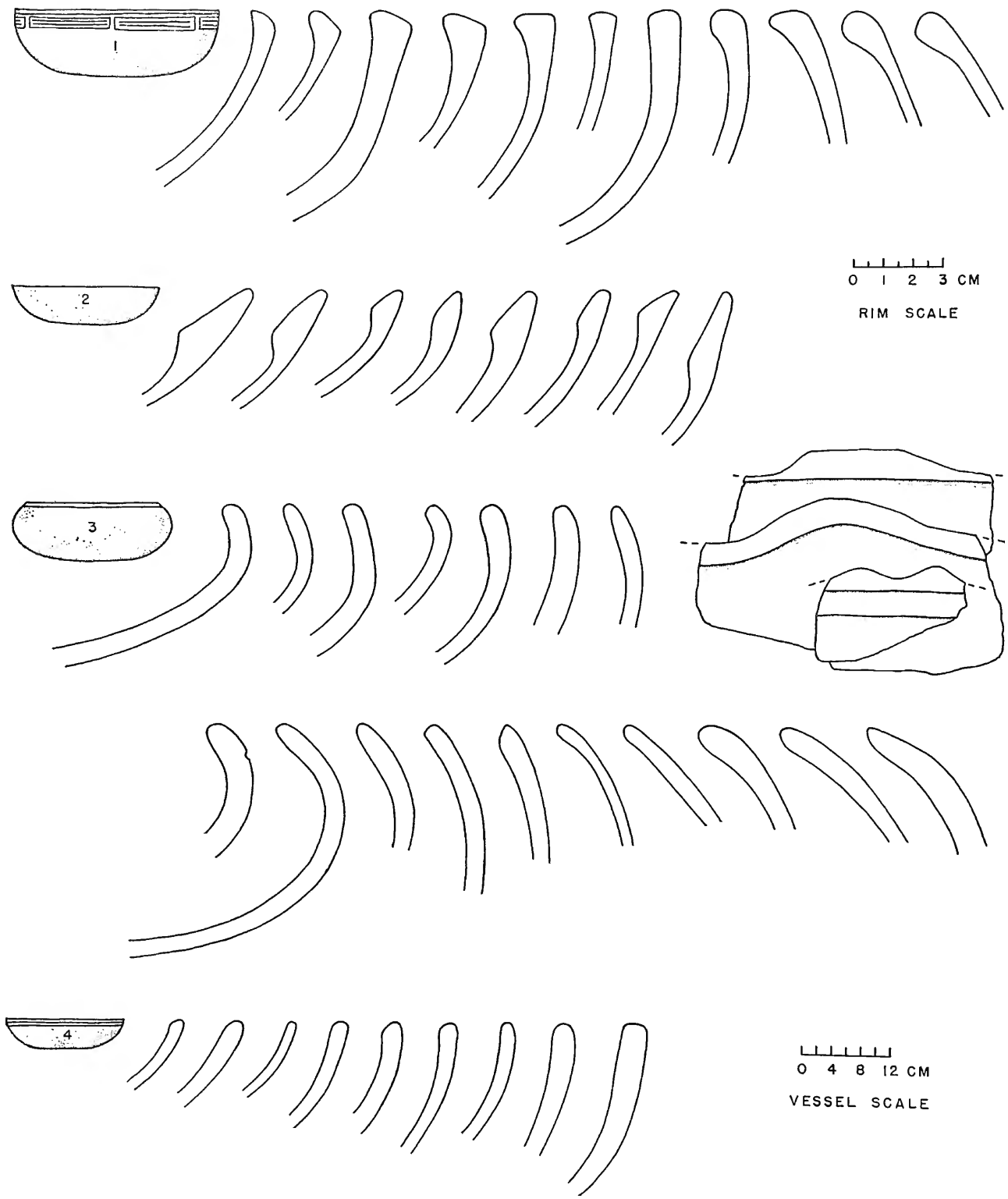

FIGURE 24.—Rim profiles and reconstructed vessel shapes of Valdivia Broad-line Incised, Forms 1–4.

wall. Decoration limited to rim above carination. The interior of the carination is typically unthickened. Mouth diameter 20–33 cm. (fig. 25–6).

7. Bowl with flattened bottom, outcurving lower wall joining the incurving upper wall at a sharp angle. The wall at the carination is markedly thickened, producing a gentle curve on the interior. Mouth diameter 12–32 cm. (fig. 25–7).
8. Bowl with flattened bottom, wall outsloping to join the nearly vertical or slightly concave upper wall at a pronounced angle. Wall thickness is typically greater above than below the carination. Rim diameter 20–30 cm. (fig. 25–8).
9. Jar with rounded body, constricted neck and cambered rim. The upper wall is vertical to insloping, and usually convex. Wall thickness is increased at the camber, either by filling in the angle on the interior or adding a projection on the exterior. Rim diameter 8–22 cm., majority 14–20 cm. Decoration limited to rim above camber. The exterior is frequently red slipped (fig. 25–9).
10. Small jar with rounded body constricted mouth and exteriorly thickened rim producing the appearance of cambering. Rim diameter 10–14 cm. Decoration limited to exterior rim thickening (fig. 25–10).

DECORATION (pls. 30–42, 116 d–e, h, 160 h–l, 161 d–h, 162 j–m):

Technique: Broad incisions executed on a polished surface when the clay was sufficiently dry to leave a clearly defined mark. Execution is widely variable in width, depth and appearance. Width typically ranges between 2–5 mm., with a rare variant having unusually narrow lines 0.5–1.0 mm. wide. Depth is typically 0.5–1.0 mm., occasionally reaching 1.5 mm. Cross section of the cut is U-shaped, with angular or rounded corners, or V-shaped. Termination of strokes may be square, slanting, tapered or rounded, the first two often associated with U-shaped cross sections and the latter two with V-shaped cross sections. Width, depth and cross section form generally vary slightly on a single sherd, but some examples show extreme fluctuations in part correlated with the degree of pressure exerted on the incising tool. The bed of the incision may have a granular texture, or show fine striations parallel to the length of the line. Although some designs are well executed, lines are not typically evenly spaced or uniformly parallel. Long strokes vary from straight to slightly wobbly. Curved lines tend to be less well controlled than straight ones.

Possible variations in technique include final surface polishing subsequent to incision, partially obliterating the margins of the lines; red slipping done after incision, incompletely or completely coloring the bed of the incisions; and application of red pigment after firing to the incisions, a treatment whose frequency may be obscured by difficulties of preservation.

Motif: Designs are predominantly rectilinear, with occasional rounded corners or undulations. Parallel lines are a nearly universal component of decoration; they are principally straight but occasionally zigzag. Amount of the vessel surface occupied ranges from a single incision just below the rim to complete coverage of the exterior. Several motifs are characteristically associated with specific portions of the exterior surface, including the following:

1. A single line drawn parallel to the rim 0.5–3.5 cm. below the lip (pl. 30), or less commonly 2 or 3 parallel lines in this position (pl. 31). The lip may be lobed or undulating. Forms 1, 3, 4, 9, and 10; rarely, Forms 6 and 7, where the incision runs just above the angle of carination.
2. A band of incision incorporating concentric rectangles (pls. 32 f–i, 42a, 161h), straight and undulating lines forming alternating zones occupied by short lines (pls. 33 b–j, 42b), straight horizontal lines alternating with vertical ones (pls. 32 a–d, 161d), or slightly more complicated variants of these simple motifs (pls. 33 a, k–m, 42d). Forms 5, 6, and 7 above the angle of carination; Form 9 above the camber; and Forms 1 and 3 above the shoulder.
3. Two straight parallel lines with one (rarely two) zigzag or wavy lines halfway between them (pls. 34, 42c). Variants include an undulating line producing alternating zones occupied by a zigzag line (pl. 35 a, d), a single straight line and a zigzag line (pl. 34c), and an additional zigzag line below the angle of carination (pl. 35 f, j). Zigzag lines range from angular to rounded. Forms 5, 6, and 7 above the angle of carination; Form 9 above the camber; Form 3 above the shoulder.
4. Short, straight, parallel lines forming rectanguloid, trianguloid or amorphous zones or concentric rectanguloids covering the bottom of the vessel, sometimes leaving the center plain (pls. 36, 37, 42e, 160 k–l, 161e, 162 j–m). Form 8.
5. Complicated patterns formed by stepped, zigzag or straight parallel lines beginning at the rim and covering the exterior except the center of the bottom (pls. 38, 39). Forms 1, 3, and 5.
6. Two or more parallel straight lines on the rim interior, sometimes cross hatched. (pl. 40 a–l). Form 2.
7. Stylized anthropomorphic faces, usually placed to coincide with a rim lobe (pl. 41). Forms 1, 3, and 4.
8. Simple rectilinear patterns principally composed of parallel horizontal lines, associated with small nubbins projecting from the shoulder (pls. 40 m–o, 160i). Nubbins are circular, about 2 cm. in diameter, or oval, 1.7 by 2.8 cm. and 5–7 mm. in elevation. Forms 3, 6, and 9.

Associated techniques: Bowls of Form 8 may have pebble polished decoration above the carination. Designs incorporating braid impression (Valdivia Cord Impressed), nicked incisions (Valdivia Nicked Broad-line Incised) or rocker stamping (Valdivia Rocker Stamped) have been classified under these types.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Several general trends of change can be discerned in Valdivia Broad-line Incised, making examples from Period C, for instance, readily distinguishable from those of Period A, although

the changes are gradual and proceeding at different rates. The most important tendency is toward the increased coverage of the exterior surface. A single line bordering the rim (Motif 1) or a band above the shoulder (Motif 2) are most typical of Period A. In Period B, the design area begins to expend down the vessel wall (Motif 5) and incision of the bottom becomes frequent (Motif 4). This trend is accentuated in Periods C and D (Appendix 1, table 7). The second general evolutionary tendency is toward increasing curvilinear motifs. Designs in Periods A and B make little use of curves, slightly rounded corners being the only deviation from straight lines. In Period C, undulating lines become characteristic, and in Period D, short parallel lines are more often slightly curved than straight, and pronounced angular motifs are rare.

Although the number of sherds from seriated levels is relatively small, several marked changes in the popularity of the decorative motifs seem discernible. Motif 3 is the most restricted temporally, being limited to the latter half of Period C, as represented at G–54. Motif 8 appears to be restricted to Periods C and D. Motif 1, although present throughout the sequence, is the dominant form in Periods A and B, where it typically represents around 50 percent of the sherds. During Periods C and D, it declines to less than 25 percent. Motif 4 shows the opposite trend, occurring in a frequency of under 25 percent during Periods A and B, but constituting between

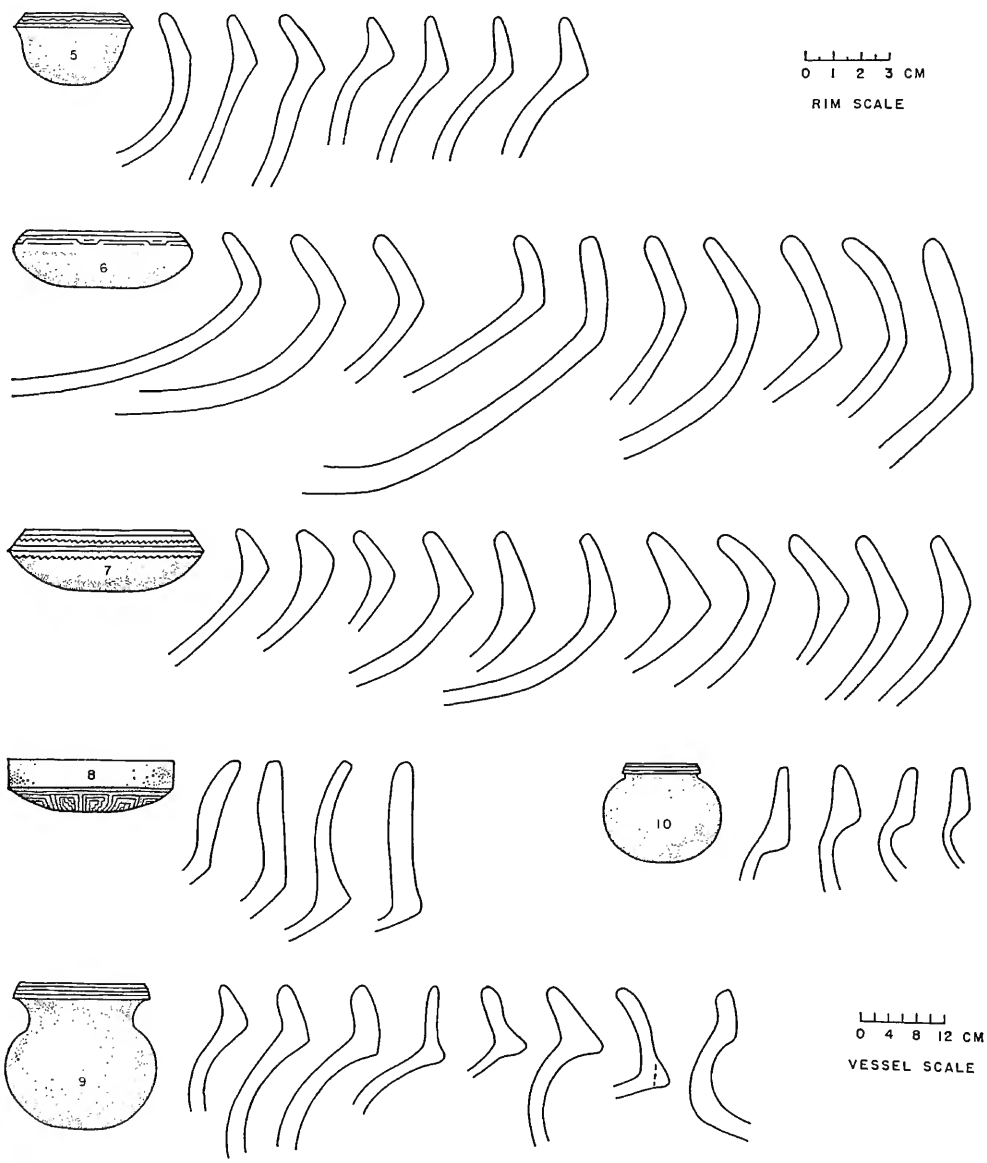

FIGURE 25.—Rim profiles and reconstructed vessel shapes of Valdivia Broad-line Incised, Forms 5–10.

40 and 75 percent of the sherds from Periods C and D (Appendix 1, table 7).

Vessel shapes show some distinct time differences. Forms 2, 5, and 7 are found only in Period C; Forms 6 and 9 in Periods C and D; Forms 8, 10, and 11 in Period D only. Form 4 occurs throughout, but becomes the principal vessel shape in Period D. Lobed rims are absent in Period D.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Broadline Incised occurs throughout the duration of the Valdivia Phase seriated sequence, increasing slightly in frequency but never exceeding 8 percent (figs. 49, 50, 52, 53).

Valdivia Brushed
(*Valdivia Brochado*)

PASTE:

Method of manufacture: Coiling.

Temper: Coarse beach sand containing white particles of feldspar and occasional bits of shell. Grains 1–4 mm. are typical, those under 1 mm. less abundant; occasional grains up to 7 mm. Large particles tend to cluster, but if size is discounted, temper is well distributed. Flat or elongated particles tend to lie parallel to the surface. In many sherds, quantity approaches 50 percent of volume. A minority has fine sand temper.

Texture: Compact, fine-grained clay contrasts with coarseness of the temper. Broken edges are irregular because of pits left by temper grains, but not friable. Tensile strength is great even in areas where large temper grains occupy almost the entire cross section. Elongated air pockets are rare.

Color: Variation from bright orange to dark gray throughout the cross section, with all intermediate combinations. A few sherds have an orange-brown core with a medium gray band along both surfaces.

Firing: Poorly controlled, with considerable fire clouding. Incompletely to completely oxidized. A few examples with oxidized core and reduced surfaces may represent refiring during use in cooking.

SURFACE:

Color: Light orange, light tan, light brown, light to dark gray, with wide variation on a single sherd as a result of fire clouding. Both surfaces may be the same color or at opposite extremes, such as orange interior and dark gray exterior. Interior of rim and neck are often red slipped, with the application incomplete producing red striations that leave the underlying tan surface visible between.

Treatment:

Exterior: See "decoration".

Interior: Very variable, ranging from smooth, even and striated polished, with temper grains submerged; to smoothed with a slightly undulating surface studded with large protruding temper particles; to brushed like the exterior, but less completely, leaving smooth areas. Fine crackle lines radiate from temper grains on some sherds, but are not typical. The rim and neck interior is the best smoothed part of the vessel.

Hardness: 3.5–4.

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FORM:

Rim: Direct, cambered or exteriorly thickened with rounded or tapered lip.

Body wall thickness: 4–10 mm.

Base: Rounded or slightly flattened and slightly thickened.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, concave-walled neck, strongly everted rim with rounded lip. Body wall thickness may be slightly increased on the everted portion of the neck. Rim diameter 14–26 cm. (fig. 26–1).
2. Jar with rounded body, constricted neck and curved cambered rim. Cambered wall is typically unthickened. Rim diameter 16–28 cm. (fig. 26–2).
3. Jar with rounded body, constricted neck and angular cambered rim. Wall is frequently interiorly thickened at the camber producing a curved interior wall. Wall above camber is vertical or slightly outsloping. Rim diameter 14–22 cm. (fig. 26–3).
4. Jar with rounded body, constricted neck and everted rim turning upward 1.0–1.7 cm. below the lip. A channel on the interior corresponds to the exterior angle; the red slip on lip and neck interior typically is omitted in this channel. Wall thickness is usually increased above the point where the eversion begins. Rim diameter 12–20 cm. (fig. 26–4).
5. Jar with rounded body, constricted neck and exteriorly thickened rim producing a vertical to insloping area 1.5–2.5 cm. in width giving the external appearance of a camber, but produced principally by increased thickness rather than curvature of the wall. Rim diameter 10–16 cm. (fig. 26–5).
6. Bowl with rounded or slightly flattened bottom outsloping wall, direct or slightly expanded rim with rounded or tapered lip. Rim diameter 10–22 cm. (fig. 26–6).

DECORATION (pls. 43–46, 116 b–c, 174 h–j, 175 g–i,):

Technique: The exterior surface was smoothed to erase coil junctions, but never polished. When irregularities and unevenness still remain, the surface was brushed or combed with a tool that left adjacent, parallel grooves 1–5 mm. wide and less than 1 mm. deep. These marks are distinct and drawn when the surface was sufficiently wet to leave a clean line. Larger sherds show that this treatment was executed in short strokes, applied to give a textural effect rather than produce a symmetrical pattern. Overlapping, changes of direction and other indications of haphazard application are common. Two principal types of tool were used: 1, a piece of fluted shell, leaving evenly parallel marks 1–2 mm. in width, rectangular in cross section and separated by a narrow even ridge (pls. 43–45, 174i, 175 g–i); or 2, a bunch of sticks producing more poorly defined marks of less consistent width (1–5 mm.) and separation (adjacent to 5 mm. apart) and typically rounded in cross section (pls. 46, 174h).

Motif: Brushing typically covers the exterior surface,

creating a textural effect. Occasionally bands or stripes are produced by individual strokes of the comb or single lines running at right angles to the principal direction of the overall pattern (pl. 45b, e–i, o–p). Rarely, more complicated patterns are produced by multiple combing (pl. 45 q–r).

Brush marks produced by a bunch of twigs may be applied to the jar neck in a zigzag pattern resembling that of Valdivia Incised (pl. 46 c, f), or diagonal or vertical on the body (pl. 46 g–n).

Associated techniques: Cambered rims may have small applique nubbins (pl. 43 k, m), or a row of shell stamping at the lower edge (pl. 44 a–f). Occasionally one or two deep crude incised lines run horizontally above (pl. 44 a–b, f). Rare sherds have red-painted bands about 1 cm. wide added after brushing was completed. Vessels of Valdivia Applique Fillet were frequently brushed prior to addition of the fillets.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Shell scraping is the more common technique, and although temporal differences between it and twig brushing are not cleancut, it appears to be slightly more frequent during Periods A and B. Twig brushing is most common during Period C at the site of G–54, where it often imitates the zigzag motif of Valdivia Incised.

Vessel shapes show a change from dominance of Forms 2 and 4 during the first part of Period C to dominance of Forms 1 and 3 in late Period C and Period D.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Brushed is very rare during Period A, becoming more common during late Period B and constituting one of the principal pottery types during Periods C and D (figs. 49, 50, 52, 53).

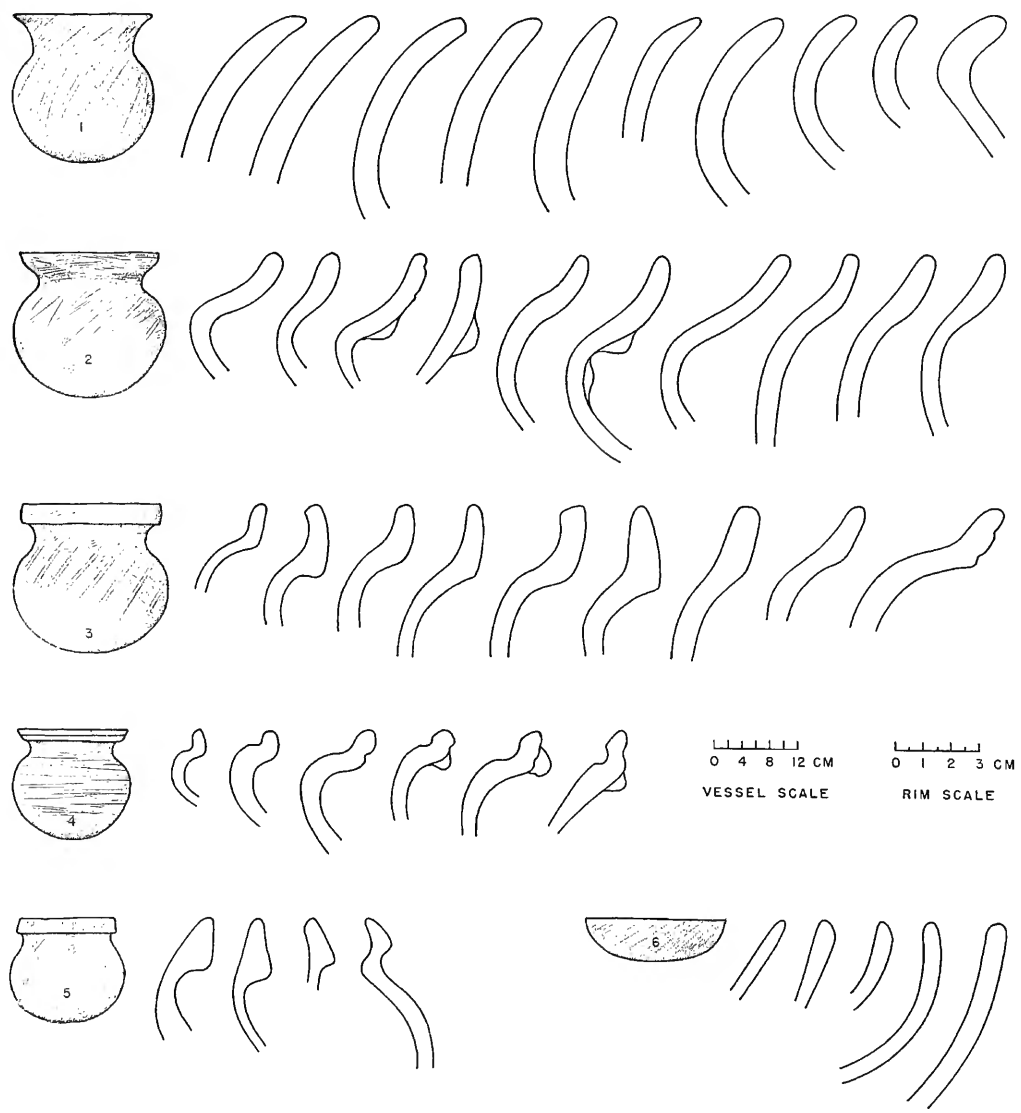

FIGURE 26.—Rim profiles and reconstructed vessel shapes of Valdivia Brushed.

Valdivia Carved
(*Valdivia Labrado*)

PASTE:

Temper: Fine to medium sand, sometimes with gold flecks; variation from very fine paste with no temper visible to abundant sand temper showing white particles.

Texture: Compact, fine grained, sandy, with temper particles evenly distributed.

Color: Dark gray or orange through the cross section; rarely light gray.

Firing: Incompletely to completely oxidized. Rare sherds show fire clouding.

SURFACE:

Color: Dark gray, light gray, light orange or tan, generally correlated with paste color and similar in shade on both surfaces.

Treatment: Even, smooth. Some uneroded surfaces show low polish. Interior is typically as well finished as exterior.

Hardness: 3.5–4.

FORM:

Rim: Expanded, direct or carinated, with rounded or tapered lip.

Body wall thickness: 4–6 mm.

Base: Probably rounded or slightly flattened.

Vessel shapes reconstructed from sherds:

1. Rounded bowl with walls upcurving to nearly vertical, expanding rim with rounded lip. Rim diameter 10–16 cm. (fig. 27–1).
2. Rounded jar with constricted direct rim, rounded lip. Rim diameter 14–24 cm. (fig. 27–2).
3. Carinated bowl with flattened bottom, angular shoulder, insloping upper wall, direct rim with flattened or slightly rounded lip. Wall thickness is not increased at the carination. Rim diameter 12–14 cm. (fig. 27–3).
4. Carinated bowl with flattened bottom and angular shoulder, 1.5 to 3.0 cm. below the lip. Wall thickness is markedly increased at the carination forming a curved interior wall. Above the carination, thickness decreases to form a tapering lip. Rim diameter 24–28 cm. (fig. 27–4).
5. Carinated bowl with flattened bottom, low angular shoulder, slightly concave upper wall, direct or slightly expanding rim with flattened or tapered lip. Rim diameter about 26 cm. (fig. 27–5).

DECORATION (pl. 47):

Technique: Very wide (4–8 mm.), shallow (under 1 mm.) grooves executed with a broad ended tool. Margins of grooves vary from straight and clearly defined to

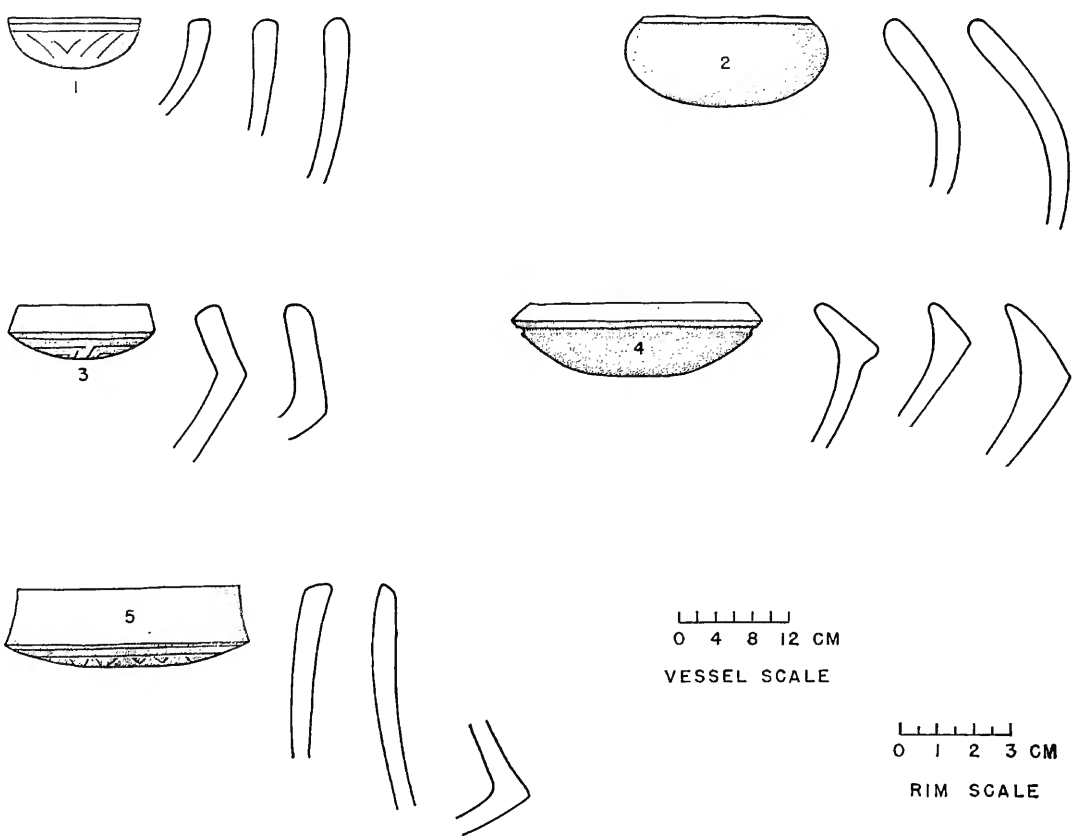

FIGURE 27.—Rim profiles and reconstructed vessel shapes of Valdivia Carved.

irregular, and the bed may be smooth or slightly roughened. Width of grooves varies as a result of uneven pressure on the cutting tool, deeper areas being slightly wider than shallower ones. The effect is similar to that produced by tooling of leather.

Motif: Straight or curved parallel lines, apparently often forming concentric trianguloid patterns. Lines are typically 5–8 mm. apart. Small size of most sherds makes total design unreconstructable. Single lines are characteristic of Form 2, where they are adjacent to the rim exterior, and Form 4, where they are just below the angle of carination. Decoration occupies the exterior wall on Form 1 and the area below the carination on Forms 3 and 5.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Forms 2 and 4 are restricted to Period C; the other shapes are restricted to Period D.

CHRONOLOGICAL POSITION OF THE TYPE: Although it appears rarely and sporadically in the latter part of Period C, this type is diagnostic of Period D of the seriated sequence (figs. 52, 53).

Valdivia Combed
(Valdivia Peinado)

PASTE AND SURFACE: Usually on Valdivia Plain (p. 72), rarely on San Pablo Plain (p. 45); see those type descriptions for details.

FORM:

Rim: Folded-over or direct, with rounded or flattened lip. Folded-over rims are sometimes decorated on the lip with a series of fingertip marks or nicks.

Body wall thickness: 5–7 mm.

Base: Probably slightly flattened.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, insloping to nearly vertical neck, direct or slightly everted rim and rounded lip. Rim diameter 17–22 cm. (fig. 28 1–top). Techniques 1, 2, and 3.
2. Jar with rounded body, insloping neck, vertical to slightly everted folded-over rim. Lip sometimes ornamented with nicks or finger impressions. Rim diameter 10–26 cm. (fig. 28 2–top). Techniques 1, 2, and 3.

DECORATION (pls. 48–50, 172 f–i):

Technique: Three varieties can be distinguished:

1. Relatively shallow and wide trough-like marks with 3–4 easily distinguished parallel grooves 1–2 mm. wide and up to 1 mm. deep running the length of the trough, made with a comb (probably a fragment of shell). Total width of the trough, 0.5–1.0 cm. (pls. 48, 49).
2. Single narrow grooves with striations in the bed produced by a fibrous tool (possibly a piece of cane); grooves are 2–5 mm. wide and typically about 1 mm. deep (pl. 50 a–n).
3. Short strokes made with a tool like that of Technique 2. Down stroke produces a pushed up ridge at the lower end. Length of marks ranges from 0.5–1.5 cm., the majority being 0.5–1.0 cm. long (pl. 50 o–s).

Motif: The most common motif in all three techniques is a series of vertical parallel marks beginning below the rim and extending to the shoulder. Spacing is adjacent to 2 cm. apart. In Technique 1, the lines may be wavy rather than straight. Other variations include horizontal wavy lines (pls. 49 k–m, 50 i, j, n), diagonal or vertical-horizontal hachure (pls. 48 l, o, 49 o–r), and alternating straight and wavy horizontal lines (pl. 49n).

Associated techniques: Decoration of the type designated as Valdivia Modeled appears on some examples in all three techniques.

TEMPORAL DIFFERENCES WITHIN THE TYPE: All three techniques occur throughout the temporal distribution of the type. Those motifs common enough to give reliable results also occur throughout.

CHRONOLOGICAL POSITION OF THE TYPE: Most popular in Period A, continuing in Period B, absent thereafter (figs. 49–53).

Valdivia Cord Impressed
(Valdivia Estampado con Cuerdas)

Note: Two varieties of cords were used for pottery decoration, one twisted and the other braided. Ware and vessel shape are different in the two varieties, but both are rare and rather than consider them as minor unclassified decorative techniques, they have been combined as variants of a general category of cord impression.

PASTE AND SURFACE: Braid impression occurs on polished surfaces like those of Valdivia Polished Plain (p. 74); cord impression is on unpolished surfaces like those of Valdivia Plain (p. 72); see those type descriptions for details.

FORM:

Rim: Braid impression occurs on carinated bowls with direct rim, cord impression on exteriorly thickened rims with rounded lip.

Body wall thickness: 5–7 mm.

Base: Probably rounded or slightly flattened.

Vessel shapes reconstructed from sherds:

1. Carinated bowl with flattened, shallow bottom, slightly incurving upper wall, direct rim and rounded lip. This form appears to be the only one exhibiting braid impression, and almost all sherds are from the area below the carination, suggesting the upper wall was typically undecorated (or possibly pebble polished).
2. Jar with rounded body, insloping to slightly everted neck, exteriorly thickened rim with rounded lip (similar to Valdivia Incised Form 6). Rim diameter 10–12 cm. This form is the only one showing twisted cord impressed decoration.

DECORATION (pls. 51, 185 e–g):

Technique: Two kinds of cord impression occur: braided and twisted.

1. Braid impression (pls. 51 a–l, 185 f–g). A design is drawn with broad (1–2 mm.), generally straight and evenly spaced incisions. Corners are angular or

overshot on the outer side and rounded on the inner side leaving a small trianguloid excised area. A braided cord appears to have been pressed into the incision, frequently obliterating the margins but sometimes leaving the bed of the incision as a straight line down the center of the braid. The braided line may be the same width or slightly wider than the incision; according to the tightness of the braid, the imprint may be almost parallel sided or have undulating edges. Fine striations are sometimes visible, running diagonally or parallel to the length of the braid.

2. *Cord impression* (pls. 51 m–n, 185e). Single strands of twisted cord, slightly over 1 mm. in diameter, are pressed into the vessel surface leaving a clear imprint. The impressions are not always evenly spaced.

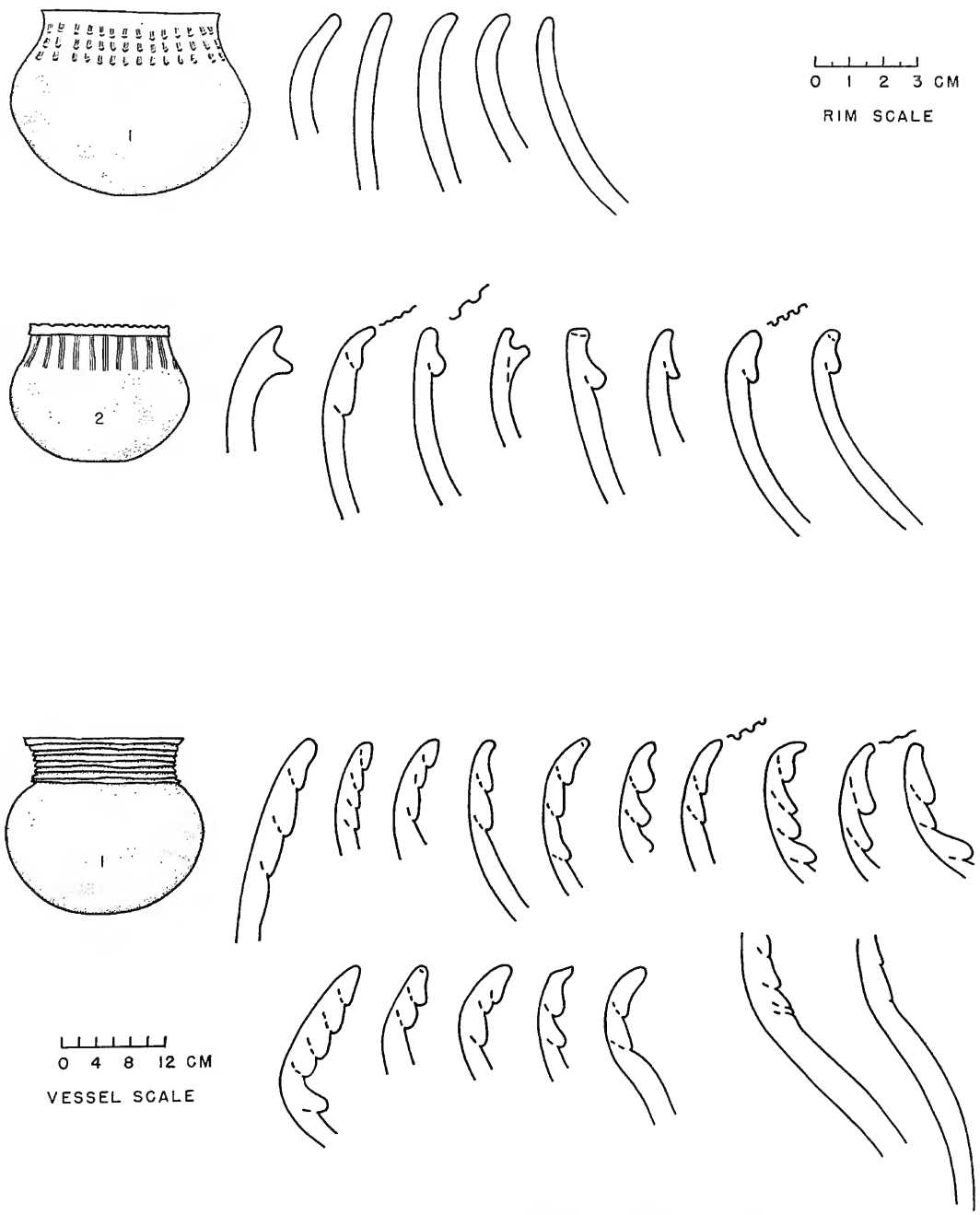

FIGURE 28.—Rim profiles and reconstructed vessel shapes of early Valdivia Phase decorated types. *Top*, Valdivia Combed. *Bottom* Valdivia Corrugated.

Motif:

1. *Braid impressed designs.* Straight parallel incisions 4–8 mm. apart form angular patterns of concentric geometric figures. The braided cord has been pressed into the incised lines forming one side of the geometric figure.
2. *Cord impressed designs.* Three parallel cord impressions decorate the exterior part of the thickened rim. The body of the vessel has Valdivia Incised designs.

TEMPORAL DIFFERENCES WITHIN THE TYPE: This type is very rare and no temporal variation can be discerned in the existing sherd sample.

CHRONOLOGICAL POSITION OF THE TYPE: Encountered only at G–31, where it is associated with Period B levels of Cut J (fig. 50, 51).

Valdivia Corrugated
(Valdivia Corrugado)

PASTE AND SURFACE: Typically on San Pablo Plain

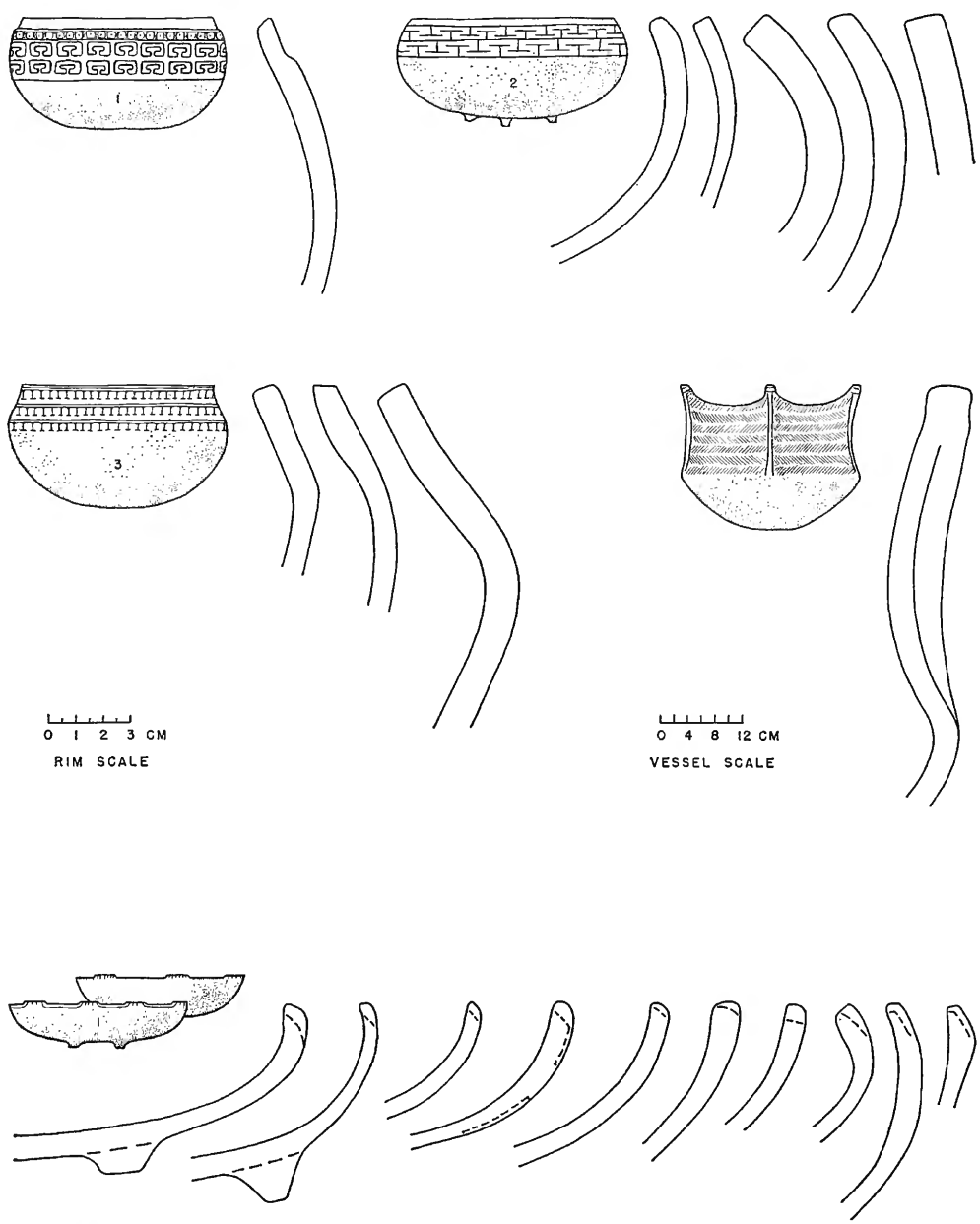

FIGURE 29.—Rim profiles and reconstructed vessel shapes of early Valdivia Phase decorated types. *Top*, Valdivia Red Incised. *Bottom*, Valdivia Cut and Beveled Rim.

(p. 45), occasionally on Valdivia Plain (p. 72); see those type descriptions for details.

FORM:

Rim: Slightly to strongly everted and folded over, sometimes with a row of nicks or fingertip impressions along the lip. Lip tapered, rounded or flattened.

Body wall thickness: 3–9 mm.; considerable variation may occur on the same sherd between the upper and lower edge of a corrugation.

Base: Probably rounded or slightly flattened.

Vessel shapes:

1. Jar with rounded body, insloping neck, everted rim, with tapered, flattened or rounded lip. Lip may be nicked or finger pressed. Rim interior above maximum constriction is striated polished or polished red. Rim diameter 12–24 cm. (fig. 28–1 bottom; pl. 54a).

DECORATION (pls. 52–54a, 116 f–g):

Technique: Unsmoothed coils overlapped unevenly produce generally horizontal rows of variable width and projection. Upsloping coil juncture is generally traceable, partially or completely through the cross section. Distance between coil junctions in cross section is 0.6–1.3 cm. Corrugations are rarely ornamented on the lower edge with nicks or finger tip marks sometimes leaving a fingernail mark toward the left edge of the depression (pl. 53 f, h, j–n).

Motif: Variation from a minimum of two coils beginning at rim to corrugations covering the neck, ending at the shoulder or above.

Associated techniques: Additional ornament of the type classified as Valdivia Modeled may occur near the shoulder.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None.

CHRONOLOGICAL POSITION OF THE TYPE: Most characteristic of Period A, continuing into Periods B and C of the Valdivia Phase sequence (figs. 50–53).

Valdivia Cut and Beveled Rim
(Valdivia Biselado y Recortado)

PASTE: Similar to Valdivia Polished Red (p. 76); see that type description for details.

SURFACE: Incompletely polished like the early variety of Valdivia Polished Red, giving a striated, streaky appearance, or well polished. Interior less well finished than exterior, and sometimes lacking red slip.

FORM:

Rim: Direct or slightly expanded (rare), with flattened or rounded lip.

Body wall thickness: Range 0.5–1.0 cm.; majority 0.7–1.0 cm.

Base: Tetrapod; possibly alternatively flattened.

Vessel shapes:

1. Shallow bowl with outcurving or upcurving wall, direct (rarely slightly expanded) rim, flattened or rounded lip. Rim diameter 16–36 cm.; majority 24–34 cm. (fig. 29–1 bottom).

DECORATION (pls. 55, 56):

Technique: The diagnostic feature of this type is the treatment of the rim, portions of which are cut out creating a series of low prominences 1–5 cm. wide and 2–5 mm. high. They are not uniform in size or equally spaced. Alternatively, the exterior of the lip may be beveled, producing a similar effect. Incised lines are typically associated; these are 1–2 mm. wide, not even in width, perfectly straight or equally spaced. Incisions are sometimes polished, more often not.

Motif: Three methods of combining lobes and incisions can be distinguished:

1. Alternating high and low sections, the lobes usually decorated with vertical parallel nicks or short incisions 2–7 mm. apart; rarely, the lobe is plain (pl. 55 a–j).
2. Alternating high and low sectors, the lobes with parallel nicks as in Motif 1 and the low areas bordered by an incised line or lines originating from the nicks; rarely, from the end of the lobe (pls. 55 k–l, 56 a–j).
3. Like Motif 2 except that cutout areas extend 2 cm. down the exterior wall giving the effect of excision. The surface of the cutout portion is polished (pl. 56 k–n).

TEMPORAL DIFFERENCES WITHIN THE TYPE: All three motifs occur throughout the existence of the type.

CHRONOLOGICAL POSITION OF THE TYPE: Limited to Periods A and B of the Valdivia Phase seriated sequence (figs. 49–53).

Valdivia Embossed
(Valdivia Mascaron)

PASTE AND SURFACE: Four on crude, early variety of Valdivia Polished Red, with thin slip and poorly polished surfaces; one incompletely polished, dark gray surface.

FORM:

Rim: Direct with flattened or rounded lip. Rim diameter 24–36 cm.

Body wall thickness 5–9 mm.

Base: Slightly flattened; possibly tetrapod.

Vessel shape reconstructed from sherds:

1. Bowl with flattened bottom, rounded sides and vertical to slightly incurving direct rim with rounded or flat lip. Rim diameter 24–36 cm. (fig. 30).

DECORATION (pls. 57, 184d):

Technique: Modeling in low relief on upper wall just below rim. Relief 5–10 mm. high, edges blended into adjacent surface. Execution somewhat crude and asymmetrical.

Motif: Anthropomorphic face surrounded by applique ridge, which at the top constitutes eyebrows and extends down at center to form the nose. Eyes and mouth are low nubbins with horizontal incision at center. No two faces are alike in detail. One example is a circle with a diagonal bar through the center, rather than a face (pl. 57c).

Associated technique: Two rims have one or more lobes, the former with finger pressed decoration.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None evident in small sample.

CHRONOLOGICAL POSITION OF THE TYPE: All examples are from Period A and B levels at G–31, Cut J (figs. 50–51).

Valdivia Excised
(*Valdivia Exciso*)

PASTE:

Method of manufacture: Coiling.

Temper: Abundant fine sand; occasional sherds with scattered white particles of waterworn quartz or feldspar.

Texture: Sandy, fine-grained; typically well mixed. Small air pockets are frequent, but large ones 3–5 mm. long occur rarely.

Color: Typically gray or brown-orange, similar to the surface color. Some have a gray core bordered by brown-orange bands 1–2 mm. wide along both surfaces.

Firing: Ranges from incompletely to completely oxidized, with some color variation on each sherd. Few fire clouds.

SURFACE:

Color: Light tan, dark red-brown, dark red, or dark gray are most typical. Interior and exterior are usually a similar shade.

Treatment:

Exterior: Well smoothed, even, and polished giving a low luster; faint smoothing tracks sometimes visible.

Interior: Usually less carefully finished than the exterior, varying from smoothed to striated polished, occasionally completely polished leaving polishing tracks visible. Flaws often remain.

Hardness: 4–4.5.

FORM:

Rim: Direct or expanding, with rounded, tapered or flattened (rare) lip. Lobes are frequent.

Body wall thickness: Range 5–10 mm.; majority 7–9 mm. Thickness is variable on a single sherd.

Base: No base sherds, clearly associated with excised decoration, were found; probably rounded or slightly flattened.

Vessel shapes reconstructed from sherds:

1. Large rounded bowl with incurving direct rim, rounded or rarely flattened lip. Mouth diameter 12–20 cm. (fig. 31–1).
2. Open bowl with outcurving to nearly vertical wall, direct rim, rounded or rarely flattened lip. Rim diameter 16–30 cm. (fig. 31–2).
3. Carinated bowl with outcurving lower wall turning sharply inward 1.5–3.0 cm. below the lip producing a sharply defined shoulder. The interior wall forms a smooth curve as a result of marked thickening at the carination, which may be twice the thickness of the lower body wall. Lip is tapered or flattened. Mouth diameter 16–24 cm. (fig. 31–3).
4. Rounded jar with slightly to strongly constricted mouth. Wall is expanded or interiorly thickened beginning 1.5–3.0 cm. below the lip and attains a thickness about 5 mm. greater than the lower body wall. Mouth diameter 18–36 cm. (fig. 31–4).

DECORATION (pls. 58–60, 177 f–h):

Technique: Incisions 2–5 mm. wide and 1–3 mm. deep combined with small excised or gouged-out areas. Incisions have the form of a broad, rounded groove. Long lines are usually not perfectly straight or evenly parallel; short lines are straighter. The majority of incisions show fine parallel lines in the bed of the groove, left by the end of the cutting tool. Excised areas are gouged out to a depth of 2–5 mm. by successive adjacent or overlapping cuts and jabs. The majority are about 3 mm. deep. Excision typically occupies only a small portion of the decorated surface. Some vessels were polished after decoration giving the excised zones the same polish as the original surface; however, typically the excised portions are unpolished.

A few sherds show traces of red pigment added in the excisions after firing (pls. 58p, 59f). The material adheres poorly to the surface and is fugitive, so that a larger number of the Valdivia Excised designs may have once had this additional ornamentation than the sherd sample now suggests.

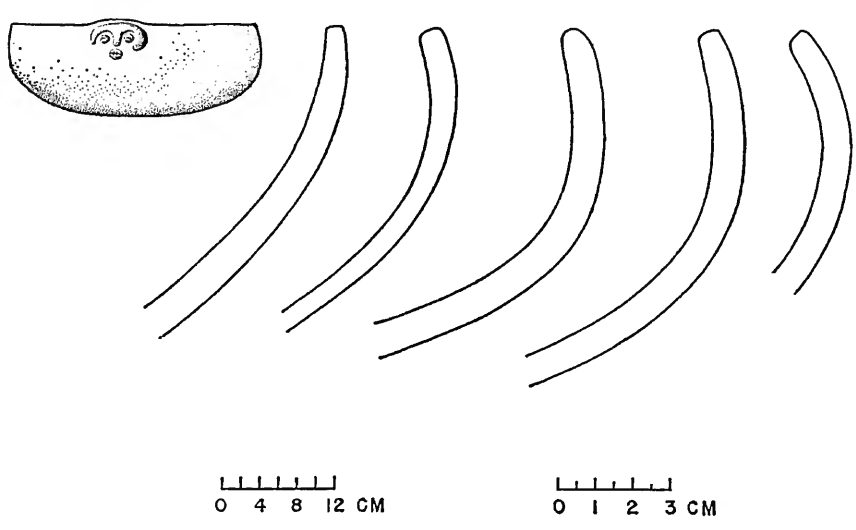

FIGURE 30.—Rim profiles and reconstructed vessel shapes of Valdivia Embossed.

Motif: Decoration sometimes covers the exterior, but is more frequently limited to a band adjacent to the rim, or on Form 3 just below the shoulder. The following elements are commonly employed:

1. Stylized anthropomorphic faces, in which the eyes, nose and mouth are left in relief by excising away the adjacent surface (pl. 58 a–m).
2. Excised bands separating or interlocking with areas of parallel, broad-line incisions (pl. 59 a–c).
3. Triangles placed adjacent to form a band, or alternating apex up and down and separated by incised lines (pl. 59 d–g).
4. I- or T-shaped areas isolated or placed at intervals to form a band (pl. 59 h–l).
5. Horizontal row of gouged-out scallops, typically crudely defined and unevenly excised (pl. 60 a–e).

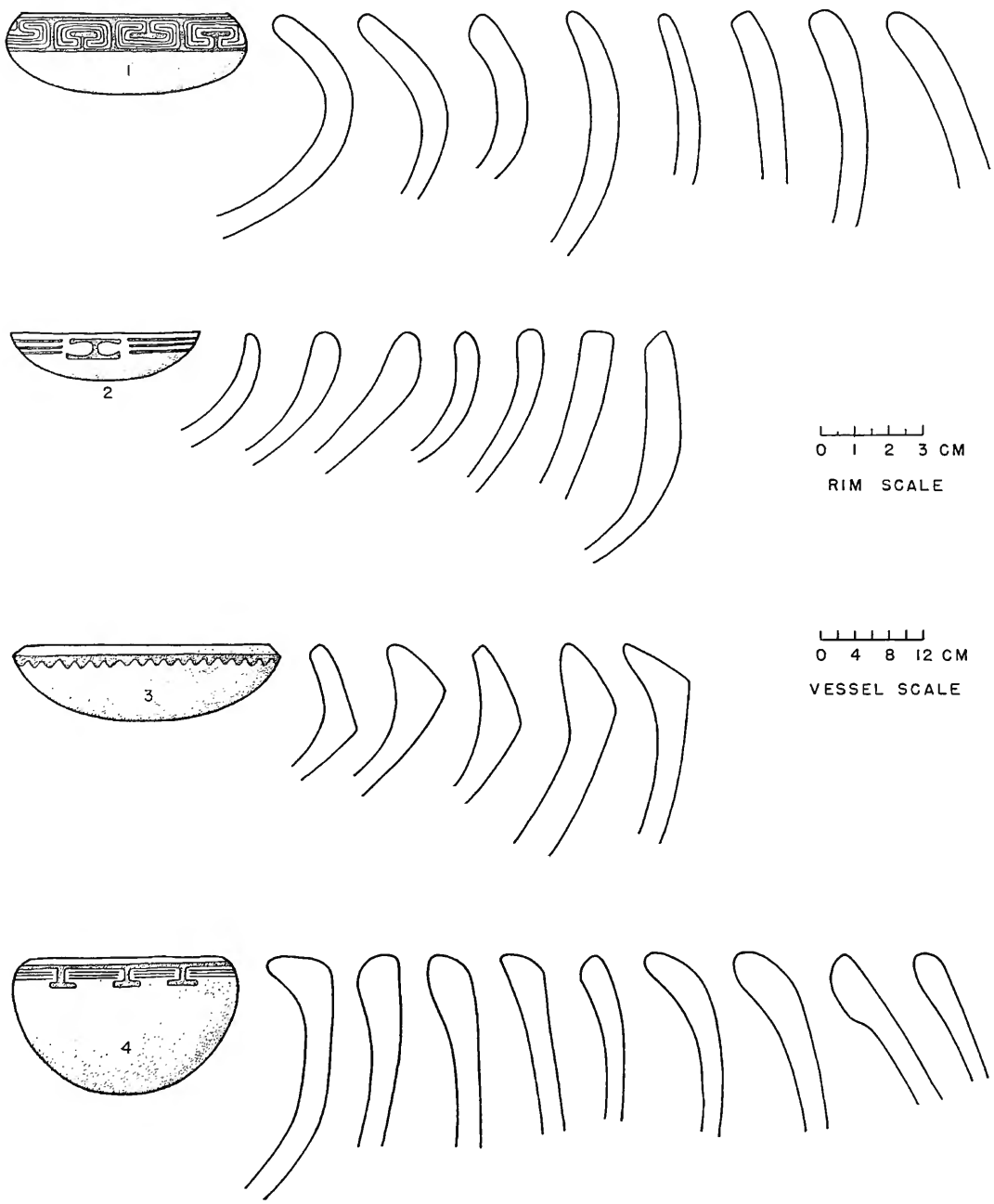

FIGURE 31.—Rim profiles and reconstructed vessel shapes of Valdivia Excised

6. Two parallel incisions linking small trianguloid excised areas arranged alternately to produce an intervening undulating band (pl. 60 f–j).
7. Broad-line incised designs incorporating excised areas of variable outline and extent (pl. 60 k–l).

Associated techniques: Broad-line incision is a typical component of excised designs. Rocker stamping is rarely associated.

TEMPORAL DIFFERENCES WITHIN THE TYPE: The best executed examples of excised decoration, and also the most extensively excised designs, come from late Period B and early Period C. During Period A, excision is limited largely to small trianguloid or I-shaped elements incorporated in broad-line incised designs, a technique that can be compared to that employed in some examples of Valdivia Red Incised. During late Period C, there is a degeneration in which excised zones are again small in area and gouged-out rather than evenly cut back. Motif 5, from its chronological position late in Period C appears to be a degenerate version of Motif 3, which occurs in Period B and the first half of Period C (Appendix 1, table 12).

Except for Form 3, which is absent from Period A, the vessel shapes occur throughout the duration of the pottery type.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Excised appears toward the middle of Period A and continues to the end of Period C. It is a rare decorated type throughout the sequence (figs. 49–53).

Valdivia Fine-line Incised

(*Valdivia Inciso Línea Fina*)

PASTE:

Temper: Fine to medium sand, with particles up to 5 mm.

Texture: Poorly mixed, giving a laminated appearance to the cross section; irregular fracture.

Color: Light-tan to orange along both surfaces, leaving a gray core 1–2 mm. in width.

SURFACE:

Color:

Exterior: Red-slipped in the same manner as Valdivia Polished Red.

Interior: Unslipped and fired tan, or red-slipped.

Treatment: Well smoothed and polished in the decorated area on the upper exterior of the body wall. Lower exterior and interior surfaces striated polished and frequently somewhat uneven.

Hardness: 4.

FORM:

Rim: Direct, expanded or shouldered, with flat or rounded lip.

Body wall thickness: Range 0.5–1.3 cm.; majority 0.8–1.1 cm.

Base: Slightly flattened or tetrapod (see Valdivia Polished Red (p. 76) Base Form 4 and fig. 43a).

Vessel shapes reconstructed from sherds:

1. Bowl with wall curving upward or slightly inward. Between 1.0 and 1.5 cm. below the lip, body wall thickness is reduced 1–2 mm. producing a well marked shoulder on the exterior. Rim diameter about 24 cm. (fig. 32–1).
2. Bowl with wall curving upward and slightly inward. About 3 cm. below the lip, the body wall begins to expand in thickness gradually or abruptly, so that thickness at or just below the lip is about twice that of the shoulder. Lip is typically flat or square in cross section. Rim diameter 22–42 cm. (fig. 32–2).
3. Bowl with wall curving upward to direct rim, flat (rarely rounded) lip. Majority are slightly incurved at rim; variation extends from open bowl to constricted bowl. Rim diameter 20–34 cm. (fig. 32–3).
4. Jar with rounded body, wall sloping inward and upward to direct rim, flattened lip. Rim diameter 24–34 cm. (fig. 32–4).

DECORATION: (pls. 61–64, 183 e–f):

Technique: V-shaped incisions cut through red slip into orange underlying surface when dry enough to cause chipping along margins of cuts. Lines are sharply defined, up to 1 mm. wide and 1 mm. deep. Design appears generally well laid out but lines are rarely straight or evenly parallel, especially in hatched zones. Hatched lines are sometimes finer than those outlining areas, but typically are the same width. Overshot or undershot intersections are frequent.

Motif: Decorated area is limited to upper wall adjacent to lip and extending down the exterior about 5 cm., with some variation according to the size of the vessel. Six motifs can be recognized. Sixty percent of the total sherds are Motif 1; 17.5 percent are Motif 2; the others vary from 2.6 to 3.6 percent.

1. Alternating hatched trianguloid areas and slanting lines. One or two rows typical, sometimes with a lower border of pendent triangles (pls. 61, 62).
2. Rows of hatched triangles, either with points touching or separated. Apex usually up, occasionally down (pl. 63 a–k).
3. Hachured triangles, alternating apex up and apex down, with intervening zigzag band (pl. 63 l–q).
4. Hachured triangles and diamonds (pl. 64 a–d).
5. Vertical rectangles filled with hachure (pl. 64 e–g).
6. Hachured triangles alternating with diagonal bands filled with hachure (pl. 64 h–j).

Seven percent of the sherds have decoration that deviates from the above motifs, although utilizing hachured zones and incised lines (pl. 64 k–q). Designs are unique or appear on not more than two sherds in the available sample.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Motifs 3, 5, and 6 appear to be limited to Period A; the rare examples from Period B levels are probably explainable as the result of disturbance of the refuse (Appendix 1, table 9).

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Fine-line Incised is most popular during Period A. It continues in minor frequency during Period B and is absent thereafter (figs. 49–53).

Valdivia Finger Grooved
(*Valdivia Acanalado*)

PASTE AND SURFACE: Similar to Valdivia Plain (p. 72); see that type description for details.

FORM:

Rim: Folded-over and plain or finger pressed along the lip or lower edge; lip rounded, tapered or flattened; very unlevel.

Body wall thickness: 4–8 mm.

Base: Probably rounded or slightly flattened.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, rounded or slightly angular shoulder, insloping neck turning upward or outward slightly below exteriorly thickened rim. Thickening coil is not smoothed onto the surface, but remains overlapped. Lip may be finger pressed or nicked. Exterior rim diameter 16–24 cm. (fig. 33–1).

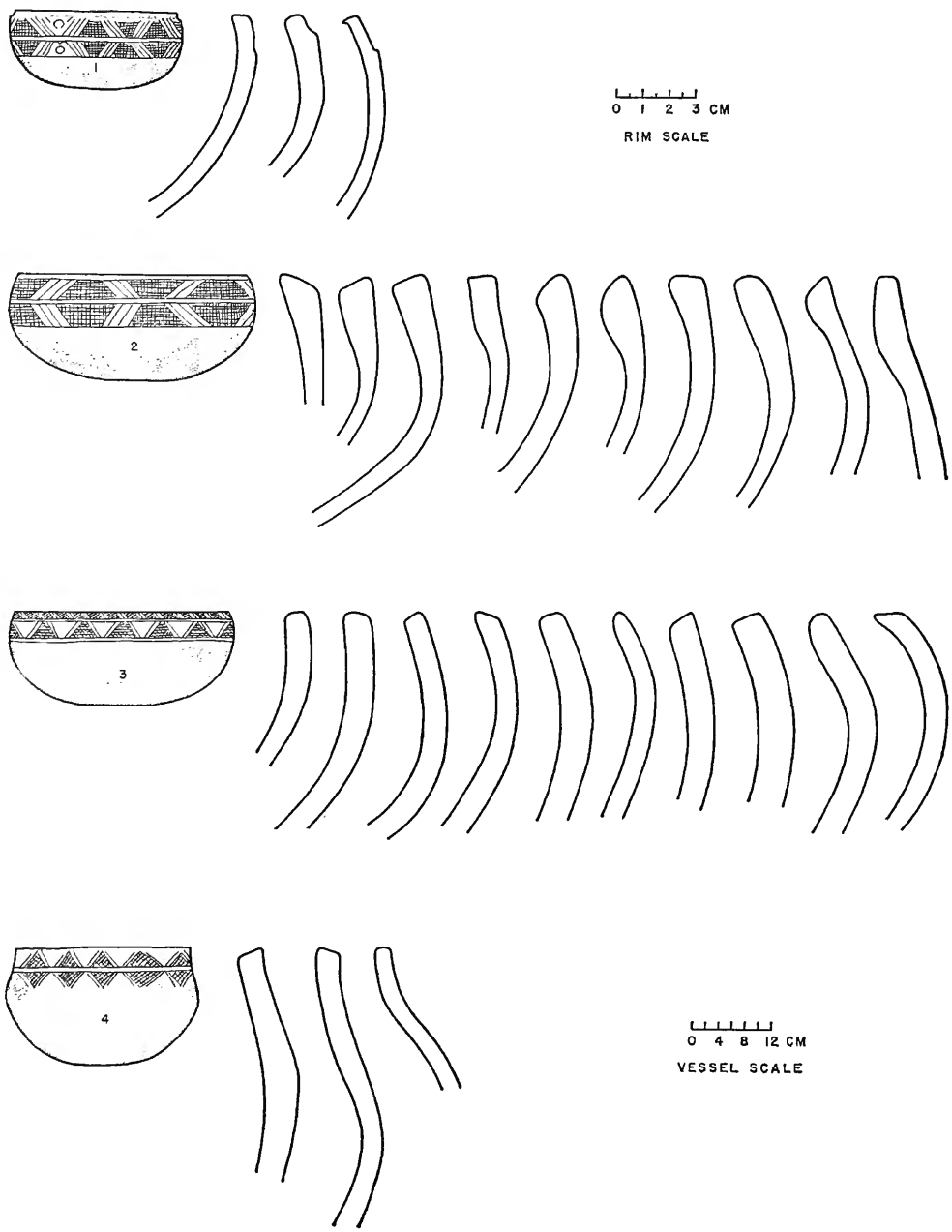

FIGURE 32.—Rim profiles and reconstructed vessel shapes of Valdivia Fine-line Incised.

2. Jar with rounded body, rounded shoulder, insloping neck turning upward or outward slightly below exteriorly thickened rim. Thickening coil not smoothed onto neck surface, but remains overlapped and is ornamented on the lower edge by pressing with the finger. Exterior rim diameter about 16 cm. (fig. 33–2).

DECORATION (pls. 65, 176 j–l):

Technique: Well defined grooves produced by pressing the surface with the finger and drawing downward. Grooves are 2–5 cm. long, 0.9–1.3 cm. wide and 1–5 mm. deep. Wider marks tend to be deeper; width and depth are relatively consistent on a single vessel.

Motif: Vertical parallel grooves occur on the vessel neck, beginning just below the folded-over rim. Spacing is 0.5–4.0 cm. apart. Curved grooves are rare.

Associated techniques: Decoration of the type designated as Valdivia Modeled may occur on the shoulder or just below the lower end of the grooves; occasionally zones of fingertip or fingernail punctates alternate with grooves (pl. 65 c, d, m).

TEMPORAL DIFFERENCES WITHIN THE TYPE: None; both decoration and vessel shape are very consistent throughout the duration of the type.

CHRONOLOGICAL POSITION OF THE TYPE: Diagnostic of Period A. It occurs in Period B levels of G–31, Cut J (fig. 50–51) but was not encountered in Period B sample from G–88 (fig. 52), raising the question of whether continuation in Cut J may not reflect upward migration of sherds in the refuse. On the other hand, the discrepancy can be accounted for by the rarity of the type and the relatively small size of the G–88 sample in comparison to that from G–31, Cut J.

Valdivia Fingernail Decorated
(Valdivia Decorado con las Uñas)

PASTE AND SURFACE: Similar to Valdivia Plain (p. 72) or or San Pablo Plain (p. 45), rarely Valdivia Striated Polished Plain (p. 84); one example on Valdivia Polished Red (p. 76); see those type descriptions for details.

FORM:

Rim: Folded-over, exteriorly thickened or direct, with flat or rounded lip.

Body wall thickness: Range 0.4–1.0 cm.; majority 0.7–1.0 cm.

Base: Probably flattened or slightly rounded.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, insloping or vertical neck, folded-over rim. Lip may be nicked or finger pressed. Rim diameter 12–14 cm. Techniques 1 and 2 (fig. 34–1).
2. Jar with rounded body, insloping neck, slightly everted exteriorly thickened rim with flattened lip. Rim diameter 16 cm. Technique 2 (fig. 34–2).
3. Jar with rounded body, insloping neck, slightly everted rim with flattened or tapered lip. Rim diameter 18–20 cm. Techniques 1 and 2 (fig. 34–3).
4. Jar with rounded body, constricted neck, curved cambered rim with flattened lip. Technique 1 (fig. 34–4).
5. Rounded bowl with slightly constricted mouth, direct rim, flattened lip. Rim diameter 24 cm. Technique 2 (fig. 34–5).
6. Rounded bowl with upper wall thickened or inturned 2–3 cm. below the rounded lip. Rim diameter 18–24 cm. Technique 2 (fig. 34–6).

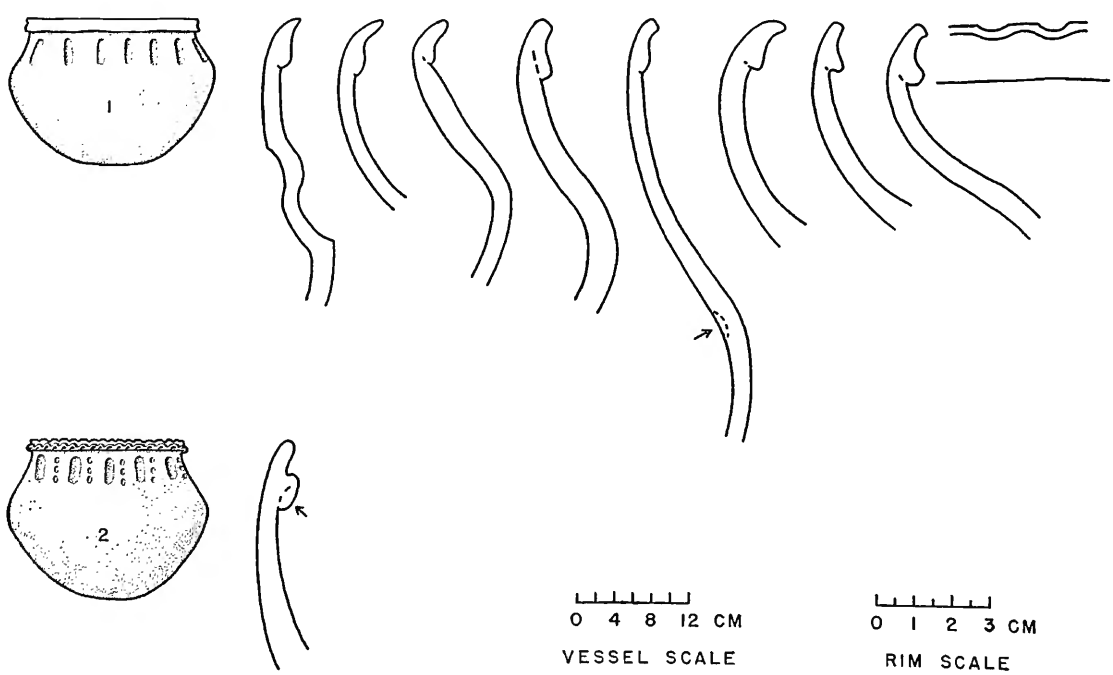

FIGURE 33.—Rim profiles and reconstructed vessel shapes of Valdivia Finger Grooved.

DECORATION (pls. 66, 178 e–g):

Technique: Two kinds of marks can be distinguished:

1. Fingernail marks. Deep, fine, sharply defined, curved impressions 7–10 mm. long (pl. 66 a–m).
2. Fingertip marks with nail impression toward one edge. Marks are ovoid to nearly circular and up to 2 mm. deep at center, with adjacent surface sometimes slightly elevated forming a ridge on one edge (pl. 66 n–u).

Motif: One or several rows of marks below the rim or on the neck, or a single row near the shoulder. Rows are horizontal (with nail mark vertical) in Technique 2, and either vertical or horizontal in Technique 1 Marks are 2–9 mm. apart; rows are generally straight.

Associated techniques: One example of Technique 1 has vertical rows of nail marks alternating with incised lines; Technique 2 is occasionally associated with Valdivia Finger Grooved.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Both techniques occur throughout the duration of the type, with Technique 2 the most common in all levels.

CHRONOLOGICAL POSITION OF THE TYPE: Most common in Period A, continuing into Period B, and absent thereafter (figs. 49–53).

Valdivia Incised
(Valdivia Inciso)

PASTE:

Method of manufacture: Coiling. Most examples have the coil junctions well kneaded and completely erased, but a few show fracture along coil lines.

Temper: Fine to medium sand in sufficient amount to be easily visible in the paste. Size of temper grains is typically under 0.5 mm., but a few sherds have water-worn particles 4–9 mm. in diameter.

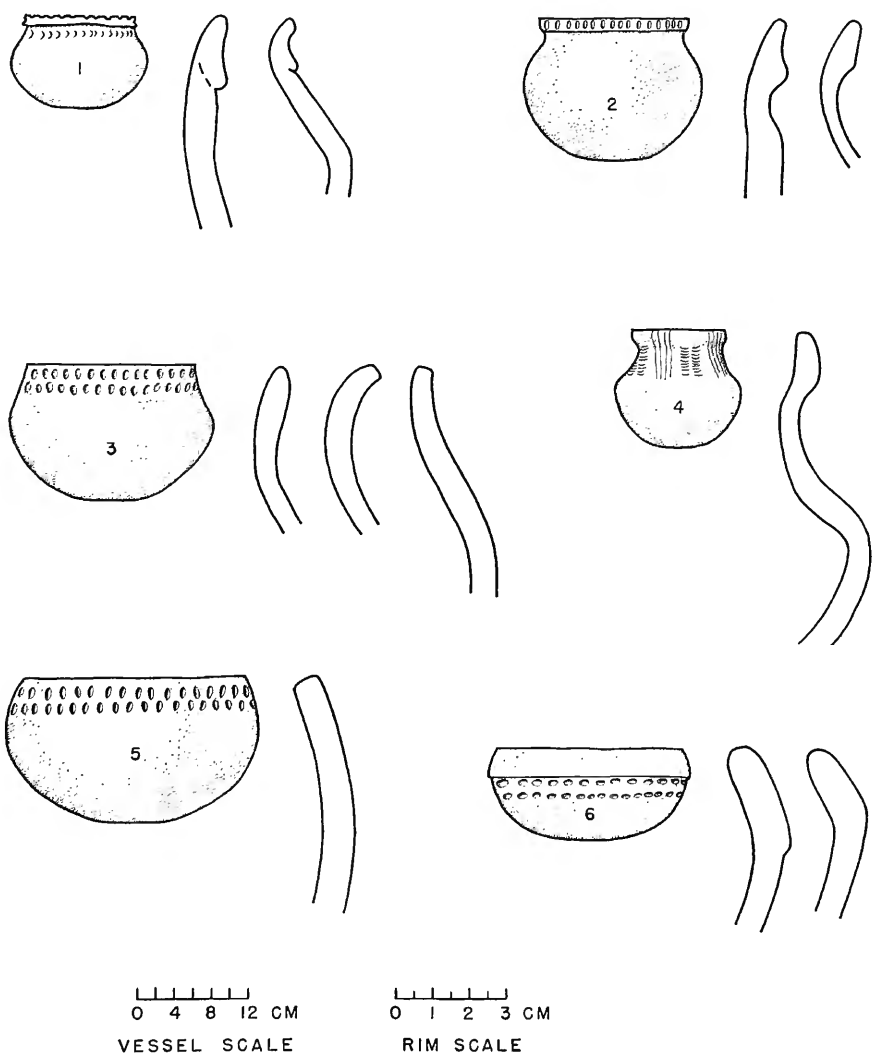

FIGURE 34.—Rim profiles and reconstructed vessel shapes of Valdivia Fingernail Decorated.

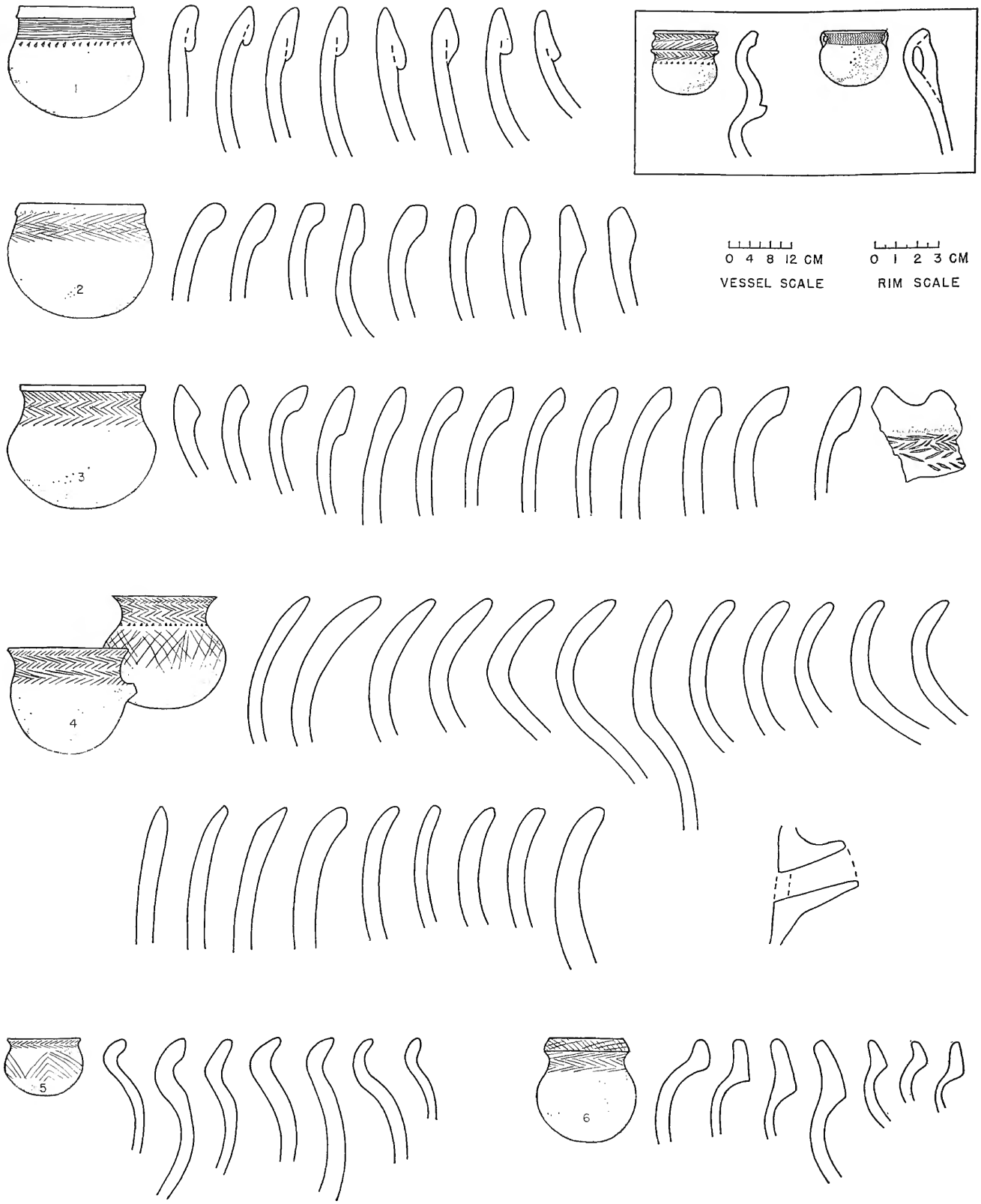

FIGURE 35.—Rim profiles and reconstructed vessel shapes of Valdivia Incised.

Texture: Sandy. Temper is not always well mixed, resulting in clustering of sand grains. Air pockets and fine, pinpoint bubbles occur in some sherds. Fracture is extremely irregular.

Color: Typically orange, tan-orange or red-orange; less than 1 percent have grayish tan core.

Firing: Usually completely oxidized; fire clouds are rare.

SURFACE:

Color: Red-orange, tan-orange, orange or gray-orange, with rare dark gray areas produced by fire clouds. Some jar sherds are red slipped on the neck interior, with the slip extending over the lip exterior.

Treatment:

Exterior: Smoothed and fairly even, but not polished; smoothing marks sometimes visible. Temper grains frequently protrude.

Interior: Better smoothed on neck than exterior, with 50 percent showing some degree of polish. Five percent of neck interiors have a thin red slip, thinner and less carefully applied than that on Valdivia Polished Red.

Hardness: 4.

FORM:

Rim: Exteriorly thickened, folded-over, direct, everted or cambered, with rounded, tapered or flattened (rare) lip. Very rarely, the rim is lobed (pl. 67 g–h); more frequently it is nicked or fingerpressed (pl. 69 d–o).

Body wall thickness: Range 4–13 mm., majority 6–10 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Jar with rounded body, insloping concave neck, slightly everted folded-over rim with tapered lip. Rim diameter 14–28 cm. (fig. 35–1).
2. Jar with rounded body, insloping to nearly vertical neck, slightly everted exteriorly thickened rim, rounded or flattened lip. Rim diameter 18–26 cm. (fig. 35–2).
3. Jar with rounded body, insloping to vertical neck, slightly everted rim with expanded beveled lip. Rim diameter 18–30 cm. Rarely, the rim is lobed (fig. 35–3).
4. Jar with rounded body, vertical concave-walled neck, slightly to strongly everted direct rim with tapered or rounded lip. Rim diameter 16–32 cm., majority 16–24 cm. (fig. 35–4).
5. Small rounded jar with constricted mouth, everted rim, tapered or rounded lip. Body wall thickness frequently increases at the neck. Rim diameter 9–18 cm. (fig. 35–5).
6. Jar with rounded body, short vertical or insloping neck, cambered rim with rounded or flattened lip. Rim diameter 12–20 cm. (fig. 35–6).

Rare variations in vessel shape:

1. Superimposed jars, in which the body wall is designed to give the appearance of one small rounded jar resting on top of another of similar shape. Two examples, rim diameter about 12 cm. (fig. 35 inset; pl. 72h).
2. Jar of Form 5 with a small handle running vertically from the rim exterior to the shoulder. No complete vessels exist, so that the number of handles per jar is not known (fig. 35 inset; pl. 72 d–g).
3. Jar with spout. Only one spout was identified. It shows incision on the exterior and the edge of red slip on the interior at one side, indicating a position at the shoulder. Its presence in a level where the jar of Form 4 predominates suggests possible association with that shape (pl. 69p).

DECORATION (pls. 67–77, 116 i, m–n, 163 i–k, 164 g–j, 165 d–f, 166 e–f, 167 j–n,182j):

Technique: Incisions ranging in width between 0.5 and 4.0 mm., with the majority 1–3 mm. wide. Cuts are always sharply defined, often 2 mm. deep. A ridge of clay is often pushed up along one or both sides of the incision, enhancing the appearance of depth and roughening the surface. Lines terminate in a tapered point, and are typically U-shaped in cross section. Width is relatively uniform on a single sherd, but varies somewhat according to the amount of pressure exerted on the tool. Application is frequently hasty or slapdash, with lines unevenly spaced, irregularly parallel, with adjacent rows overlapping. In rare examples, particularly in the smaller size range, lines are very neatly drawn, and the rows are even in width and spacing. Punctates are executed with a variety of tools, producing marks of triangular, circular, elongated or irregular shape; punctations like the incisions are characteristically sharply defined and often exceed 1 mm. in depth.

Motif: Decoration typically occurs in a band on the jar neck, sometimes continuing downward over the body. The following motifs are most common:

1. Zigzag (pls. 67–72, 164 g–j, 165 d–f, 166e), produced by rows of parallel strokes sloping alternately right and left. Rows may be independent, abutting or overlapping. The angle of slant varies from about 45 degrees to nearly horizontal. Both spacing and slant are generally relatively consistent on a single jar. Execution varies from neat to sloppy. Applied only to neck. A rare variant, occurring only on the body, runs vertically rather than horizontally (pl. 72 a–c, 164 g–h).
2. Crosshatch (pls. 73, 166f, 167 j–l), produced by overlapping vertical and horizontal or diagonal incised lines. Elements are not evenly parallel or consistently spaced, but range of neatness in execution is not as wide as in Motif 1. On neck or body.
3. Horizontal parallel lines (pl. 74, 75, 163 j–k, 167 m–n), produced by a series of short strokes or a continuous incision. Incisions are usually less than 5 mm. apart, and vary from approximately horizontal and parallel to slightly sloping and overlapping. Ends of continuing lines usually fall short or overshot. On neck only.
4. Branched lines (pls. 76 a–g, 163i), produced by parallel lines slanting downward on both sides of a vertical incision. On body only.
5. Vertical parallel lines (pl. 76 h–k), produced by drawing vertical incisions, typically more than 1 mm. apart.

6. Network formed by 3–4 parallel lines connecting small relief nubbins with each other (pl. 77 a–f). On body only.
7. Zoned punctate (pls. 77 g–l, 168 i–m), in which areas filled with parallel incised lines alternate with areas filled with punctate. On rim or body.

Associated techniques: A row of punctation may occur at the lower edge of the incision when it is confined to the neck (pls. 74 i–l, 165 d–f), or may intervene between neck and body decoration (pl. 73k). Valdivia Incised decoration may occur on vessels with rocker stamping, nicked rib, cord impression or nicked broad-line incision; in such cases the sherd has been classified in one of these types.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Red slipping of the neck interior is typical of Periods A and B; in Period C application of red is rare and when present is frequently applied in striations rather than an even, well polished coating. Abundant coarse temper is typical of Period C examples.

The common motifs (zigzag, crosshatch, horizontal parallel lines) are popular in all periods (Appendix 1, table 10). Motifs 4 (branched) and 6 (network) are restricted to Period C, and extension of incision over the body appears most characteristic of this period. Motif 7 (zoned punctate) is not represented in the sample from Period A. A lower border of punctates does not occur in Period D.

Examples of Valdivia Incised from Period D are notably divergent, contrasting in vessel shape, boldness of decoration and variety of motif with material from earlier periods.

Vessel Forms 5 and 6 are absent in Period A; Forms 1, 2, and 5 are absent in Period C. Form 5 is typical of Period C and Form 6 of Period D. Forms 2 and 4 are the most frequent in all periods except D, when they are replaced by Form 6.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Incised is present throughout the seriated sequence. During Periods B and C it not only constitutes the most popular decorative type, but in some levels exceeds individual plain types in frequency (figs. 49–50, 52, 53).

Valdivia Modeled
(Valdivia Modelado)

PASTE: On Valdivia Plain (p. 72); see that type description for details.

SURFACE:

Color: Light tan to orange-tan to gray-tan on both surfaces.

Treatment: Majority hand swiped, leaving the surface rough and uneven. Scraping occurs rarely. Undulating, "lumpy", uneven surface typical. Occasionally striated polished, most frequently on neck interior.

Hardness: 4–4.5.

FORM:

Rim: Folded-over, with flattened, tapered or rarely rounded lip.

Body wall thickness: Range 5–10 mm.; majority 7–8 mm.; considerable variation on a single sherd.

Base: Probably flattened.

Vessel shape reconstructed from sherds:

1. Jar with rounded to slightly angular shoulder, vertical to insloping neck, folded-over rim. Rim diameter 12–24 cm. (fig. 36–1).

DECORATION: (pl. 78):

Technique: Single row of low bumps often barely visible on the exterior produced by inserting the hand into the vessel and pressing outward with fingers spread 5–15 mm. apart. Depressions on the interior are distinct, and show the imprint of both fingertip and fingernail. In a few examples, the depressions are slightly closed-over by subsequent smoothing of the interior. Impressions vary from 8–15 mm. in diameter on the interior, generally correlating with the depth to which the finger was pressed. On the exterior, bosses vary from prominent to indistinguishable, with the majority being small rises 1–3 mm. high, not strongly differentiated from the surrounding surface.

Motif: A single row of bosses occupies the jar shoulder, approximately halfway between the base of the neck and the region of maximum body diameter (fig. 36).

Associated techniques: Valdivia Finger Grooved, Valdivia Combed, Valdivia Pseudo-Corrugated.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None.

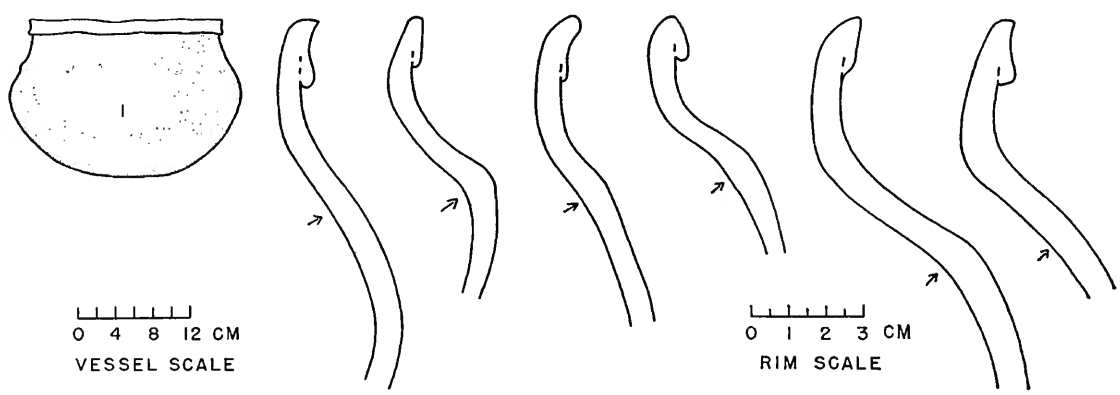

FIGURE 36.—Rim profiles and reconstructed vessel shapes of Valdivia Modeled.

CHRONOLOGICAL POSITION OF THE TYPE: The most popular decorated type during Period A, declining in frequency during Period B and absent thereafter (figs. 49-50, 52-53).

Valdivia Multiple Drag-and-Jab Punctate

(Valdivia Rastreado y Punteado)

PASTE AND SURFACE: On San Pablo Plain or Valdivia Plain; rim and neck interior usually polished red slipped, body may have polishing striations.

FORM:

Rim: Slightly everted, expanded or exteriorly thickened with tapered lip; rarely cambered with rounded or tapered lip.

Body wall thickness: 4–11 cm.

Base: Probably rounded or slightly flattened.

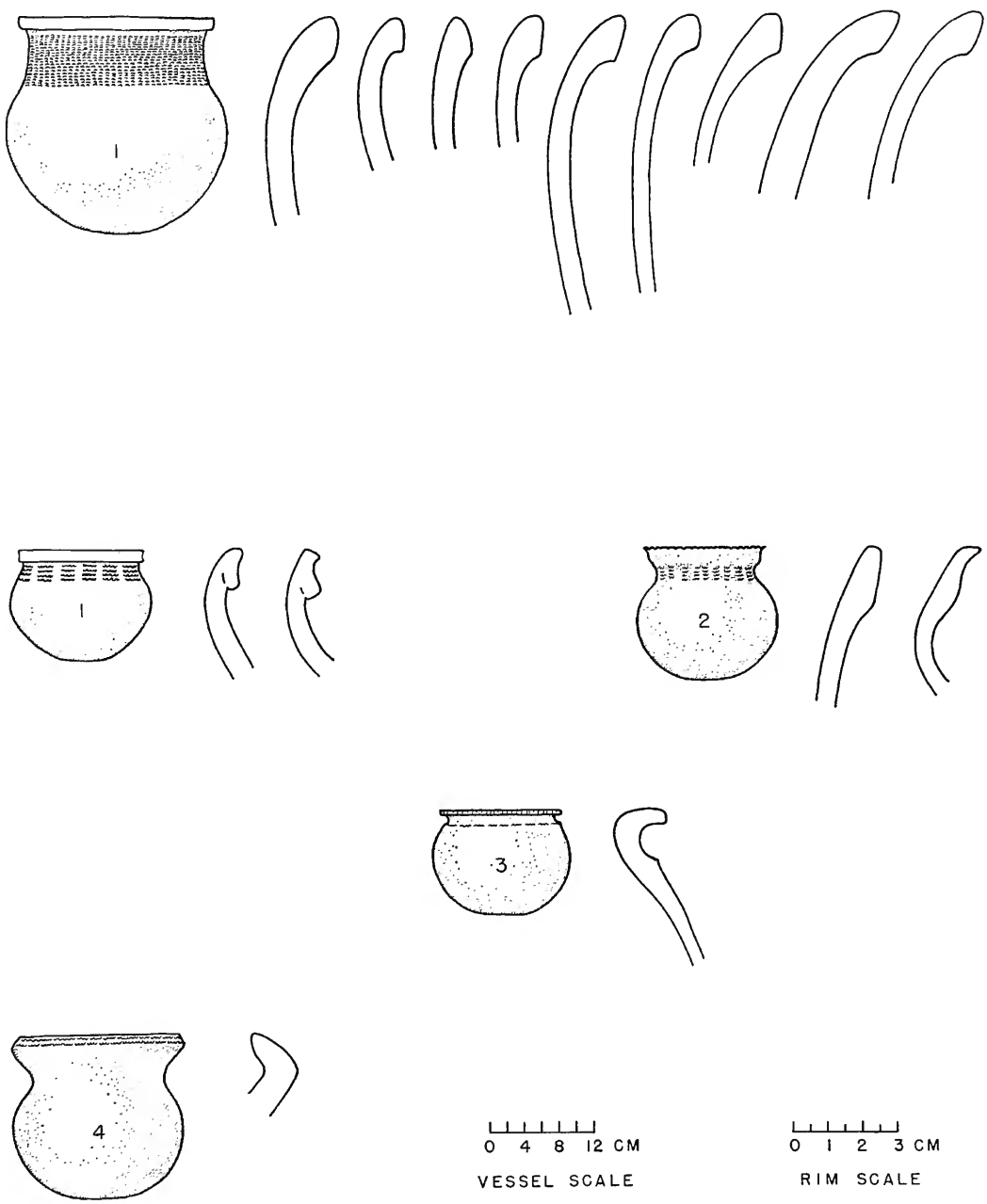

FIGURE 37.—Rim profiles and reconstructed vessel shapes of early Valdivia Phase decorated types. *Top*, Valdivia Multiple Drag-and-Jab Punctate. *Bottom*, Valdivia Shell Stamped.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, concave walled to almost vertical neck, slightly everted rim, beveled to produce a sharply defined nearly vertical band on the exterior. This zone is generally polished and red slipped like the neck interior. Rim diameter 16–28 cm. (fig. 37–1 top).
2. Jar with rounded body, constricted neck and sharply everted, angular, cambered rim. Rim diameter about 22 cm. Rim and neck interior may be plain or striated red.

DECORATION (pls. 79, 80, 170 e–h, 183 h–i):

Technique: Parallel lines of punctates made with a multiple-ended tool. Regularity of the rows makes it difficult to analyze their method of execution but close examination suggests a double-ended tool was most frequently used. The ends may be curved, producing rounded punctates, or square, producing angular ones. in several cases the tool appears to have more than two projections, and the marks could have been produced with a section of fluted shell. The extent to which the tool was lifted after each application varies, producing a range from independent punctates to a series of dragged marks. The failure of the curvature of the end of the tool to coincide with that of the vessel surface causes differences in depth and length of punctates produced with the same stroke. This variability, added to the high degree of control exercised in maintaining parallelism and spacing, makes it virtually impossible to analyze the technique of execution in many examples. One sherd exhibiting lack of coincidence between the beginning and end of rows and one example in which edges of the successive rows do not abut offer the principle evidence for description of the technique. Rare sherds show drag and jab punctate with a single ended tool (pls. 183 h–i).

Motif: Adjacent horizontal rows producing a continuous, overall decoration on the neck exterior. Rarely, a single row or several independent rows occupy the rim or neck.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Dragged marks are untypical in Period B, but typical in Period C. Independent rows are also more usual in Period C than Period B. Vessel Form 2 is limited to Period C.

CHRONOLOGICAL POSITION OF THE TYPE: On the seriated sequences of the Valdivia Phase, Valdivia Multiple Drag-and-Jab Punctate begins toward the end of Period A, reaches its highest popularity in Period B, and continues sporadically and rarely in Period C (figs. 49–53). Its possible existence at the beginning of Period A cannot be ruled out until a larger sherd sample from this period is available, since the type is exceedingly rare and may not be represented in a small collection of sherds.

Valdivia Nicked Broad-line Incised
(Valdivia Línea Ancha Mellada)

PASTE AND SURFACE: On Valdivia Polished Plain (p. 74), Valdivia Striated Polished Plain (p. 84), or rarely Valdivia Polished Red (p. 76); see those type descriptions for details.

FORM:

Rim: Expanded, direct, carinated or cambered, with rounded lip.

Body wall thickness: 5–8 mm.

Base: Flattened or slightly rounded.

Vessel shapes reconstructed from sherds:

1. Deep bowl with flattened bottom, upcurving to nearly vertical sides, expanding rim and slightly to markedly rounded lip. Wall thickness begins to expand 1.0–1.5 cm. below the lip and increases to 4–6 mm. more than the thickness of the body wall. Rim diameter 14–26 cm. (fig. 38–1).
2. Open bowl with flattened bottom, outsloping walls expanding in thickness 2.0–2.5 cm. below the lip, which is beveled on the interior creating a sloping flat surface. Rim diameter 20 cm. (fig. 38–2).
3. Rounded bowl with flattened bottom, slightly constricted mouth, direct rim and rounded lip. Mouth diameter 12–24 cm. (fig. 38–3).
4. Carinated bowl with flattened bottom, walls curving outward to angular shoulder 2–3 cm. below the rim. Lip rounded or flattened. Interior of carination thickened 3–6 mm. creating a smooth curve on the interior. Mouth diameter 22–28 cm (fig. 38–4).
5. Rounded jar with constricted neck and cambered rim, rounded or tapered lip. Camber is 1.5–2.5 cm. below the lip and angular, joining the neck at an angle of about 90 degrees. Rim diameter 12–14 cm. (fig. 38–5).

DECORATION (pls. 81–84, 190 d–f):

Technique: Broad incisions typically 5 mm. wide and 1 mm. deep, but varying from 2–10 mm. in width, scored with vertical or slightly slanting nicks. The form of the nicks ranges from thin, sharply defined, straight or curved cuts to broad, nearly circular punctates, the margins of which abut and occasionally overlap. Nicks conform closely to the width of the line, and rarely extend beyond its margins. Spacing of nicks is slightly variable on a single vessel, but sufficiently similar to give the appearance of regularity.

Motif: A single nicked broad-line incision is characteristically placed on the exterior 5–9 mm. below the lip on bowls of Forms 1 and 3. On Form 2, two to three nicked incisions run parallel on the flat insloping rim interior. On Forms 4 and 5, a single incision occurs just above the carination or camber, or just below the lip, or less commonly in both positions. When two incisions are present, only one may be nicked. The incision appears to be typically continuous, but in some cases is discontinuous, the ends about 2.5 cm. apart (pl. 83g).

Associated techniques: Bowls of Form 4 may be pebble-polished above the carination; bowls of Form 1 occasionally have broad-line incision on the wall below the nicked line. Rare jars of Form 5 have Valdivia Incised decoration on the neck.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None.

CHRONOLOGICAL POSITION OF THE TYPE: Characteristic of Period C, continuing as a rare type during Period D (figs. 52, 53).

Valdivia Nicked Rib or Nubbin
(Valdivia Listón Mellado)

PASTE: On San Pablo Plain (p.45); see that type description for details.

SURFACE:

Color: Light tan, orange, brown, gray-brown, or gray on unslipped surfaces. Color tends to be even except where darkened by fire clouds.

Treatment:

Exterior: Generally even but not smooth and never polished. Temper grains typically visible, giving a speckled appearance.

Interior: Ranging from superficially smoothed leaving rough bands, ridges and grooves to even and striated polished. Interior of neck and rim may be red slipped, varying from an even coating subsequently polished to streaky and incompletely covering the surface.

Hardness: 4.

FORM:

Rim: Cambered, or exteriorly thickened to resemble a camber, rounded or flattened lip.

Body wall thickness: 5–9 mm.

Base: Probably rounded or slightly flattened.

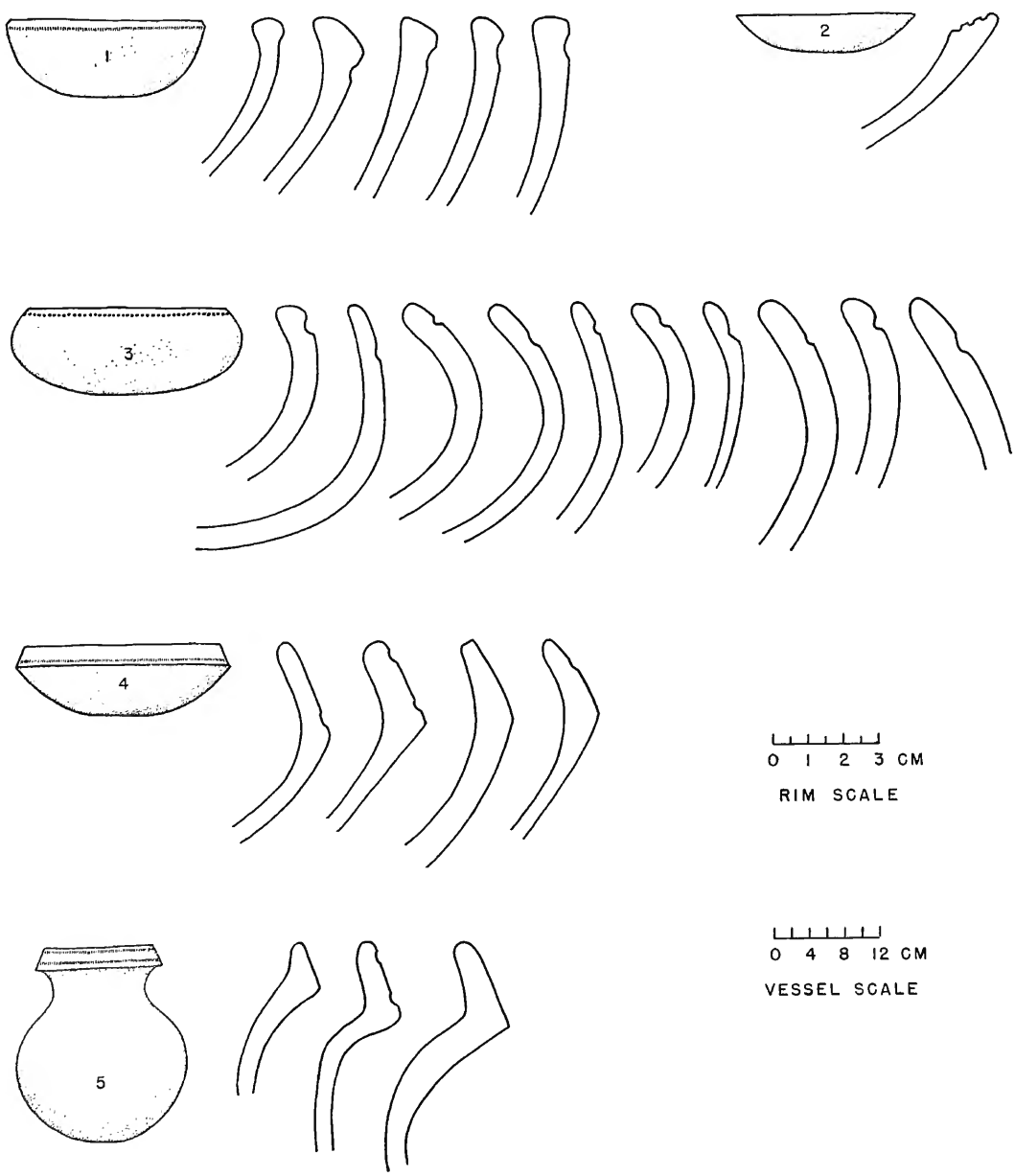

FIGURE 38.—Rim profiles and reconstructed vessel shapes of Valdivia Nicked Broad-line Incised.

Common vessel shapes reconstructed from sherds:

1. Jar with rounded body, constricted neck and cambered rim. The rim is vertical to insloping, and joins the outcurving neck at an angle of 90–130 degrees. Rim diameter 10–20 cm. (fig. 39–1 bottom; pl. 90d).
2. Small jar with rounded body, slightly constricted neck and exteriorly thickened rim tapering toward the lip. Lower edge of thickened rim is sharply defined, producing an angular profile similar to that of Form 1. Rim diameter 12–14 cm. (fig. 39–2 bottom).

Rare vessel shapes:

1. Bowl or jar with rounded body, slightly constricted mouth, slightly everted rim with rounded lip. Rim diameter 12–16 cm. (pl. 90 a, c).
2. Bowl with rounded bottom, rounded shoulder, constricted mouth, direct rim and rounded lip. Mouth diameter 8–14 cm. (pl. 90b).

DECORATION (pls. 85–90, 189 f–i):

Technique: Applique ribs, either laid on the surface and pressed to adhere, leaving the junction sharply defined, or smoothed over to blend onto the adjacent surface, are the most typical. Ribs are 5–10 mm. wide and 1–5 mm. in elevation. The ridge is scored or nicked crosswise, nicks being 1–5 mm. apart and 0.5–5.0 mm. wide, with wider nicks generally correlated with smaller separation. Rare variations include a lengthwise groove down the center of the rib, or finger pressing of the ridge. Pellets of circular or irregularly curved outline, 0.6–2.0 cm. in diameter and 2–3 mm. in elevation, have flattened or slightly convex surface nicked or left smooth (pl. 87). Conical nubbins smoothed onto the adjacent surface, sometimes with crudely incised anthropomorphic faces, occur less frequently (pl. 89).

Motif: Applique ribs or nubbins are typically applied to the exterior of the rim, extending from the camber or thickening upward to the lip. Ribs are vertical or diagonal, 0.4–2.5 cm. apart. Nubbins may occupy the same position, forming one or two slightly wavering rows, in which the nubbins may be abutting or between 5 and 10 mm. apart. Occasionally larger nubbins are more widely spaced.

Less commonly, vertical applique ribs or large nubbins occupy the shoulder of the rounded body of jars of Form 1.

Associated techniques: Nicked ribs are always in combination with Valdivia Incised decoration, which may be applied between the ribs as well as on the neck and body of the vessel. Rare examples associated with rocker stamping have been classified as Valdivia Rocker Stamped.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None.

CHRONOLOGICAL POSITION OF THE TYPE: Rare in Periods A and B, characteristic of Period C (figs. 49, 52–53).

Valdivia Pebble Polished
(Valdivia Pulido con Guijarro)

PASTE:

Method of manufacture: Coiling. Unobliterated coil junctions occasionally visible on the surface of Variant B are 10–15 mm. apart.

Temper: Great variation in size and amount, ranging from none (?) to large quantities of coarse beach sand containing particles up to 4 mm. and rarely attaining 11 mm. There is no consistent correlation between coarseness of temper and surface finish, but better polished surfaces tend to be associated with finer paste.

Texture: Compact, fine-grained to "peanut-brittle" consistency depending on the size of the temper.

Color: Majority gray through the cross section, or with a gray core; about 40 percent are fired tile orange throughout.

Firing: Incompletely to completely oxidized.

SURFACE:

Color: Black, gray-brown, brown, tan or bright orange. Fire clouding may produce a wide variation on a small area.

Treatment:

Variant A (pls. 91–93, 116 j–k): Surfaces with fine ripples are polished giving a slight luster on the exterior. Interior is polished or striated polished. Both surfaces are even and smooth.

Variant B (pl. 94): Surfaces with coarse grooves are unpolished on about 25 percent of the examples and unevenly finished in the majority leaving scars, pits and unsmoothed areas. Polish is typically restricted to the high spots, with depressions uneven and unpolished. Interior finishing varies from even and polished to poorly smoothed leaving smoothing tracks and ridges.

Hardness: 3.5–4.

FORM:

Rim: Usually direct with rounded, tapered or flattened lip; rarely expanded or interiorly thickened with flattened or tapered lip.

Body wall thickness: Range 5–11 mm., majority 6–8 mm.

Base: Probably rounded or slightly flattened.

Vessel shapes reconstructed from sherds:

1. Bowl with flattened bottom, rounded body and constricted mouth with flattened lip. At a distance of 1.5–3.0 cm. below the lip, the wall thickness narrows abruptly forming an inset band sharply defined at the lower edge. Pebble polished decoration is typically confined to this band (fig. 40–1).
2. Shallow bowl with flattened bottom, wall curving upward to expanded or interiorly thickened rim with rounded lip. Rim diameter 16–20 cm. Associated principally with Variant B (fig. 40–2).
3. Open bowl with rounded bottom, walls curving upward to direct rim with rounded or tapered lip. Rim diameter 12–22 cm. (fig. 40–3).
4. Rounded bowl with flattened bottom, constricted

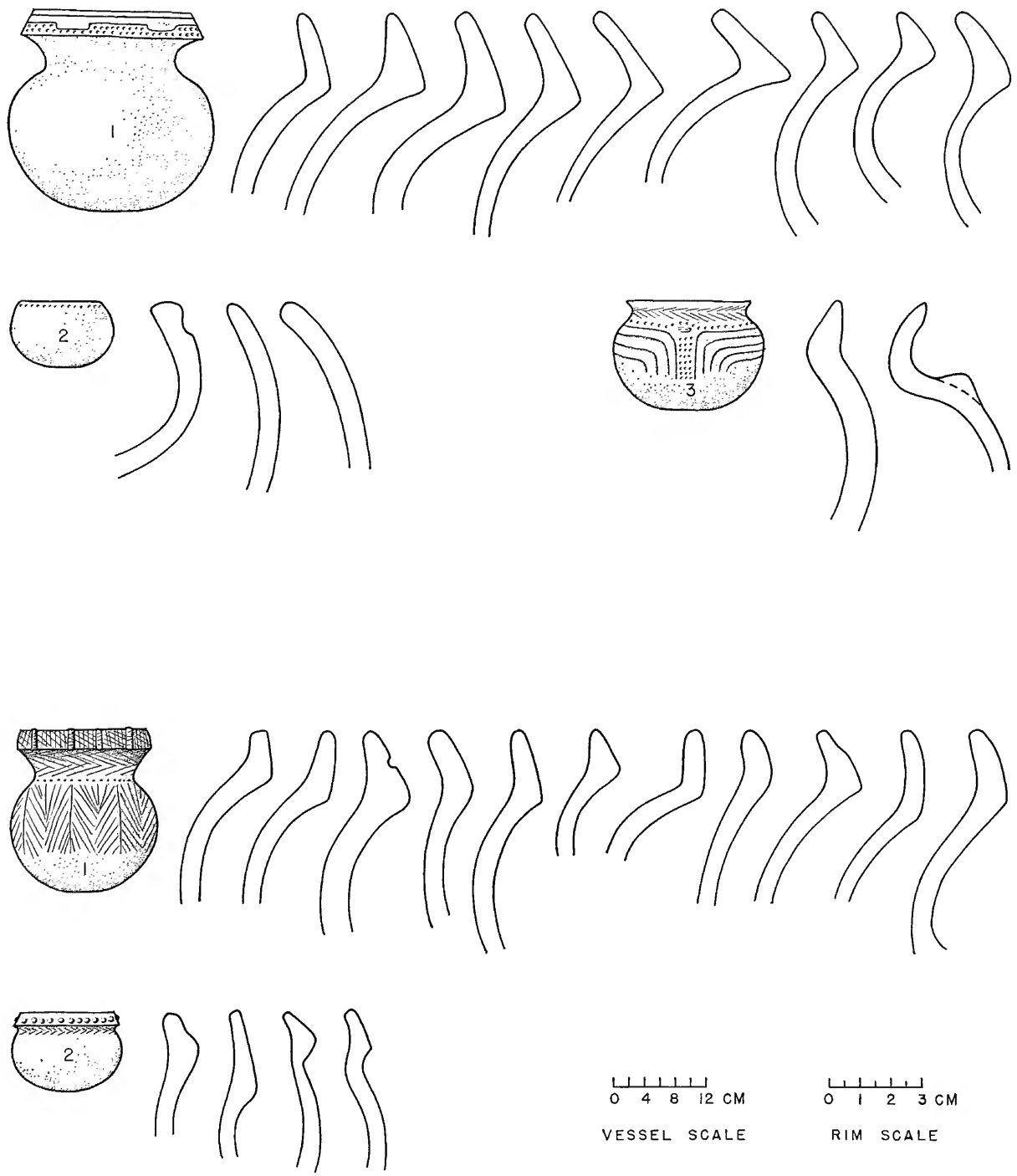

FIGURE 39.—Rim profiles and reconstructed vessel shapes of Period C decorated types. *Top*, Valdivia Red Zoned Punctate. *Bottom*, Valdivia Nicked Rib or Nubbin.

mouth, direct rim and rounded lip. Mouth diameter 14–24 cm. (fig. 40–4).

5. Carinated bowl with flattened bottom, wall curving outward to between 2 and 3.5 cm. below the lip, where it curves inward to the direct rim, rounded or tapered lip. Mouth diameter 12–28 cm. (fig. 40–5).
6. Carinated bowl with flattened bottom, walls curving outward to angular shoulder, then sloping or curving inward to constricted rim with flattened, rounded or tapered lip. Wall thickness increases markedly at the carination, producing a smooth curve on the inner wall. Mouth diameter 13–34 cm. (fig. 40–6).
7. Carinated bowl with flattened bottom, joining the vertical or slightly insloping upper wall 4–7 cm. below the lip at a sharp to rounded shoulder. The rim is direct, with rounded or flattened lip. Rim diameter 16–36 cm. (fig. 40–7).

DECORATION (pls. 91–94):

Technique: Markings ranging from slight ripples to deep grooves cover all or part of the exterior surface. These exhibit considerable variation, but cluster into two major categories:

Variant A: Parallel grooves so shallow that they are barely visible in profile view. The parallel polished troughs are separated by fine ridges (pls. 91–93). Method of execution is uncertain, but the width and contour of typical grooves are in keeping with use of a polished antler tip awl (pl. 25 a–d). Width ranges from 2–10 mm., with the majority about 5 mm., and is relatively consistent on a single vessel. Most examples are well executed.

Variant B: Deep, prominent parallel grooves, in some cases possibly drawn with the finger but polished with a pebble afterwards, 5–10 mm. wide and about 5 mm. apart, separated by a rounded ridge. Depth is 1–2 mm. Depressions tend to be less polished than ridges (pl. 94).

Motif: Parallel, straight, adjacent marks running vertically or slightly diagonally on the vessel exterior. Variant A is typically restricted to the wall above the shoulder on Forms 1, 5, 6, and 7, but usually covers the exterior except the bottom on Forms 3 and 4. Variant B covers the exterior except the bottom on Forms 2, 3, and 5.

Associated techniques: A single broad-line incision often occurs just above the shoulder on Form 4 (pl. 93f), or just above the carination on Forms 5 and 6. A nicked broad-line incision is rarely substituted (pl. 93h). The exterior below the carination is typically covered with broad-line incision on Form 7 (pl. 93j).

TEMPORAL DIFFERENCES WITHIN THE TYPE: Form 1 is restricted to Period B, and Form 7 is found only in Period D. Form 3 is absent from Period D.

All-over pebble polishing is most common in Period B, continuing in Period C, but absent in Period D. The addition of broad-line incision, either on the shoulder as a single line or all-over on the bottom, is confined to Periods C and D. Variant B is limited to Period B.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Pebble Polished begins at the end of Period A and continues throughout the remainder of the sequence (figs. 49–50, 52–53).

Valdivia Plain
(Valdivia Ordinario)

PASTE:

Method of manufacture: Coiling.

Temper: Fine to medium sand, with particles under 0.5 mm.

Texture: Sandy, fine grained, with frequent air-bubble holes. Laminated areas indicate poor kneading of paste.

Color: Typically orange, red-orange, tile-orange or brown-orange through the cross section. A few sherds are orange along both surfaces leaving a medium to dark gray core.

Firing: Oxidized, usually completely. Fire clouding is common.

SURFACE:

Color: Variation from orange-tan to light orange to tan to gray-orange, with frequent small medium to dark gray fire clouds.

Treatment:

Exterior: Smoothed and hand swiped when sufficiently wet to leave marks. Typically even, but never polished.

Interior: Scraped to remove major irregularities and obliterate coil junctions. Sometimes rubbed with a pebble to produce a smooth finish, but not enough to produce a luster.

Hardness: 4.

FORM:

Rim: Folded-over (pls. 95 h, i, 182 i, k–l), exteriorly thickened, expanded, direct or cambered, with rounded tapered or flattened lip. Rim may be lobed or decorated with nicks or finger pressed (pl. 95 j–q). Typically lip is markedly unlevel, especially on jars.

Body wall thickness: Range 7–12 mm., majority 8–10 mm.

Base: Flattened and unthickened or slightly thickened; rarely, concave or tetrapod (see Valdivia Polished Red Base Forms 4 and 5 (p. 76) and fig. 43).

Common vessel shapes reconstructed from sherds:

1. Jar with rounded body, slightly constricted neck, slightly everted folded-over rim with tapered or rounded lip. Rim diameter 12–24 cm. (fig. 41–1).
2. Jar with rounded body, slightly constricted neck, slightly to markedly everted folded-over rim, finger pressed along the lower edge. Occasionally nicked, finger pressed or lobed lip. Rim diameter 14–32 cm. (fig. 41–2).
3. Jar with rounded body, slightly constricted neck, broad exteriorly thickened rim with flattened or rounded lip. Width of thickening is 3–4 cm. Rim occasionally lobed. Rim diameter 24–32 cm. (fig. 41–3).
4. Rounded jar with slightly constricted rim, tapered or rounded lip. Rim diameter 18–32 cm. (fig. 41–4).

5. Jar with rounded body, short vertical to concave sided neck, direct rim with tapered, flattened or rounded lip. Rim diameter 16–24 cm. (fig. 41–5).
6. Jar with rounded body, slightly everted exteriorly thickened rim with tapered or flattened lip. Rim diameter 10–22 cm. (fig. 41–6).
7. Jar with rounded body, short insloping neck, direct rim with flattened lip. Rim diameter 8–24 cm. (fig. 41–7).
8. Jar with rounded body, constricted neck, curved cambered rim with rounded lip. Rim diameter 18–22 cm. (fig. 41–8).
9. Jar with rounded body, slightly constricted neck, angular cambered rim with tapered or flattened lip. Rim diameter 10–22 cm. (fig. 41–9).
10. Small rounded jar with exteriorly thickened rim, tapered or flattened lip. Exterior thickening is approximately the same width as the wall above the camber in Form 9, and gives a similar appearance. Rim diameter 10–16 cm. (fig. 41–10).

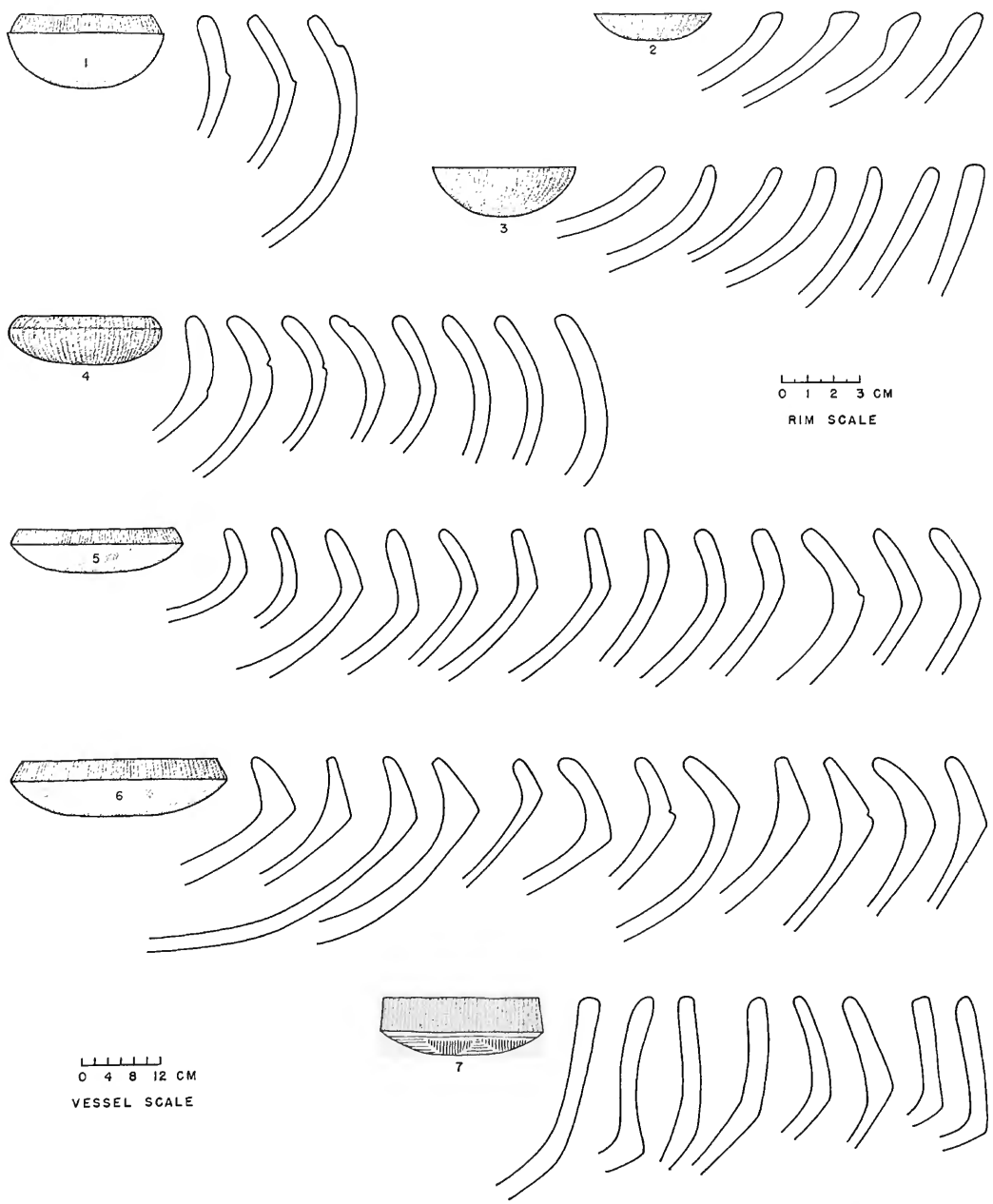

FIGURE 40.—Rim profiles and reconstructed vessel shapes of Valdivia Pebble Polished.

11. Open bowl with flattened bottom outsloping walls, direct rim with rounded or tapered lip. Rim diameter 10–24 cm. (fig. 41–11).

TEMPORAL DIFFERENCES WITHIN THE TYPE: Forms 4, 6, and 7 are absent during Period A; Forms 1, 2, and 3 are absent during Period D; Form 8 is restricted to Period B, Form 9 to Periods C and D, and Form 10 to Period D.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Plain is the dominant unslipped plain type during Periods A and B, declining to a minor frequency during Periods C and D (figs. 49, 52, 53).

Valdivia Polished Plain

(*Valdivia Pulido*)

PASTE:

Method of manufacture: Coiling; breakage along coil junctions is frequent, revealing coils typically 1.5–2.0 cm. wide.

Temper: Majority contains very fine sand, possibly a natural component of the clay. A minority contains coarse particles up to 4 mm. long, similar to the temper characteristic of San Pablo Plain.

Texture: Sandy, fine grained, but poorly kneaded resulting in air pockets and a layered appearance. Fracture very irregular, but edges not friable.

Color: Typically red-orange, tan, orange-brown or brown, with a few examples gray-brown throughout the cross section. Some sherds are fired tan, orange or brown along both surfaces leaving a medium to dark gray core.

Firing: Oxidized, usually completely.

SURFACE:

Color: Tile orange, tan, orange-brown, brown, gray-tan, gray or black, with considerable variation on a single sherd. Occasional fire clouds.

Treatment:

Exterior: Polished to produce an even, smooth and slick surface with a low luster (pl. 96). Best surfaces are floated forming a thin fine-grained layer subject to spalling. Some well polished surfaces may have a streaky appearance. Occasionally, the surface is slightly undulating or uneven.

Interior: On a majority of bowls, the interior is finished like the exterior. On the remainder it is less well polished and may have a striated appearance. On jars, the interior is scraped and smoothed, but shows no polishing. On coarse tempered vessels, the temper grains sometimes remain visible and may be surrounded by radiating fine crackle lines.

Hardness: 4–4.5.

FORM:

Rim: Direct, expanded, interiorly thickened, exteriorly thickened, everted or carinated, with rounded, tapered or flattened lip. Lip may be level or undulating (lobed).

Body wall thickness: Range 3–9 mm.; majority 5–7 mm.

Base: Flattened and unthickened or thickened; concave (pl. 96n) or tetrapod (see Valdivia Polished Red Base Forms 4 and 5 (p. 76), and fig. 43).

Common vessel shapes reconstructed from sherds:

1. Bowl with flattened bottom, rounded shoulder, slightly constricted mouth, direct rim and flattened or rounded lip. Between 2.5 and 3.5 cm. below the lip, the exterior surface is cut back 1–3 mm., removing this thickness for the entire distance, or allowing wall thickness to gradually increase toward the lip. Rim Diameter 12–30 cm. (fig. 42–1).
2. Rounded bowl with flattened or tetrapod base, walls curving upward to nearly vertical rim with rounded lip. Between 1 and 2 cm. below the lip, wall thickness is slightly to markedly expanded. Rim diameter 18–32 cm. (fig. 42–2).
3. Bowl with flattened bottom, walls outsloping or almost vertical, interiorly thickened rim, rounded or tapered lip. The interior thickening has an insloping flattened or slightly convex surface. Rim diameter 12–30 cm. (fig. 42–3).
4. Rounded bowl with flattened or tetrapod base, rounded shoulder, constricted mouth and direct rim with rounded lip. Rim diameter 14–28 cm. (fig. 42–4).
5. Shallow bowl with rounded or slightly flattened bottom, walls outcurving to nearly vertical, direct rim, rounded or tapered lip. Rim diameter 14–32 cm. (fig. 42–5).
6. Bowl with rounded or slightly flattened bottom, walls curving upward to slightly constricted mouth. Between 2 and 4 cm. below the lip, exterior thickening produces an angular contour enhanced by a slight incurving of the wall above this point. Increased body wall thickness may continue to the lip or taper. Rim diameter 12–34 cm.; majority 24–34 cm. (fig. 42–6).
7. Carinated bowl with flattened bottom, walls sloping upward to join insloping upper wall at rounded to angular shoulder. Wall thickness is typically not increased at the carination. Rim diameter 14–30 cm. (fig. 42–7).
8. Jar with concave or flattened bottom, rounded shoulder, short insloping to nearly vertical neck, direct rim, flattened, tapered or rounded lip. Rim diameter 10–16 cm. (fig. 42–8).
9. Jar with rounded body, concave neck, everted exteriorly thickened rim with rounded or tapered lip. Rim diameter 12–20 cm. (fig. 42–9).

ASSOCIATED DECORATION: Except for rare examples of Form 1 in which the exterior channel is colored red and occasional undulating or lobed lips, sherds classified as Valdivia Polished Plain bear no decoration.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Form 1 is restricted to Periods A and B; Forms 7 and 9 are absent during Period A and Form 8 is absent from Period D. Tetrapod bases are absent after Period B, concave bases after Period C.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Polished Plain begins at the early part of Period A, reaching its maximum popularity during the latter part of Period A, continuing throughout Periods B and C, declining markedly in Period D (figs. 49–50, 52–53).

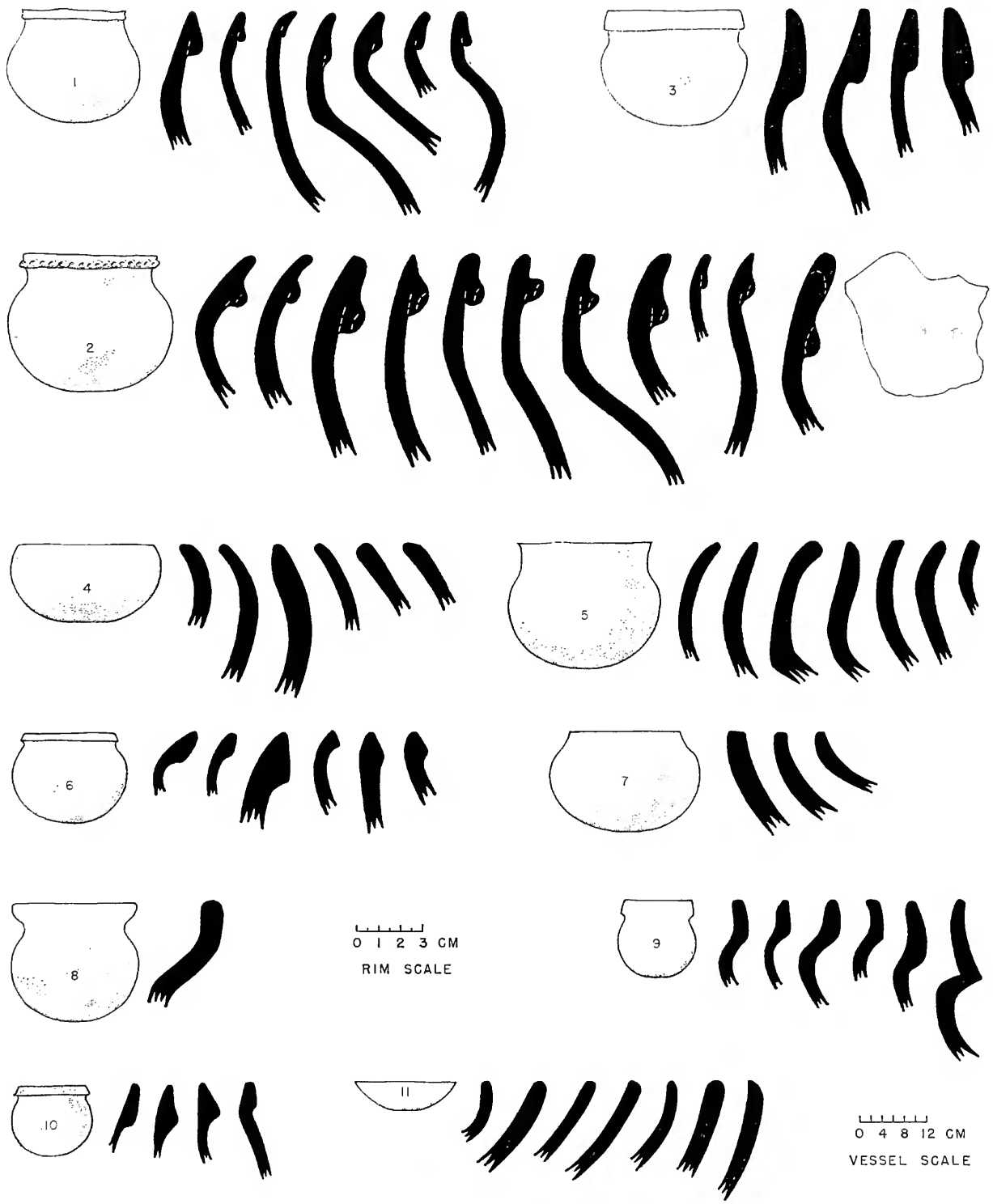

FIGURE 41.—Rim profiles and reconstructed vessel shapes of San Pablo Plain and Valdivia Plain.

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Valdivia Polished Red
(Valdivia Rojo Pulido)

PASTE:

Method of manufacture: Coiling.

Temper: Wide variation from fine sand, possibly a natural inclusion of the clay, to coarse, whitish inclusions of feldspar and waterworn shell of the type used in Valdivia Brushed.

Texture: Typically fine, compact, sandy but not friable.

Color: Solid orange, solid gray, or orange along both surfaces leaving a thin gray core.

Firing: Incompletely to completely oxidized.

SURFACE:

Color:

Slipped surface: Exterior and rim interior of jars and both surfaces of open bowls are covered with a paper thin, rich, dark red slip. Variation in firing produces shades ranging from bright red to nearly black.

Unslipped surface: Tan, light orange, brown, or gray.

Treatment:

Slipped surface: Typically, polished to produce a glossy, smooth, even finish (pl. 97 c, j, l, n). In a minority, the slip is not evenly applied and forms streaks that allow the underlying orange surface to show between. Polishing is sometimes striated rather than complete, leaving the surface slightly uneven (pl. 97 b, d). Slip typically begins just below the lip on the interior and covers the exterior. Open bowls are also slipped on the interior.

Unslipped surface: Less well smoothed, sometimes leaving imperfections unobliterated, but typically polished or striated polished (pl. 97 k, m, o).

Hardness: 3.5–4.

FORM:

Rim: Direct, expanded, exteriorly thickened, interiorly thickened, cambered or carinated, with rounded, flattened or tapered lip. Rim may be level, undulating or lobed (pl. 181 l–m).

Body wall thickness: 5–11 mm.

Base: Bases may be rounded, flattened, thickened, tetrapod or concave. Details are as follows:

1. Rounded, continuing the curvature and thickness of the body wall, so that the junction between wall and base is undefinable.
2. Flattened, so that the vessel will rest without tipping, but with the curvature blending into that of the body wall so that the diameter cannot be measured with accuracy. Flattening typically produces an unlevel surface and, therefore, often the rim is not horizontal.
3. Thickened to between one quarter and one third greater than the thickness of the body wall, and typically flattened slightly on the exterior.
4. Tetrapod, the four small, stubby, truncated conical feet flattened at the end and frequently showing extreme wear. Height of unworn specimens varies from 0.4–2.5 cm., with the majority 0.4–1.2 cm. Diameter increases with increased height, and at the point of junction with the body wall ranges from 1.0–3.5 cm. On three sherds with more than one foot present, distance apart measured from center to center is 3–5 cm., with arrangement approximately symmetrical (fig. 43a; pl. 97 e–i, 98 a–b).
5. Concave, with a well defined, circular depression on the exterior and a corresponding convexity on the interior. The wall is rarely thickened either at the center or edges of the depression. Diameter ranges from 4–10 cm., with the majority 6–7 cm.; depth is 2–10 mm., with increased depth not consistently associated with increased diameter (fig. 43b; pls. 98c, 116q).

Common vessel shapes reconstructed from sherds:

1. Bowl with flattened bottom, walls upcurving to nearly vertical rim with rounded or flattened lip. Between 1.3 and 3.0 cm. below the lip, a jog is produced by cutting the surface back 1–2 mm., decreasing the body wall thickness by that amount between this point and the lip. Occasionally the inset zone may lack the red slip. Lip is rarely undulating. Rim diameter 12–32 cm., majority 18–22 cm. (fig. 44–1).
2. Deep bowl with flattened bottom, rounded walls, slightly outcurving to slightly incurving rim with rounded or tapered lip. The wall is exteriorly thickened from 2–3 mm. for a distance of 2.5–4.5 cm. below the lip producing a broad-collar-like rim. The lip is occasionally lobed. Rim diameter 14–20 cm. (fig. 44–2).
3. Rounded bowl with slightly flattened bottom, walls upcurving to vertical or slightly constricted rim with rounded lip. Beginning about 1.5 cm. below the lip, body wall thickness expands and may attain at the lip a thickness more than double that of the lower body wall. Rim diameter 14–28 cm. (fig. 44–3).
4. Shallow bowl with flattened bottom, walls outsloping to interiorly thickened rim with tapered or rounded lip. Rim diameter 14–24 cm. (fig. 44–4).
5. Rounded bowl with flattened or tetrapod base, constricted direct (rarely, expanded) rim with rounded lip. Rim diameter 12–28 cm. (fig. 44–5).
6. Shallow bowl with flattened bottom, walls outcurving to direct rim with rounded or flattened, occasionally undulating or lobed lip. Rim diameter 12–28 cm. (fig. 44–6; pl. 99b).
7. Deep bowl with rounded or slightly flattened bottom, walls curving upward to nearly vertical rim with rounded or tapered lip. On the exterior 1.5–3.0 cm. below the lip, the wall is thickened to produce an angular contour. Occasionally, the thickening is accompanied by a slightly inward turn of the wall. Rim diameter 16–22 cm. (fig. 44–7).
8. Carinated bowl with flattened bottom, wall curving outward to join the upper wall at a rounded angle 2.5–4.5 cm. below the rounded or flattened lip. Wall thickness may increase slightly at the carination. Rim diameter 16–32 cm., majority 18–24 cm. (fig. 44–8; pl. 99a).
9. Carinated bowl with flattened bottom, wall curving upward to form an angular junction with the upper wall, accompanied by thickening to produce a smooth curve on the interior. Flattened or rounded lip. Rim diameter 14–20 cm. (fig. 44–9).

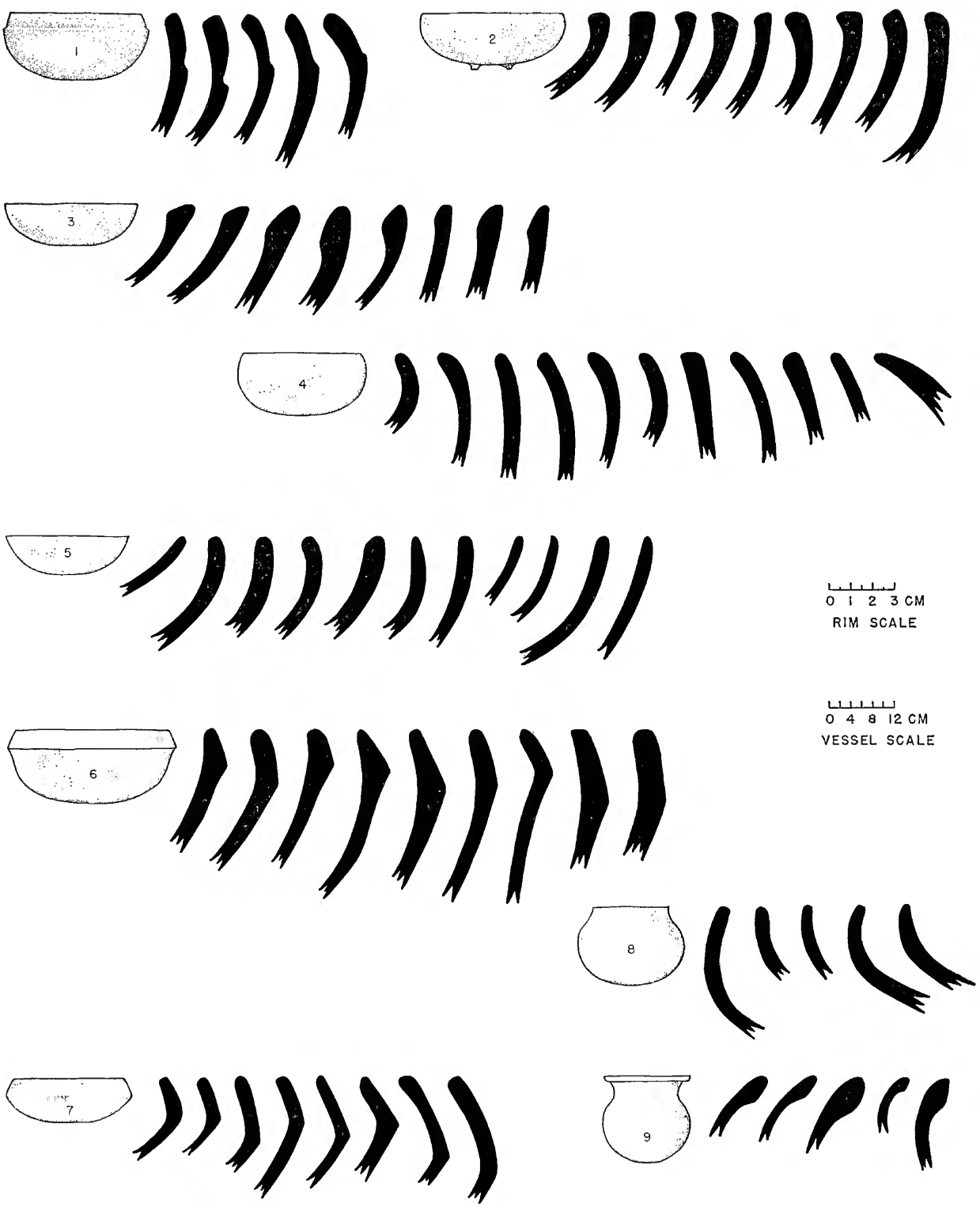


FIGURE 42.—Rim profiles and reconstructed vessel shapes of Valdivia Polished Plain.

10. Bowl with rounded body separated from the rim by a constriction sometimes accompanied by a change in body wall curvature, creating a broad channel on the exterior. Lip is tapered or rounded and occasionally lobed or undulating. Rim diameter 14–26 cm. (fig. 44–10).
11. Jar with concave or flattened base, rounded body, insloping to short nearly vertical neck, direct rim, flattened or rounded lip. Rim diameter 8–22 cm. (fig. 44–11; pl. 99c).
12. Jar with rounded body, slightly constricted neck and cambered rim. Rim diameter 12–16 cm. (fig. 44–12).

Occasional Decoration:

Technique: In rare examples, the red slip is applied incompletely, producing an ornamental effect. Edges of zones are straight and sharply defined.

Motif: Unslipped areas are most common on Form 1, where the inset zone adjacent to the rim exterior is frequently left plain. Only four examples were found in which the red slip was employed to produce a more complicated pattern, three bowl interiors of Form 3 and one exterior of Form 7 (Evans, Meggers and Estrada, 1959, fig. 32b).

Associated techniques: Except for occasional lobed or undulating rim treatment, none of the sherds classified as Valdivia Polished Red has any kind of decoration. Lobes are rectanguloid or curved and may be plain or decorated with nicks spaced 3–10 mm. apart.

Temporal Differences Within the Type: The majority of the crudely-finished, poorly-smoothed or incompletely-polished sherds come from the early part of Period A. By the latter part of Period A, workmanship is typically of good quality, although variation in degree of evenness

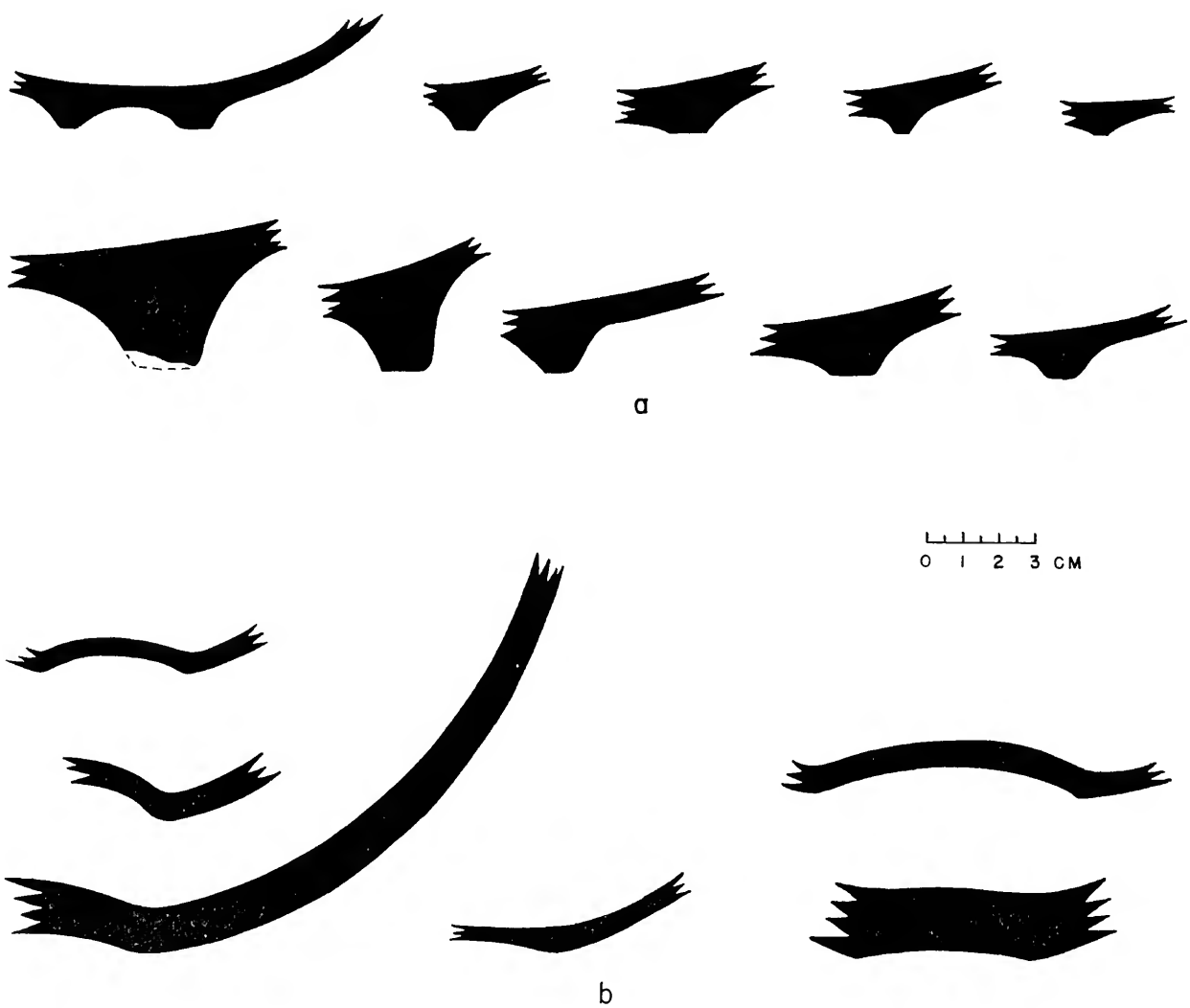


Figure 43.—Profiles of Valdivia Polished Red base forms. *a*, Tetrapod. *b*, Concave.

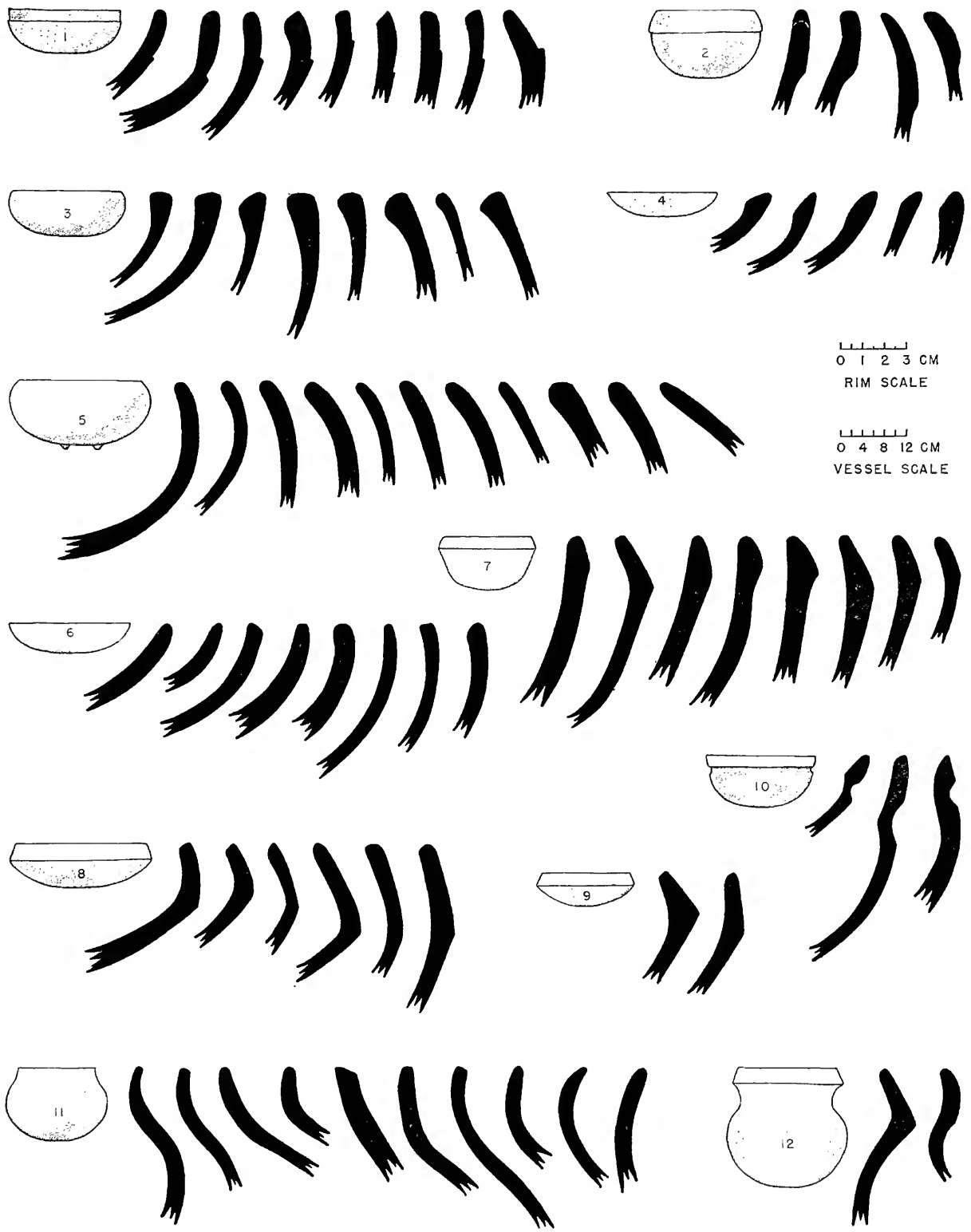


FIGURE 44.—Rim profiles and reconstructed vessel shapes of Valdivia Polished Red.

and polish occurs throughout the sequence. A general deterioration in quality is notable in Period D. Zoned red for occasional decoration is restricted to Period A.

The only vessel shapes represented in Period D are Forms 6 and 11. Forms 8 and 12 are restricted to Period C. Forms 9 and 10 appear to be restricted to Periods B and C, but are relatively rare and may not be represented in the small samples analyzed from Period A. Lobed or undulating rims are restricted to Periods A and B. Tetrapod bases are absent after the first part of Period B; concave bases continue into Period C.

CHRONOLOGICAL POSITION OF THE TYPE: Valdivia Polished Red is common in Periods A and B, attaining a frequency of 30–40 percent of the total sherds in some levels of the seriated sequence in Period A. It declines markedly in popularity in Period C, and in Period D is reduced to a very minor proportion of all the pottery types (figs. 49–50, 52–53).

Valdivia Pseudo-Corrugated
(*Valdivia Corrugado Falso*)

PASTE AND SURFACE: On Valdivia Plain (p. 72); see that type description for details.

FORM:

Rim: The single rim sherd is slightly thickened on the exterior, tapering to a rounded lip.

Body wall thickness: 4–7 mm.

Base: Probably slightly flattened or rounded.

Vessel shape reconstructed from sherds:

1. Jar with rounded body, insloping neck, slightly exteriorly thickened rim and rounded lip. Decoration begins at the lower edge of the rim thickening. Several body sherds show decoration extending from the base of the neck to a little below the maximum body diameter. Small size of sherds makes more complete description impossible.

DECORATION (pls. 54 b–i, 116 o, 169 g–i):

Technique: Pseudo-corrugation produced by pressing downward with tip of finger on the wet, soft and very plastic surface in vertical rows. On some sherds these rows seem to follow coil lines but on others they do not. "Corrugations" are typically very pronounced, strongly overlapping, with deep depressions and prominent curved ridges.

Motif: Applied to exterior of rim and neck or body below neck junction.

Associated techniques: Additional ornament of the type classified as Valdivia Modeled is sometimes associated. On several body sherds, it is above the band of pseudo-corrugation.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None.

CHRONOLOGICAL POSITION OF THE TYPE: Most characteristic of Period A, continuing sporadically during Period B (figs. 50, 51).

Valdivia Punctate
(*Valdivia Punteado*)

PASTE:

Method of manufacture: Coiling.

Temper: Fine to medium sand, with grains typically under 1 mm.; occasional sherds have coarse temper, but this is unusual.

Texture: Fine grained, compact, sandy but not friable; occasional long thin, lenticular air pockets.

Color: About 60 percent are bright orange through the cross section; the remainder have a medium gray or gray-brown cross section.

SURFACE:

Color: Orange, light tan, brown, gray-brown or black, the latter the result of fire clouding. Exterior and interior generally have similar hues except where one has a fire cloud. A red slip is occasionally applied to the rim and neck interior of jars, or rarely to the exterior.

Treatment: Great variation within the type from polished to smooth to gritty and uneven, but little variation on an individual sherd. Gashed punctates are associated with the poorest surface finish. Red slipped areas are well smoothed and polished.

Hardness: 3.5–4.

FORM:

Rim: Direct or exteriorly thickened, with rounded lip.

Body wall thickness: 6–11 mm.

Base: Probably slightly flattened or rounded.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, constricted concave-walled neck, slightly everted exteriorly thickened rim with rounded or tapered lip. Rim diameter 16–32 cm. (fig. 45–1).
2. Jar with rounded body, slightly concave-walled neck, direct rim with flattened or rounded lip. Rim diameter 10–22 cm. (fig. 45–2).
3. Rounded bowl with constricted mouth, direct rim and rounded lip. Mouth diameter 6–24 cm. (fig. 45–3).

DECORATION (pls. 100, 101, 116p):

Technique: Punctations vary greatly in form and depth, reflecting a tendency to employ a wide variety of tools. Although shape and depth are similar on a single sherd, differences in the pressure and angle of the tool may produce slight to marked variation. Diagonal pressure may push up the clay to form a ridge at one edge. The majority of punctates can be classified into one of the following categories which tend to grade into one another:

1. Circular depressions made with flat ended or pointed tool 2–5 mm. in diameter, 1–2 mm. deep. In thin walled examples, pressure may create a corresponding boss on the interior. Spacing is from adjacent to 8 mm. apart, and adjacent holes may be deformed by executing of succeeding ones (pl. 100 a–n). Rarely, a hollow tool, like a cane, produces a ring rather than a hole.
2. Trianguloid depressions made with a blunt or pointed tool (pl. 101 a, c–f).
3. Rectanguloid marks (pl. 101 b, l).
4. Ovoid depressions (pl. 101 g–k, m–n).
5. Long thin cuts (pl. 101 o–q).
6. Tiny to pinpoint size punctates of irregular form but typically under 1 mm. in diameter (pl. 100 o–r).

Motif: All-over application on the jar neck is most typical, the punctates arranged in horizontal rows or haphazardly filling the space. Occasionally, arrangement is in independent rows (pl. 100 m–n) or zones (pls. 100 b, d, r, 101 g, j, k). Rarely, punctate areas are subdivided by incised lines (pl. 101 a, b). Red slipped exterior surfaces are associated with techniques 1 and 6.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None; all techniques occur throughout the duration of the type.

CHRONOLOGICAL POSITION OF THE TYPE: Present throughout the sequence in minor frequency (figs. 49–53).

Valdivia Red Incised
(Valdivia Rojo Inciso)

PASTE AND SURFACE: Similar to Valdivia Fine-Line Incised (p. 60); see that type description for details.

FORM:

Rim: Direct with flat (occasionally rounded) lip; rarely shouldered.

Body wall thickness: 0.6–1.5 cm.

Base: Slightly flattened or tetrapod.

Vessel shapes reconstructed from sherds:

1. Bowl with wall curving upward or slightly inward. Between 1.0 and 1.5 cm. below the lip, body wall thickness is reduced 1–2 mm. producing a well marked shoulder on the exterior. Rim diameter about 28 cm. (fig. 29–1 top).
2. Bowl with wall curving upward and slightly inward to direct rim, flat (rarely rounded) lip. Rim diameter 24–34 cm. (fig. 29–2 top).
3. Jar with rounded body, wall sloping inward and upward to direct rim, flattened lip. Rim diameter 28–34 cm. (fig. 29–3 top). One example has a castellated rim (pl. 103 a, b).

DECORATION (pls. 102–104, 177i, 178b):

Technique: Incised lines 2–3 mm. deep and 2–5 mm. wide made when clay was fairly dry, giving the effect of careful workmanship although lines are not always evenly spaced or exactly parallel. Intersecting lines may have rounded corners. In about one-third of the examples, there is some excision at corners or in small areas of the design. Some examples include circular punctates.

Motif: Geometric patterns, predominantly rectilinear, in a small number of variants. Most common are straight vertical and horizontal lines producing a hachure (pl. 102f) sometimes with punctates at the center of the squares (pl. 104 a, f); interlocking frets (pls. 102 a–b, g, 103c), sometimes with one element excised (pl. 102 c–d); and a band of circles with a dot in the center (pl. 104 b–e, g–h). Rarely, horizontal rows of slanting parallel lines occur (pl. 103 a–b). Decoration is applied to the exterior from rim to below the shoulder.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None; examples with excision occur in minor frequency throughout the duration of the type.

CHRONOLOGICAL POSITION OF THE TYPE: Most frequent during Period A, declining during Period B, and absent thereafter (figs. 49–53).

Valdivia Red Zoned Punctate
(Valdivia Rojo Punteado en Zonas)

PASTE:

Method of manufacture: Coiling, with tendency to break along coil junctions, particularly on the neck.

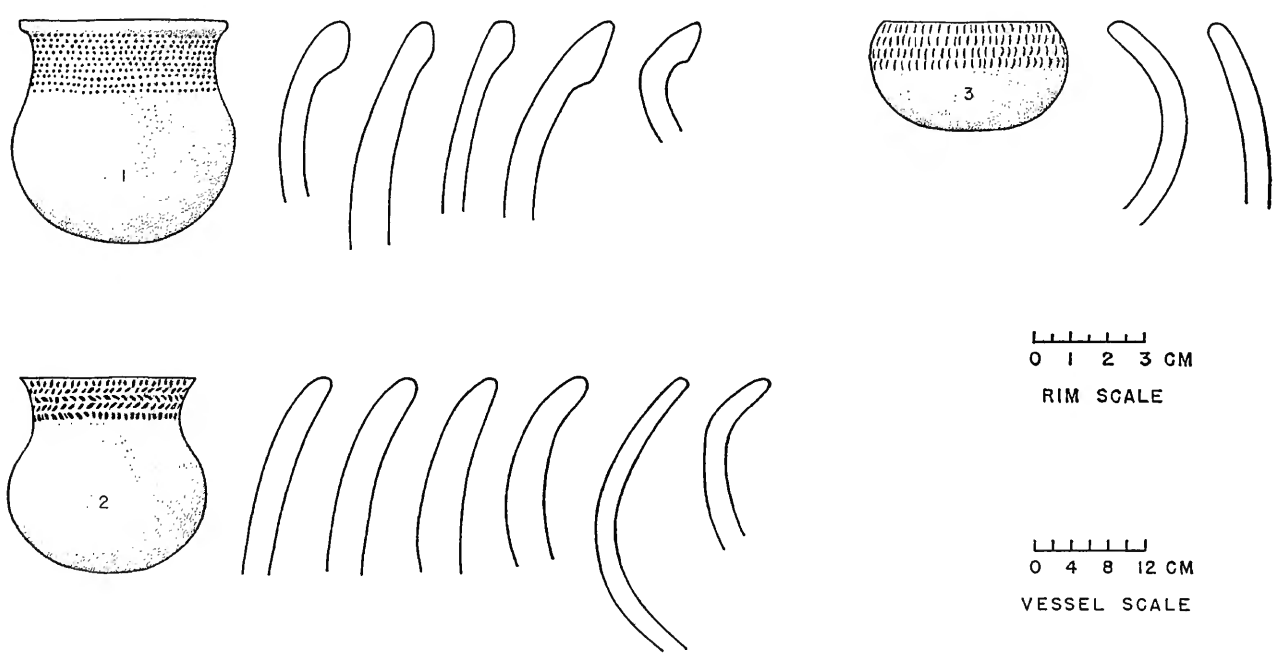


FIGURE 45.—Rim profiles and reconstructed vessel shapes of Valdivia Punctate.

Temper: Abundant fine to medium sand, with occasional grains up to 4 mm. White particles abundant in some vessels.

Texture: Compact, fine grained; temper sometimes appears unevenly distributed because of differential size of particles.

Color: Variation from dark gray to orange through the cross section, with some examples fired orange 1–2 mm. from each surface leaving the remainder of the core gray.

Firing: Completely to incompletely oxidized. Occasional small fire clouds.

SURFACE:

Color:

Exterior: Red slipped, varying from rich red to red-orange. Rare examples lack a red slip, and are light grayish tan to light brown.

Interior: Light tan to light gray-brown most typical; rarely medium gray.

Treatment:

Exterior: Red slip usually applied rather evenly in a thin coat covering the entire surface; occasionally applied in streaks leaving the orange-tan surface visible between. Decorated area and neck are generally even, smooth and polished to a low luster. Polishing streaks may run vertically on the neck producing burnished lines of darker hue. Red slip was typically applied subsequent to decoration, coloring the incisions and punctations as well as the surrounding surface, and occasionally omitted from zones between the incisions.

Interior: Smoothed to a degree ranging from superficial, leaving ridges and unevenness, to good, producing an even, smooth, striated polished to polished finish.

Hardness: 3.5–4.

FORM:

Rim: Typically cambered; rarely, direct or everted; rounded, flattened or tapered lip.

Body wall thickness: Range 4–9 mm., usually 5–8 mm.

Base: Probably rounded or flattened; no complete examples.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, constricted neck and cambered rim forming an insloping collar 2.0–3.5 cm. wide. Rim diameter 10–18 cm. (fig. 39–1 top).
2. Rounded jar with constricted mouth, direct or slightly expanded rim, rounded or tapered lip. Mouth diameter 10–18 cm. (fig. 39–2 top).
3. Rounded jar with constricted neck and short everted rim with tapered lip. Rim diameter 14–20 cm. (fig. 39–3 top).

DECORATION (pls. 105, 106):

Technique: Broad incisions defining zones that are filled with punctation. Incisions are 2–5 mm. wide, the width of a single line varying slightly due to varying pressure of the tool. Depth is 0.5 mm. or less, with a shallow U-shaped cross section. Incisions may be straight and evenly parallel or waving, but typically are not precisely drawn. Punctates are circular (diameter 2–4 mm.) or elongated (2 by 4, 3 by 5 mm.) and ovoid or rectanguloid in outline. Circular punctates are made either with a pointed or flat ended tool producing a conical or cylindrical imprint. Punctates vary from adjacent to 5 mm. apart, and spacing tends to be similar on a single vessel. Red slip was applied after decoration, filling incisions and shallow punctates, but leaving deeper ones uncolored. Polishing subsequent to slipping may cause clay to overlap the mouth of the punctates.

Motif: A band of decoration occupies the area above the camber on jars of Form 1. Most commonly, a lobed, undulating or zigzag incision divides the area horizontally into two zones, the lower one filled with punctation (pl. 105 a, c–g, j–k). Occasionally, a second incision runs just below the rim, and the area between the two incisions may be left unslipped (pl. 105b). Less common motifs include independent square or rectanguloid areas defined by incision and alternately filled with punctation and left plain (pls. 105i, 106a), and a band of punctation on the upper portion of the rim rather than the lower edge (pl. 105h).

On jars of Form 2, a double row of circular punctates may be applied on the exterior just below the lip (pl. 106 d–e), or punctates may occupy a broad band bounded at the rim by a broad incision paralleling the lip. Jars of Form 3 may have punctation on the exterior of the constricted neck, or in zones bordered by broad-line incision.

Associated techniques: One jar of Form 3 has Valdivia Incised decoration on the neck; one jar of Form 1 has a band 8–9 mm. wide on the center of the punctated zone executed in the multiple drag-and-jab technique.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None.

CHRONOLOGICAL POSITION OF THE TYPE: Occurring rarely and sporadically in Periods A and B, becoming characteristic in Period C (figs. 49, 52–53).

Valdivia Rocker Stamped
(Valdivia Estampado en Zig-zag)

PASTE AND SURFACE: On bowls of Valdivia Polished Plain (p. 74) or rarely Valdivia Polished Red (p. 76), the interior surface being less well finished than the exterior and typically striated polished, or on jars of San Pablo Plain (p. 45) or less frequently Valdivia Plain (p. 72), the rim interior generally polished plain or polished red. See descriptions of the above types for details.

FORM:

Rim: Direct, expanded or carinated with rounded or flattened lip on bowls; everted with expanded or direct lip or cambered on jars.

Body wall thickness: Range 4–10 mm.; Majority 5–8 mm.

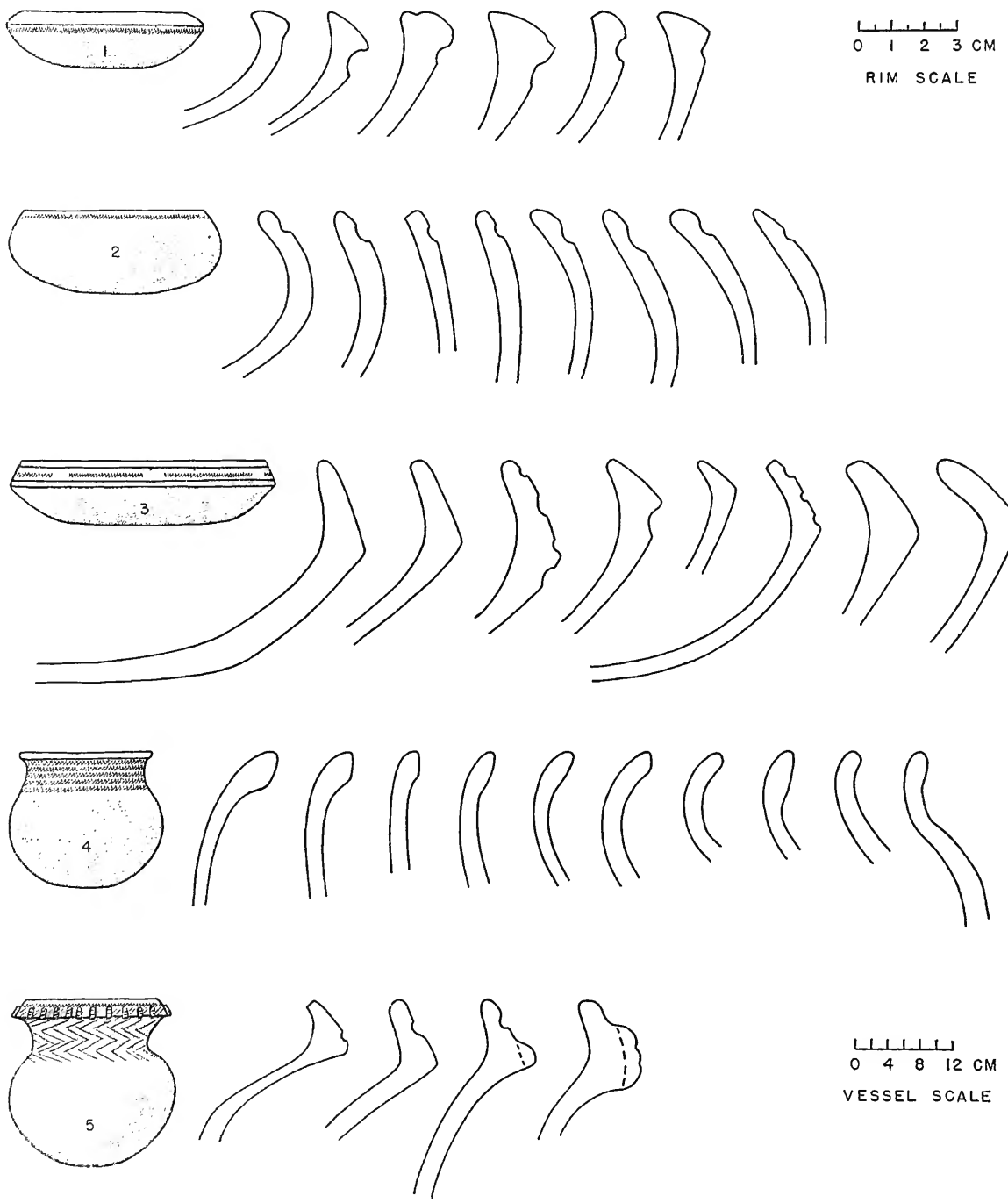
Base: Probably rounded or slightly flattened.

Vessel shapes reconstructed from sherds:

1. Shallow bowl with flattened bottom, walls curving upward to expanded rim with a broad outsloping top. Thickness at the lip is 2 to 4 times that of the body wall. Rim diameter 16–32 cm. (fig. 46–1).
2. Deep rounded bowl with slightly constricted mouth,

direct rim and rounded, tapered or flattened lip. Mouth diameter 14–26 cm. (fig. 46–2).

3. Carinated bowl with flattened bottom, wall sloping upward to angular shoulder 1–3 cm. below the direct rim, rounded or flattened lip. Carination is thickened markedly to produce a smooth curve on the interior. Rim diameter 24–34 cm. (fig. 46–3).
4. Rounded jar with slightly constricted mouth, slightly everted rim sometimes expanded in thickness just below the rounded or tapered lip. Rim diameter 14–18 cm. (fig. 46–4).
5. Jar with rounded body, constricted neck and



RE 46.—Rim profiles and reconstructed vessel shapes of Valdivia Rocker Stamped. (Depressions on exteriors result from decoration.)

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cambered rim. Camber is angular and thickened on the interior. Lip is rounded or flattened. Rim diameter 12–20 cm. (fig. 46–5).

DECORATION (pls. 107–112, 179 i–n):

Technique: Rocker stamping executed by a combination of rocking and dragging of a broad ended tool, producing a series of interlocking trianguloid depressions separated by a narrow ridge. The effect is a negative version of the usual type of rocker stamping. The technique is applied so as to create a band 0.5–1.3 cm. wide and 1–2 mm. deep. In some examples the margin is straight suggesting a broad incision may have been drawn first; in others the margin is jagged and appears to be formed by the rocker stamping itself. Typically, the rocking is evenly executed, with strokes 4–5 mm. apart, but instances occur of "crowding" particularly toward the end of a line where the strokes are so closely spaced that they obscure each other. The trianguloid facets often show parallel horizontal striations. The left edge is typically deepest, with the surface sloping upward to the right, suggesting execution from left to right.

Motif: On bowls, rocker stamping is applied in one or more independent rows, either continuously around the circumference or interrupted by blank areas 0.5–2.0 cm. in width (pls. 107–109). On Form 1, the row is just below the angular outer edge of the rim. On Form 2, it is 0.5–1.0 cm. below the lip. On Form 3, a row of rocker stamping typically occupies the center of the upper wall, between two broad-line incisions, one just below the lip and the other just above the carination (pl. 110 a–b); rarely, two rocker stamped rows run parallel (pl. 111g). Occasionally a second row of rocker stamping occurs just below the carination (pl. 110 d, g). One example of Form 2 has additional vertical rows (pl. 179k).

On jars of Form 4, the exterior of the neck is typically covered with adjacent horizontal rows of rocker stamping producing an overall textural effect (pl. 112 g–q, s, u). Jars of Form 5 are occasionally similarly decorated, but more commonly rocker stamping is limited to a single row adjacent to the rim or just above the angle of the camber (pl. 112 b–c).

Associated techniques: Pebble polishing (pl. 109k), incision or punctation are rarely applied to bowls of Form 2. Bowls of Forms 1 and 3 may have broad-line incision on the body (pls. 110, 111). Jars of Form 5 and rarely of Form 4 may have Valdivia Incised decoration on the neck or body. Nicked ribs sometimes occur on rims of Form 5.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None evident.

CHRONOLOGICAL POSITION OF THE TYPE: Limited to Period C, particularly the latter half of the Period as exemplified at G–54 and G–115 (figs. 52–53).

Valdivia Shell Stamped
(Valdivia Estampado con Concha)

PASTE AND SURFACE: Similar to San Pablo Plain (p. 45) and Valdivia Plain (p. 72); see those type descriptions for details.

FORM:

Rim: Folded-over, exteriorly thickened or everted with flattened lip.

Body wall thickness: 5–9 mm.

Base: Probably rounded or slightly flattened.

Vessel shapes reconstructed from sherds:

1. Jar with rounded body, insloping neck, slightly everted exteriorly thickened rim with flattened lip. Exterior thickening not smoothed onto underlying surface, giving "folded-over" appearance. Rim diameter about 14 cm. Lip nicked or finger pressed. Associated with decoration of Motif 1 (fig. 37–1 bottom).
2. Jar with rounded body, insloping neck, everted exteriorly thickened rim, flattened lip sometimes decorated with notches. Associated with decoration of Motif 1 and 2 (fig. 37–2 bottom).
3. Jar with rounded body, constricted neck, strongly everted rim and flattened lip. Exterior rim diameter 14 cm. Associated with decoration of Motif 3 (fig. 37–3 bottom).
4. Jar with everted rim turned inward at almost a 90° angle 1.5 cm. below the tapered lip. Rim diameter 18 cm. Associated with decoration of Motif 3 (fig. 37–4 bottom).

DECORATION (pl. 113 a–k):

Technique: Series of marks made with a piece of fluted shell giving a slightly curved dentate impression 1.0–1.5 cm. long, with 3–4 "teeth." Marks are deep, clear and well defined, produced by pressing the shell straight into the clay. Spacing is 1–5 mm. apart.

Motif: Three distinct decorative motifs occur:

1. Rows of horizontal marks running vertically down neck to shoulder; rows are typically continuous, 0.3–1.5 cm. apart, but may be in zones separated by undecorated areas (pl. 113 a–e).
2. One or more rows of vertical marks running horizontally along the rim or neck exterior (pl. 113 f–i).
3. A continuous line formed by joining marks end to end (pl. 113 j–k).

TEMPORAL DIFFERENCES WITHIN THE TYPE: Motif 1 is confined to Period A; the other motifs occur in Period B, possibly continuing into Period C.

CHRONOLOGICAL POSTION OF THE TYPE: Characteristic of Period A (figs. 50–51).

Valdivia Striated Polished Plain
(Valdivia Pulido en Líneas)

PASTE: Similar to Valdivia Plain (p. 72); see that type description for details.

SURFACE:

Color: Orange-tan, red-orange, brown-orange, brown or gray-brown, with some range of variation on each sherd. Few fire clouds. Jar exteriors are sometimes blackened, possibly from use in cooking.

Treatment:

Exterior: After preliminary smoothing, the surface was allowed to dry slightly before rubbing with a smooth,

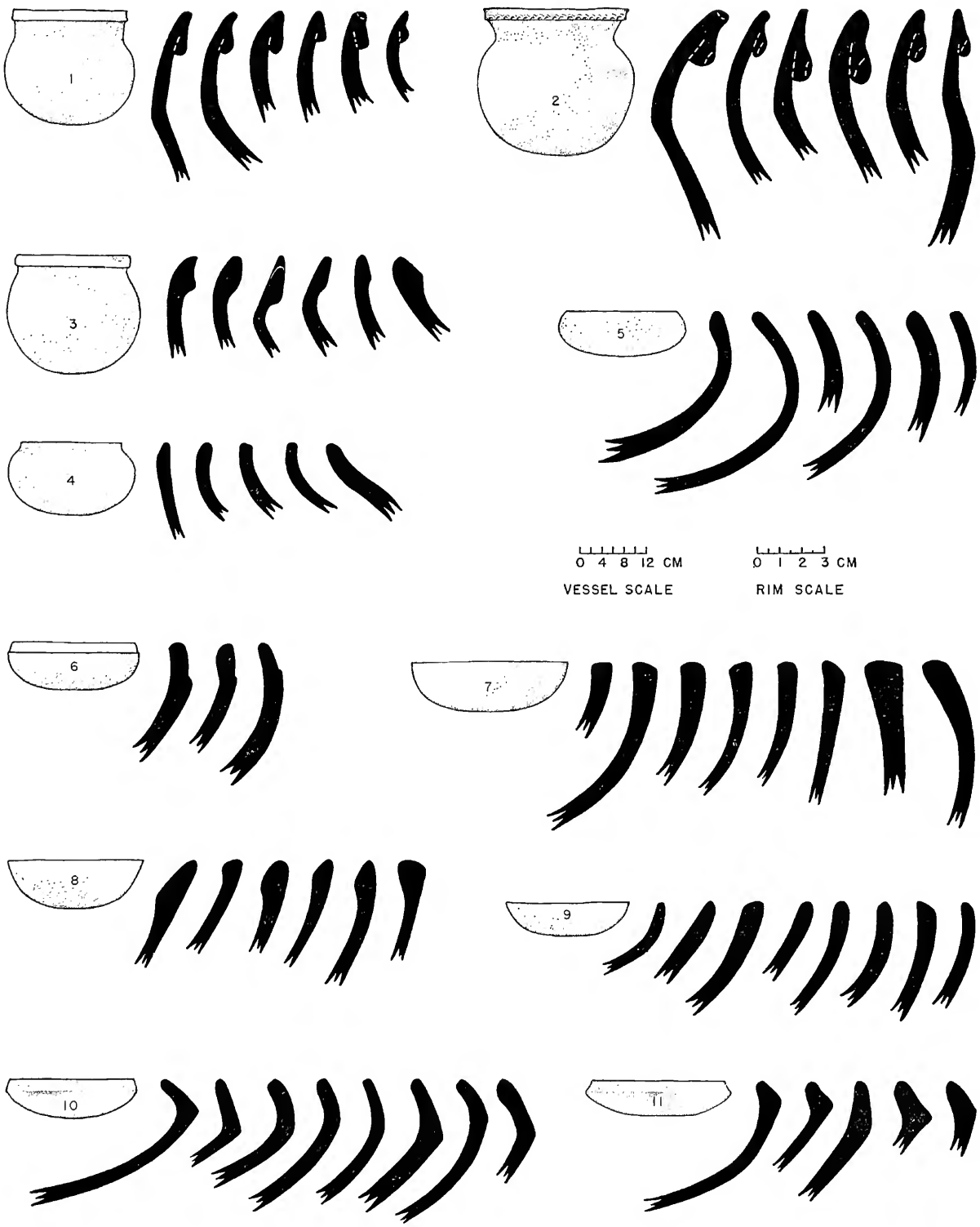

FIGURE 47.—Rim profiles and reconstructed vessel shapes of Valdivia Striated Polished Plain.

waterworn pebble to produce polishing striations 0.5–1.5 mm. wide (pl. 115). Striations usually vary from overlapping to 5–15 mm. apart, although some surfaces show only a few widely spaced lines. Direction is generally horizontal. Finish ranges from distinct striations to incomplete polish leaving small lusterless areas.

Interior: On bowls, treatment is similar to that on the exterior. On jars, striated polish is usually limited to the interior of the rim and neck, the remainder of the interior being superficially smoothed.

Hardness: 4–4.5.

FORM:

Rim: Folded-over, exteriorly thickened, expanded, interiorly thickened, direct or carinated with rounded, flattened or tapered lip. Lip is occasionally finger pressed or lobed (undulating).

Body wall thickness: 4–9 mm.

Base: Rounded or slightly flattened; sometimes thickened to 10–13 cm., rarely, concave.

Common vessel shapes reconstructed from sherds:

1. Jar with flattened bottom, slightly constricted neck, exteriorly thickened folded-over rim with tapered or flattened lip, sometimes finger pressed. Rim diameter 18–22 cm. (fig. 47–1).
2. Jar with flattened or thickened bottom, rounded body, slightly constricted neck, everted folded-over rim with tapered or flattened lip. The lower edge of the exterior thickening is ornamented by a continuous row of fingertip impressions; occasionally the lip is similarly treated. Rim diameter 18–36 cm. (fig. 47–2).
3. Jar with flattened bottom, rounded body, slightly constricted neck, insloping or slightly everted, exteriorly thickened rim with rounded, flattened or tapered lip. Rim diameter 14–22 cm. (fig. 47–3).
4. Jar with rounded body, short insloping neck, direct rim, flattened or rounded lip. Rim diameter 10–20 cm. (fig. 47–4; pl. 99d).
5. Rounded bowl with slightly constricted mouth, direct rim, rounded lip. Rim diameter 12–26 cm. (fig. 47–5).
6. Bowl with flattened bottom, rounded shoulder and slightly insloping rim with rounded lip. Between 1.5 and 2.0 cm. below the lip, the exterior wall is cut back sharply producing a 1–2 mm. decrease in thickness. Rim diameter 20–26 cm. (fig. 47–6).
7. Open bowl with flattened bottom, upcurving or slightly incurving wall, expanded rim, flattened, rounded or tapered lip. Rim diameter 20–34 cm. (fig. 47–7).
8. Open bowl with flattened bottom, walls outsloping to interiorly thickened rim with rounded or tapered, occasionally lobed lip. Rim diameter 16–32 cm. (fig. 47–8).
9. Open bowl with flattened bottom, walls curving outward or upward to direct rim with rounded or tapered lip. Rim diameter 10–28 cm. (fig. 47–9).
10. Carinated bowl with flattened bottom, lower wall joining insloping upper wall at angular to rounded junction, typically unthickened on the interior. Direct rim, rounded or tapered lip. Rim diameter 18–24 cm. (fig. 47–10).
11. Carinated bowl with flattened bottom, lower walls curving upward to join insloping upper wall at a typically pronounced angle created by exterior thickening 1.0–2.5 cm. below the lip, which is rounded. Interior wall forms a smooth curve. Rim diameter 14–28 cm. (fig. 47–11).

TEMPORAL DIFFERENCES WITHIN THE TYPE: Forms 1 and 6 are absent after Period B; Forms 2 and 5 are absent in Period D.

CHRONOLOGICAL POSITION OF THE TYPE: Although present throughout the seriated sequence, Valdivia Striated Polished Plain is most popular during Periods B and C (figs. 49–50, 52–53).

Valdivia Zoned Incised
(Valdivia Inciso en Zonas)

PASTE AND SURFACE: On Valdivia Polished Plain (p. 74); see that type description for details.

FORM:

Rim: Direct or cambered, with rounded lip.

Body wall thickness: 3–7 mm.

Base: Probably flattened.

Vessel shapes reconstructed from sherds:

1. Bowl with rounded body and slightly constricted direct rim with rounded lip. Rim diameter 8–12 cm. (fig. 48–1).
2. Carinated bowl with vertical or slightly insloping upper wall, direct rim and rounded lip. Rim diameter 12–20 cm. (fig. 48–2).
3. Jar with rounded body, constricted neck and angular cambered rim with rounded lip. Rim diameter about 12 cm. (fig. 48–3).

DECORATION (pls. 113 l–s, 114):

Technique: Designs are typically composed of broad, rounded incisions or grooves, 2–8 mm. wide and about 0.5 mm. deep delimiting areas filled with ornamentation of 3 principal and 1 rare technique:

1. A single row of short diagonal lines of the same width and depth as those forming the rest of the design (pl. 113 l–o).
2. Two or more rows of short gashes of rectanguloid or ovoid outline (pl. 113 p–r).
3. Diagonal or cross hatch drawn with shallow fine to scratch-like incisions, typically combined with very broad grooves as boundary lines (pl. 114 a–p).
4. A rare variant is composed of incisions 1–2 mm. wide, which are used for both outline and zoned cross hatch (pl. 114 q–u).

The broad-line incisions are generally straight and rather evenly spaced but intersecting ends may not meet. Fine-line incisions are unevenly spaced and may stop short of or extend over the edge of the bordering broad line.

Motif: Bands or areas of hachure bounded by incised lines. In Techniques 1, 2, and 4, the area between hatched zones is typically filled with parallel incisions; in Technique 3, it is typically left plain.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Technique 4 is the only one found in Period C of the seriated sequence.

CHRONOLOGICAL POSITION OF THE TYPE: Beginning in the latter part of Period C, continuing through Period D in slightly increasing frequency (figs. 52–53).

Unclassified Decorated

The majority of the decorated sherds not classified into pottery types bear some kind of punctation, but technique is too variable and arrangement to inconsistent for grouping into a type. Valdivia pottery is remarkably standardized, and unclassifiable sherds are rare considering the quantity of the total sample.

SHELL STAMPED.—Imprinting or stamping with the end of a narrow piece of fluted shell to produce a mark with three to four "teeth" is a common method of ornamenting the exterior of cambered rims on Valdivia Brushed and Valdivia Applique Fillet. When associated with these techniques, rims have been classified in the respective types. Three sherds from Period D have a similar horizontal row on the exterior of the thickened rim, the remaining surface apparently left plain.

PUNCTATE RIDGE.—Four sherds from Period B have diagonal ridges 1.3–1.7 cm. apart, 1 mm. in elevation, smoothed onto the adjacent surface with a row of punctates running end to end, 2–4 mm. apart, along the summit. Decoration is applied to the exterior body of small jars.

Trade Pottery of Machalilla Phase Types

Sherds of Machalilla Phase types, both plain and decorated, occur with considerable frequency in Valdivia Phase sites of Period C, particularly G–54. While plain sherds are not always readily distinguishable because of similarity in temper and surface treatment to types of the Valdivia Phase, there are several stirrup spouts and rim sherds of diagnostic Machalilla Phase vessel shapes. Identified types include the following (see Machalilla Phase type descriptions for details):

Ayangue Incised.
Machalilla Double-line Incised (pl. 138).
Machalilla Embellished Shoulder.
Machalilla Incised and Red Zoned (pl. 145j).
Machalilla Punctate and Red Zoned (pl. 148 t–u).
Machalilla Red Banded (both varieties) (pl. 153).
Machalilla Striated Polished Plain.

The Seriated Ceramic Sequence and Its Implications

The seriated sequence of the Valdivia Phase is based on stratigraphic excavations at five habitation sites on the central Ecuadorian coast. Thickness of the deposit ranges from 30–45 cm. at G–25 to 3.8 meters at G–31. Conditions for preservation of pottery surfaces are excellent at G–31, G–54 and G–88, moderately good at G–84, and exceedingly unfavorable at G–25, where most of the surfaces are badly eroded. To these variations must be added disturbances created by cultural factors, such as long continued occupation of a site and reoccupation by later groups, and analytic inconsistencies resulting from classification by different individuals over a period of years, and the lack of opportunity to recheck some of these classifications after the seriated sequences had been completed. In order to recognize and minimize the effect of these variables on interpretation of the ceramic sequence, three separate seriation charts have been prepared (figs. 49–50, 52). A fourth chart (fig. 53) combines portions of the other three into what appears to

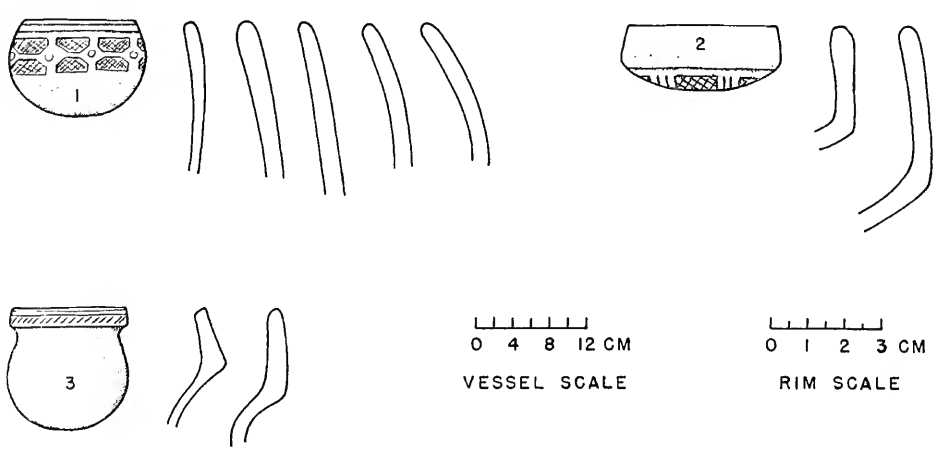

FIGURE 48.—Rim profiles and reconstructed vessel shapes of Valdivia Zoned Incised.

represent the best reconstruction of trends in pottery type frequency during the Valdivia Phase.

The first seriation includes results of three small stratigraphic pits excavated in different parts of G–31 during the first season of work in 1956–7 (fig. 49). The remaining stratigraphic cuts have not been included because either they duplicate the trends or the preliminary classification was not followed by analysis of rims and decorative motifs. The result is a revision of the chart originally published (Evans, Meggers and Estrada, 1959, fig. 78), incorporating several minor decorated types formerly left unclassified, and a reanalysis of the unpolished plain types in which San Pablo Plain was confined to coarse temper of the kind characteristic of Period C, eliminating many of the sherds originally placed in that type.

Clearcut distinctions in popularity are evident in a number of the types, either as a marked alteration in frequency or as presence or absence. Of the plain types, Valdivia Plain is dominant in the lower portion of the sequence, where it comprises more than 60 percent of the total sherds. At the top of the sequence, it has declined to less than 20 percent. While Valdivia Plain loses popularity, Valdivia Polished Plain and Valdivia Polished Red gain, the latter reaching its maximum earlier than the former and showing a more pronounced decline. Punta Arenas Plain appears as a trace in the upper half of the sequence, and its seemingly erratic appearance is partly, if not entirely, the result of failure to recognize it at the time the principal classification was made. Of the decorated types, Valdivia Fine-line Incised, Valdivia Red Incised, Valdivia Combed and Valdivia Fingernail Decorated are confined to the lower levels. Valdivia Modeled appears in its maximum frequency at this time. Valdivia Finger Grooved is confined to the lower half of the sequence. During the period the above types are popular. Valdivia Multiple Drag-and-Jab Punctate, Valdivia Red Zoned Punctate, Valdivia Nicked Broad-line Incised, Valdivia Excised, Valdivia Pebble Polished, Valdivia Brushed, Valdivia Nicked Rib or Nubbin, and Valdivia Applique Fillet are typically absent, while Valdivia Incised and Valdivia Broad-line Incised are present in minor frequency compared to later portions of the sequence. Among these later decorated types, clearcut differences in popularity cannot be identified with certainty, except that Valdivia Nicked Broad-line Incised and Valdivia Carved begin considerably later than the others. Valdivia Broad-line Incised shows a slight but consistent tendency to increase. Valdivia Incised reaches a climax of about 23 percent about one-third of the distance from the top of the sequence, followed by a climax in Valdivia Brushed. A few trade sherds of Machalilla Phase types were identified from levels near the top.

This picture presents an interesting contrast to that resulting from interdigitation of sections D and E of the large Cut J at G–31, excavated in 1961 (fig. 50). Although similar tendencies can be recognized in a few of the types, the majority occur throughout the seriated sequence. There are several possible explanations for this situation. In the normal accumulation of refuse during habitation, a certain amount of mixing will inevitably occur, not only from the movement of people but as a consequence of digging of pits, postholes or other physical alterations of a conscious nature. This happened not only during Valdivia times, but also later, when the portion of the site surrounding Cut J was reoccupied by people of the Guangala Phase. Such stirring up of the refuse would have brought early sherds upward and to a lesser extent moved later ones downward in the manner indicated by the seriation chart.* This situation was not brought out in the first season of work because of the relatively small sample per level in the small stratigraphic cuts. In Cut J, samples as large as 24,000 sherds per level showed only a tenth or a hundredth of a percent frequency for some of the types, but this is sufficient to obscure the trends. In spite of such distortion, Valdivia Shell Stamped is confined to the early levels as it is on figure 50, and Valdivia Multiple Drag-and-Jab Punctate, Valdivia Pebble Polished, Valdivia Applique Fillet and Valdivia Cord Impressed show a similar restriction to the latter part of the sequence. It should be noted that frequencies for Valdivia Plain and San Pablo Plain are absent from this chart because the types were misclassified by Estrada's laboratory assistants in Ecuador, and the error was not caught until too late to be corrected by reclassification.

The large sample from Cut J includes many minor decorated types, most of which occur in a frequency of less than 2 percent so that trends in popularity can only be brought out by magnifying the scale 100 times (fig. 51). Magnification reveals a sharp decline in frequency of Valdivia Fine-line Incised, Valdivia Red Incised, and Valdivia Combed, and less marked drops in Valdivia Cut-and-Beveled Rim, Valdivia Fingernail Decorated, Valdivia Finger Grooved, Valdivia Corrugated and Valdivia Pseudo-Corrugated. A slight decline seems to have occurred in Valdivia Embossed, although this is obscured by the erratic occurrence of the type. Valdivia Excised, by contrast with the others, shows a tendency to increase in popularity.

*A similar conclusion was reached by Lathrap (1962, p. 89) as a result of the stratigraphic distribution of Early and Late Tutishcainyo sherds in his excavations at Yarina Cocha, Peru.

The third seriated sequence (fig. 52) is composed of levels of stratigraphic excavations at four additional sites of the Valdivia Phase: G–25, G–54, G–88 and G–84. The sites were occupied successively and each is of relatively short duration compared to G–31. The pottery type occurrences are consequently subject to a minimum of distortion by mechanical mixture or disturbance of the refuse and their presence or absence at a given part of the sequence is more readily observed. Trends are generally similar to those recognized at G–31, the greatest discrepancy being in the relative frequencies of Valdivia Incised and Valdivia Brushed. The site of G–84, occupying the upper part of the sequence shows the continuation of many of the earlier trends but deviates markedly in the plain types. In evaluating this disconformity, it should be taken into consideration that surfaces are often eroded, making it difficult to identify polished plain types. Of the typical decorated types, only Valdivia Broad-line Incised, Valdivia Nicked Broad-line Incised, Valdivia Incised, Valdivia Pebble Polished, and Valdivia Brushed remain. Four new types, weakly represented earlier, are diagnostic: Punta Arenas Incised, Valdivia Applique Fillet, Valdivia Carved and Valdivia Zoned Incised. In the middle of the sequence, represented by G–54, trade sherds of Machalilla Phase origin are frequent.

For the purpose of more detailed analysis of changes in pottery types, levels for which information was available on motif and vessel shape were selected and interdigitated to reproduce the trends just described. This chart (fig. 53) includes the lower levels of Cut A and all levels of Cuts F and H from G–31, Cut 1 from G–54, Cuts 1, 2, and 3 of G–88 and Cut 1 of G–84. In the case of G–84, the 10 centimeter levels have been combined into 20 centimeter levels to avoid unrealistic prolongation of the late portion of the sequence. Whereas each of the previous charts showed a consistent trend, the juxtaposition of G–31 levels with those of other sites of presumably similar age introduces some problems. The principal difficulty is in the tendency toward a double curve of frequency exhibited by Valdivia Brushed and Valdivia Applique Fillet. Valdivia Incised has a less marked tendency in the same direction. However, the plain types and most of the other decorated types produce more consistent trends when G–31, Cut H is placed below G–54, Cut 1. As will be discussed below, this relative position also concides best with trends in vessel shapes and figurine types (figs. 54, 64). The disconformity can be explained by evidence suggesting a brief late reoccupation of G–31, with admixture of the later and earlier refuse to such an extent that it cannot be separated by levels. Particularly suggestive of this is the high frequency of Valdivia Applique Fillet, which is comparable to that at G–84 and much greater than at G–54. Such an admixture of late types would also distort the percentages of Valdivia Incised and Valdivia Brushed in the manner represented. This conclusion is supported by the presence of a number of late decorated sherds in the surface collection of G–31, as well as of a late vessel shape (Form 22), rare to absent at G–54. The upper levels of Sections D and E of G–31, Cut J show similar evidence of late reoccupation, notably the high frequency of Valdivia Applique Fillet and Valdivia Pebble Polished and the presence of Valdivia Zoned Incised, which in the sites of short duration are not associated with the early decorated types.

By ruling out differences in pottery type frequency apparently resulting from factors extraneous to the ceramic evolution (mechanical mixture, reoccupation, inconsistencies in classification, etc.), it is possible to make a fourfold division of the Valdivia Phase sequence that applies to all four of the seriation charts and equates them with one another chronologically. Since ceramic change is continuous, a situation exhibited in all of the seriation charts, the point selected for period division is arbitrary to the extent that moving it up or down one or two levels could be debated. Our division represents our best judgment after evaluating all lines of evidence available not only from ceramic differences but from differences in other kinds of artifacts. Distinctions between one period and the next are more a matter of relative frequency of types than of presence or absence. Emphasis has been placed on contrasts in characterizing the period differences (fig. 55), but the continuity implied by the curves of popularity for each type throughout the entire Valdivia Phase should be kept in mind.

Except for a small sample from Cut 3 at G–88, Period A is represented only at G–31 in levels below 2.20 meters in Cut A, below 1.80 meters in Section D of Cut J and below 2.70 meters in Section E of Cut J. Valdivia Shell Stamped is the only decorated type confined to Period A. The following types are at maximum frequency during Period A: Valdivia Plain, Valdivia Polished Red, Valdivia Fine-line Incised, Valdivia Combed, Valdivia Cut-and-Beveled Rim, Valdivia Red Incised, Valdivia Modeled, Valdivia Embossed, Valdivia Pseudo-Corrugated, Valdivia Corrugated, Valdivia Finger Grooved, and Valdivia Fingernail Decorated (fig. 55). Valdivia Excised, Valdivia Incised, Valdivia Broad-line Incised, Valdivia Brushed, San Pablo Plain, Valdivia Polished Plain and Valdivia Striated Polished Plain are present.

During Period B, represented at G–88 and G–31, decorated types characteristic of Period A continue in diminishing frequency. At maximum frequency

are Valdivia Polished Plain, Valdivia Striated Polished Plain, Valdivia Excised, Valdivia Incised, Valdivia Multiple Drag-and-Jab Punctate, and Valdivia Cord Impressed. Three new decorated types: Valdivia Red Zoned Punctate, Valdivia Nicked Rib and Nubbin and Valdivia Pebble Polished (the latter possibly beginning in Period A) appear, and Valdivia Plain, Valdivia Polished Red, San Pablo Plain, Valdivia Broad-line Incised and Valdivia Brushed continue.

Period C is characterized by increase to maximum popularity of Valdivia Brushed, Valdivia Pebble Polished, Valdivia Red Zoned Punctate, Valdivia Nicked Rib or Nubbin, and San Pablo Plain. Two new decorated types appear and achieve maximum frequency: Valdivia Nicked Broad-line Incised and Valdivia Rocker Stamped. Three others occur erratically: Valdivia Applique Fillet, Valdivia Zoned Incised and Valdivia Carved. Still surviving sporadically and in minor amounts are the early types: Valdivia Finger Grooved, Valdivia Fingernail Decorated, Valdivia Multiple Drag-and-Jab Punctate, and Valdivia Cord Impressed. Valdivia Excised, Valdivia Incised, Valdivia Corrugated and Valdivia Broad-line Incised also continue, as do all of the plain types.

Period D reflects a general decline in both quality and variety of the ceramic complex. Valdivia Broad-line Incised, Valdivia Applique Fillet, Valdivia Zoned Incised, Valdivia Carved, and Punta Arenas Incised are the dominant decorated types. Of those present earlier, only Valdivia Incised, Valdivia Brushed, Valdivia Pebble Polished and Valdivia Nicked Broad-line Incised survive. Punta Arenas Plain is the dominant plain type, the others continuing in minor frequency.

In order to find out whether changes through time could also be discerned in vessel shape popularity, 23 general shapes were discriminated by the combination of rims of similar form scattered among the various pottery types as listed on table A. When the percentage frequency of each form had been computed and plotted, the resulting graph was arranged so that the sequence of levels of the various sites duplicated their position in the pottery type seriation (fig. 53), and period divisions were made in the same places. Except for levels below 2.60 meters in Cut A at G–31, the sample was large enough to be plotted. In these early levels, a line continues downward to indicate presence of the form.

The graphic presentation of this composite vessel form study (fig. 54) shows several interesting features, not all of which can be attributed to cultural change. For example, the difficulty of orienting correctly small sherds with unlevel lips is probably responsible for the seeming sudden decline of Form 5, and the sudden reexpansion in popularity of Form 7 in Period D. These two forms represent arbitrary subdivisions of a continuous series of rims, in which the orientation ranges from incurving to outcurving. On the other hand, the marked increase of Forms 9 and 17 during the latter part of Period C probably reflects a real situation, since these forms are rather clear cut. The expanded frequency of Forms 21 and 23 during Period D, and the restriction of Form 10 to this late period also seem reliable.

The frequency curves for Forms 14 and 22 show abnormal trends. In the case of Form 22, its absence at G–54 is puzzling. A few examples were identified in the surface collection, indicating that the form was present although in insufficient frequency to appear in the sample from Cut 1 at G–54. Form 14 shows two peculiarities. The first is the low frequency in various levels of Cut F at G–31, Cut 2 at G–88, and Level 120–130 of Cut H at G–31. The second is the abrupt disappearance of the form at G–54. Several other forms show less pronounced but still abrupt alterations in popularity between the upper level of Cut H at G–31 and the lower level of Cut 1 at G–54, which follows it in the seriated sequence. It is possible that the explanation lies partly, at least, in the fact that the refuse deposit represented by Cut H at G–31 is subject to contamination from earlier periods, since the site exhibits a long-term occupation during Periods A and B. G–54, on the other hand, has no refuse earlier than Period C, and it would seem reasonable to infer that the vessel shape frequencies represented there reflect more realistically the actual situation during Period C.

Although many vessel shapes occur throughout the duration of the Valdivia Phase, some show limited periods of maximum frequency. A few are restricted in time. These factors permit characterization of the four periods in terms of vessel shape.

In Period A, jars with folded-over rims represented by Forms 13 and 14 are dominant. Form 18 is the only other jar common enough to be considered characteristic. Thick-walled, constricted bowls of Form 4, often with a tetrapod base, are also typical of Period A. Bowls of Forms 5 and 7 frequently have lobed or undulating rims, and irregular lips occur occasionally on jars of Forms 14 and 15. A rare form, whose trend at the beginning of Period B suggests it may be unrepresented in Period A levels only because of the relatively small rim sample available, is Form 2. Also making their appearance during Period A are Forms 1, 3, 6, 11, and 15, all of which are present in very small frequency. Absent are carinated bowls (Forms 8, 9, and 10) and cambered jars (Forms 20, 21, 22, 23).

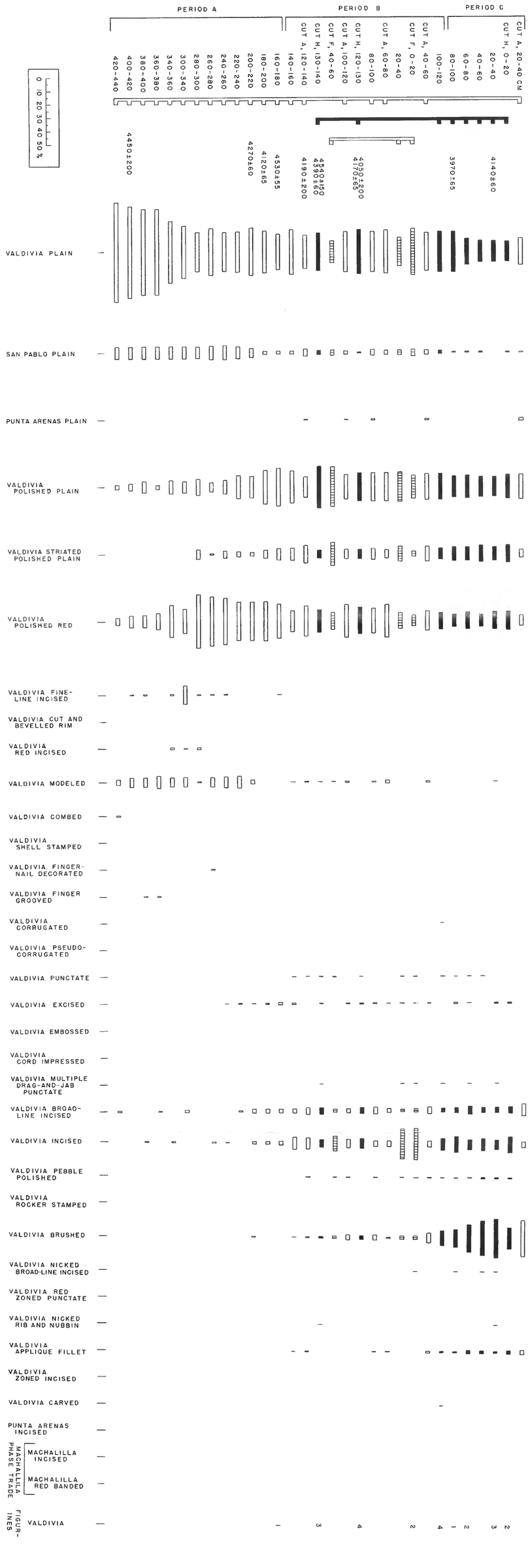

FIGURE 49.—Seriation of small cuts at G-31 on the basis of changes in pottery type frequency. The artificial prolongation of the occurrence of many types shown in Cut J, Sections D and E (fig. 50) is not evident in these results.

FIGURE 50.—Seriation of G–31, Cut J, Sections D and E on the basis of changes in pottery type frequency. Mechanical mixture is responsible for abnormal prolongation of certain early types into late levels and late types into early levels. (Valdivia Plain and San Pablo Plain were incorrectly separated and have been omitted from the chart, although percentage calculations are derived from a total count per level in which they are included; see detailed explanation, text p. 88.)

FIGURE 51.—Seriation of G–31, Cut J, Sections D and E with scale enlarged to show changes in frequency of minor early decorated types.

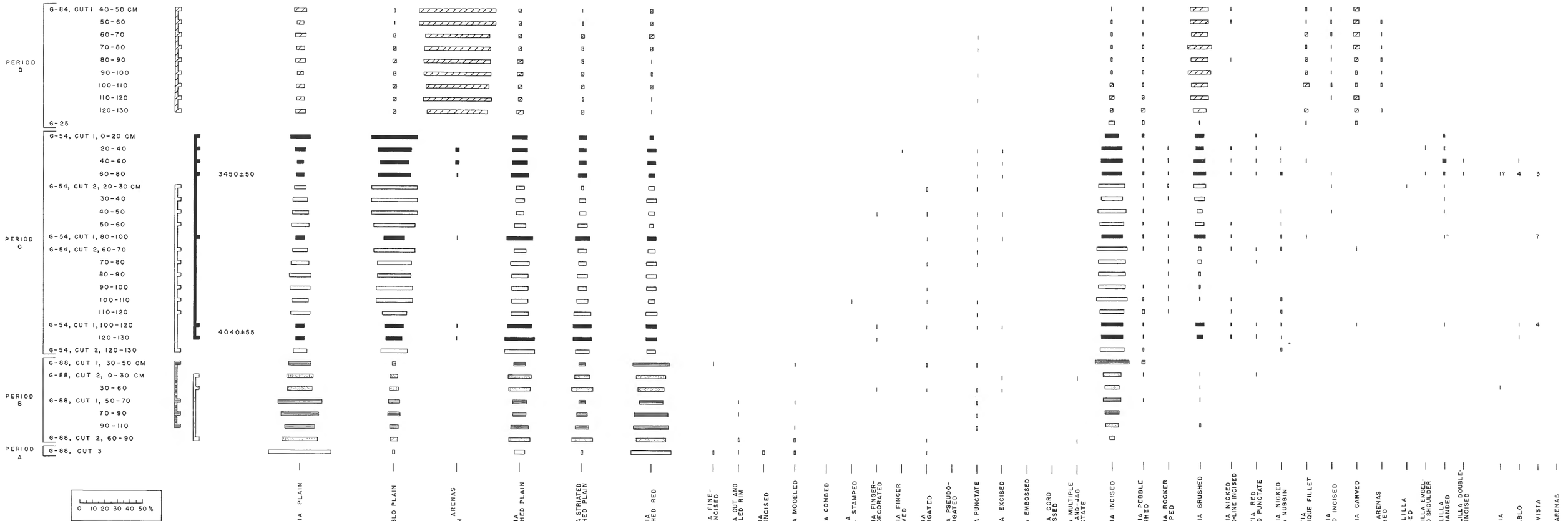

FIGURE 52.—Seriation on the basis of changes in pottery type frequency of Valdivia Phase sites and levels of relatively short-term occupation. Differences in duration of several decorated types in this sequence as compared to those for G–31 (fig. 50) can be attributed to artificial prolongation of occurrence at the latter site by mechanical mixture of the refuse during long-term occupation.

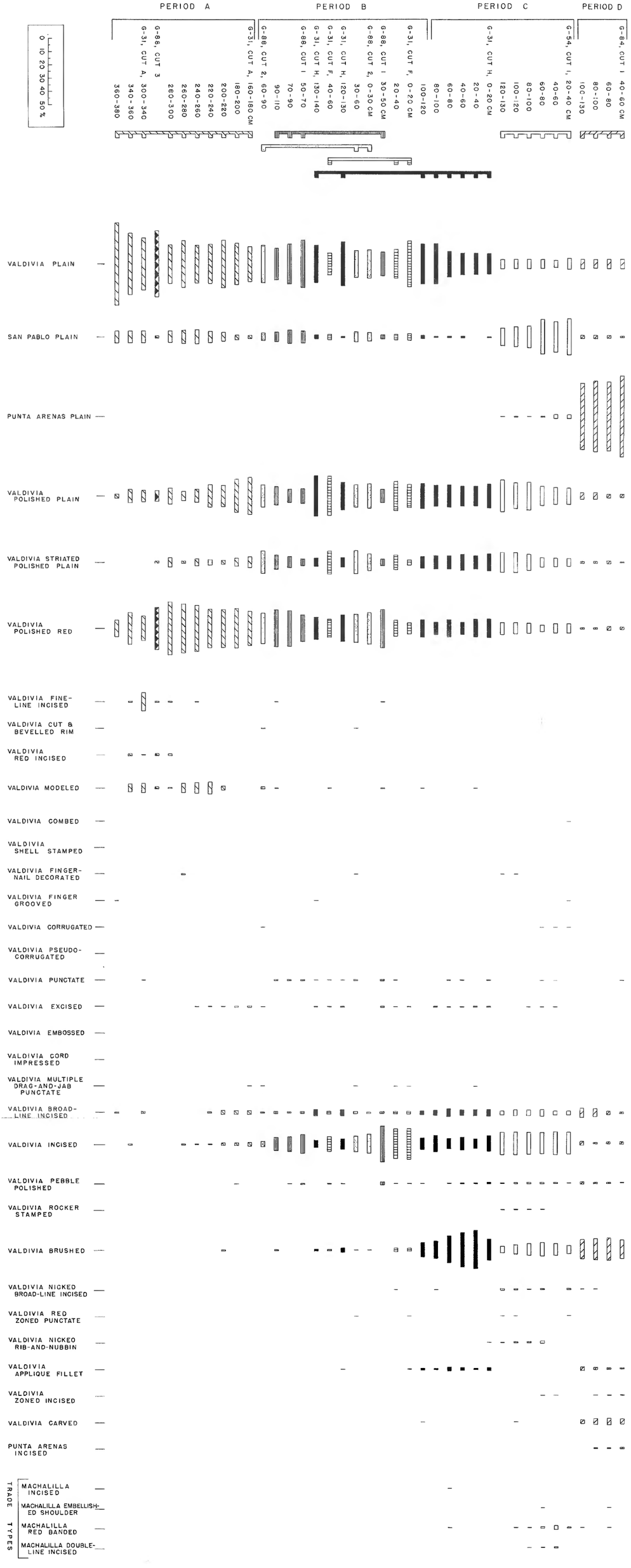

FIGURE 53.—Seriation of Valdivia Phase sites and levels selected to represent the general trends of change in pottery type frequency and to illustrate correlations between some of the types and the period subdivisions. The cuts selected show the least evidence of mixture resulting from long term occupation.

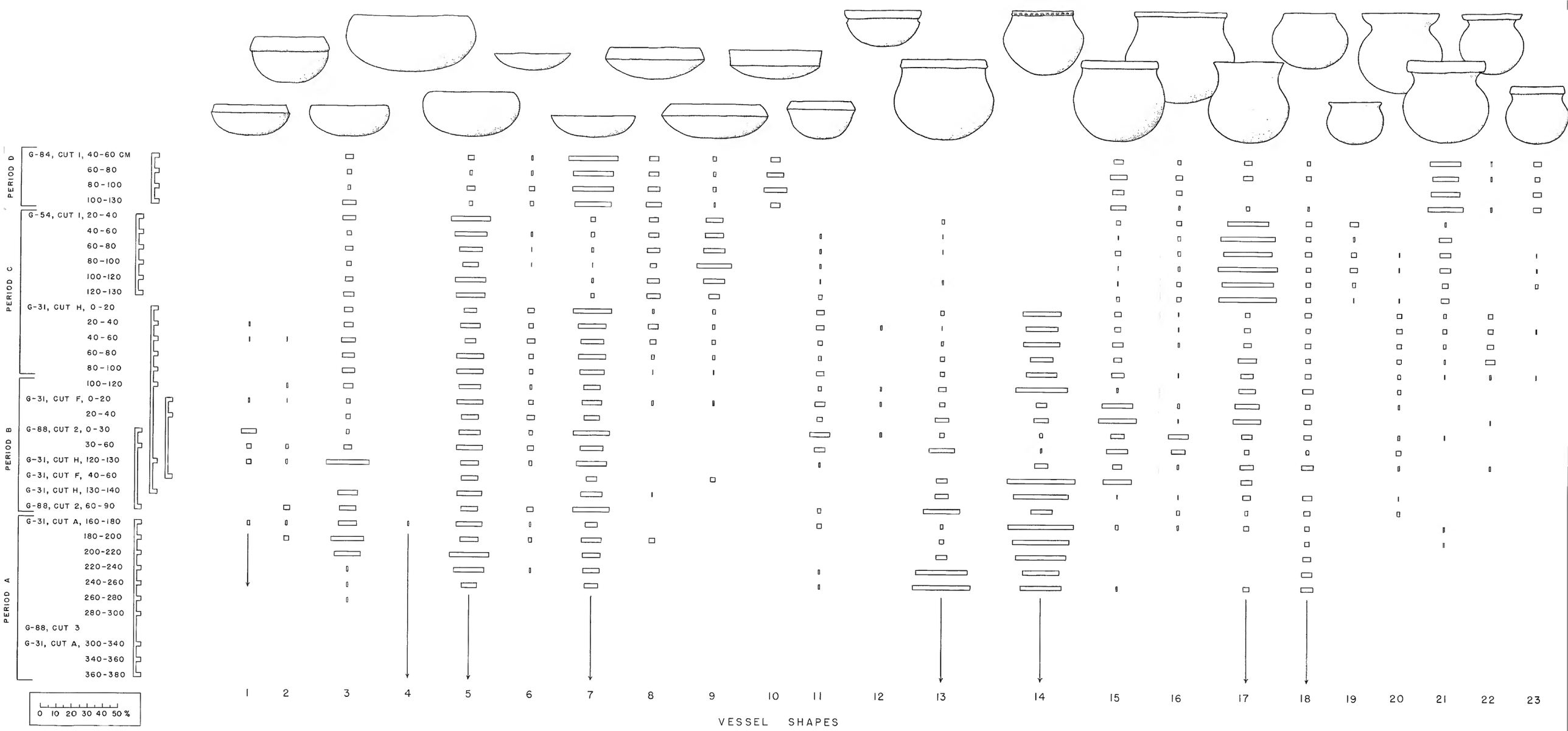

FIGURE 54.—Temporal distribution of vessel shapes of Valdivia Phase pottery types. Sites and levels are arranged in the seriated order indicated by changes in pottery type frequency (fig. 53). Shapes represent grouping of similar rim profiles in the various pottery types (Table A and Appendix 1, table 14). Arrows indicate presence of the form in levels with samples too small for percentage calculation.

TABLE A.—*Correlation between vessel shapes of Valdivia pottery types and generalized forms recognized for the Valdivia Phase*

Generalized Form	Constituent Forms
1: Indented Shoulder Bowl	Valdivia Fine-line Incised, Form 1 Valdivia Pebble Polished, Form 1 Valdivia Red Incised, Form 1 Valdivia Polished Plain, Form 1 Valdivia Polished Red, Form 1 Valdivia Striated Polished Plain, Form 6
2: Bowl with Exteriorly Thickened Rim	Valdivia Polished Red, Form 2 San Pablo Plain, Form 3 Valdivia Plain, Form 3
3: Bowl with Expanded Rim	Valdivia Broad-line Incised, Form 1 Valdivia Nicked Broad-line Incised, Form 1 Valdivia Rocker Stamped, Form 1 Valdivia Polished Plain, Form 2 Valdivia Polished Red, Form 3 Valdivia Striated Polished Plain, Form 7 Punta Arenas Plain, Form 6
4: Constricted Bowl, Direct Rim, Flattened Lip	Valdivia Fine-line Incised, Form 3 Valdivia Fingernail Punctate, Form 5 Valdivia Red Incised, Form 2
5: Constricted Bowl, Direct Rim, Rounded Lip	Valdivia Broad-line Incised, Form 3 Valdivia Carved, Form 2 Valdivia Embossed, Form 1 Valdivia Excised, Form 1 Valdivia Nicked Broad-line Incised, Form 3 Valdivia Pebble Polished, Form 4 Valdivia Punctate, Form 2 Valdivia Rocker Stamped, Form 2 Valdivia Zoned Incised, Form 1 Valdivia Zoned Red Punctate, Form 2 Valdivia Polished Plain, Form 4 Valdivia Polished Red, Form 5 Valdivia Striated Polished Plain, Form 5 San Pablo Plain, Form 4 Valdivia Plain, Form 4
6: Open Bowl, Interiorly Thickened Rim	Valdivia Broad-line Incised, Form 2 Valdivia Nicked Broad-line Incised, Form 2 Valdivia Pebble Polished, Form 2 Valdivia Polished Plain, Form 3 Valdivia Polished Red, Form 4 Valdivia Striated Polished Plain, Form 8
7: Open Bowl, Direct Rim	Valdivia Broad-line Incised, Form 4 Valdivia Brushed, Form 6 Valdivia Carved, Form 1 Valdivia Excised, Form 2 Valdivia Pebble Polished, Form 3 Valdivia Polished Plain, Form 5 Valdivia Polished Red, Form 6 Valdivia Striated Polished Plain, Form 9
7: Open Bowl, Direct Rim—Continued	Punta Arenas Plain, Form 5 San Pablo Plain, Form 11 Valdivia Plain, Form 11
8: Carinated Bowl, Unthickened Shoulder	Valdivia Broad-line Incised, Form 6 Valdivia Carved, Form 3 Valdivia Pebble Polished, Form 5 Valdivia Polished Plain, Form 7 Valdivia Polished Red, Form 8 Valdivia Striated Polished Plain, Form 10
9: Carinated Bowl, Thickened Shoulder	Valdivia Broad-line Incised, Form 7 Valdivia Carved, Form 4 Valdivia Excised, Form 3 Valdivia Nicked Broad-line Incised, Form 4 Valdivia Pebble Polished, Form 6 Valdivia Rocker Stamped, Form 3 Valdivia Polished Red, Form 9 Valdivia Striated Polished Plain, Form 11
10: Carinated Bowl, Low Shoulder	Valdivia Broad-line Incised, Form 8 Valdivia Carved, Form 5 Valdivia Pebble Polished, Form 7 Valdivia Zoned Incised, Form 2
11: Cambered Rim Bowl	Valdivia Broad-line Incised, Form 5 Valdivia Polished Plain, Form 6 Valdivia Polished Red, Form 7
12: "Waisted" Bowl	Valdivia Polished Red, Form 10
13: Folded-over Rim Jar	Valdivia Combed, Form 1 Valdivia Finger Grooved, Form 1 Valdivia Fingernail Punctate, Form 1 Valdivia Modeled, Form 1 Valdivia Shell Stamped, Form 1 Valdivia Incised, Form 1 Valdivia Striated Polished Plain, Form 1 San Pablo Plain, Form 1 Valdivia Plain, Form 1
14: Folded-over, Finger-pressed Rim Jar	Valdivia Finger Grooved, Form 2 Valdivia Striated Polished Plain, Form 2 San Pablo Plain, Form 2 Valdivia Plain, Form 2
15: Exteriorly Thickened Rim Jar	Valdivia Fingernail Punctate, Form 2 Valdivia Punctate, Form 1 Valdivia Shell Stamped, Form 2 Valdivia Incised, Form 2 Valdivia Polished Plain, Form 9 Valdivia Striated Polished Plain, Form 3 Punta Arenas Plain, Form 3
16: Expanded Rim Jar	Valdivia Multiple Drag-and-Jab Punctate, Form 1

TABLE A.—*Correlation between vessel shapes of Valdivia pottery types and generalized forms recognized for the Valdivia Phase*—Continued

Generalized Form	Constituent Forms
16: Expanded Rim Jar—Continued	Valdivia Incised, Form 3 Punta Arenas Plain, Form 2 San Pablo Plain, Form 6 Valdivia Plain, Form 6
17: Everted Rim Jar	Valdivia Brushed, Form 1 Valdivia Punctate, Form 3 Valdivia Incised, Form 4 Punta Arenas Plain, Form 1 San Pablo Plain, Form 5 Valdivia Plain, Form 5
18: Insloping Neck Jar	Valdivia Combed, Form 1 Valdivia Fingernail Punctate, Form 3 Valdivia Polished Plain, Form 8 Valdivia Polished Red, Form 11 Valdivia Striated Polished, Form 4 San Pablo Plain, Form 7 Valdivia Plain, Form 7
19: Small, Everted Rim Jar	Valdivia Incised, Form 5 Valdivia Red Zoned Punctate, Form 3
20: Curved Cambered Rim Jar	Valdivia Applique Fillet, Form 1 Valdivia Brushed, Form 2 Valdivia Fingernail Punctate, Form 4 San Pablo Plain, Form 8 Valdivia Plain, Form 8
21: Angular Cambered Rim Jar	Valdivia Applique Fillet, Form 2 Valdivia Broad-line Incised, Form 9 Valdivia Brushed, Form 3 Valdivia Nicked Broad-line Incised, Form 5
21: Angular Cambered Rim Jar—Con.	Valdivia Nicked Rib and Nubbin, Form 1 Valdivia Rocker Stamped, Form 5 Valdivia Incised, Form 6 Valdivia Red Zoned Punctate, Form 1 San Pablo Plain, Form 9 Valdivia Plain, Form 9
22: Grooved Cambered Rim Jar	Valdivia Applique Fillet, Form 3 Valdivia Brushed, Form 4
23: Cambered-like Rim Jar	Valdivia Broad-line Incised, Form 10 Valdivia Brushed, Form 5 Valdivia Nicked Rib and Nubbin, Form 2 Valdivia Zoned Incised, Form 3 San Pablo Plain, Form 10 Valdivia Plain, Form 10
Unclassified	Valdivia Corrugated, Form 1 Valdivia Cut-and-Bevelled Rim, Form 1 Valdivia Excised, Form 4 Valdivia Fine-line Incised, Forms 2 and 4 Valdivia Fingernail Punctate, Form 6 Valdivia Red Incised, Form 3 Valdivia Rocker Stamped, Form 4 Valdivia Shell Stamped, Forms 3 and 4 Valdivia Polished Red, Form 12 Punta Arenas Plain, Form 4

Period B reflects a transitional situation in jar form. Except for the high frequency of folded-over rims (Forms 13 and 14) during the first half of the period, all of the shapes included in Forms 13–18 are represented with approximately equal frequency. In addition, cambered jar Forms 20 and 21 make their initial appearance. Bowls of Forms 1, 2, 3, and 11 attain maximum frequency, and lobed rim variants of Forms 5 and 7 continue to be popular. Form 6, with an interiorly thickened rim, increases in frequency. Carinated bowls are still probably absent, and the two occurrences of Form 8 shown on the chart are probably misidentification to judge from their poor agreement with the general trend of the form. Unfortunately, the specimens were unavailable for rechecking.

Period C is characterized by dominance of Form 17 in everted rimmed jars and the presence of all varieties of cambered rim jars. Forms with thickened rims, Forms 13–15, are common during the first part of Period C but decline or disappear thereafter. Form 19, a small rounded jar with a sharply everted rim, is limited to Period C, as is a distinctive bowl, Form 12. Early bowl Forms 1 and 2 are rare to absent, common Forms 3, 5, and 7 continue, but the principal diagnostic is the emergence and increase to maximum frequency of carinated bowls, Forms 8 and 9. Forms 6 and 11 maintain a frequency similar to that during Period B.

During Period D, most forms present in Period C continue. Absent are Forms 11, 12, 14, and 20. Bowl rims are never lobed or undulating. A new variety of carinated bowl, Form 10, is limited to Period D and constitutes one of the principal bowl forms. Cambered jars of Forms 21 and 23 are also at their peak of popularity.

In addition to these differences based on rim and diagnostic body shape, it is of interest to note the distribution through time of the distinctive tetrapod and concave base forms, which in the absence of complete examples can only tentatively be assigned to particular vessel shapes. A tabulation of their occurrence arranged in the order indicated by the seriated sequence (Appendix 1, table 11) shows both forms to begin in Period A, with the tetrapod form more common until the end of Period B. During Period C, the concave base reaches its maximum frequency, and tetrapod bases occur only during the first part of the period. Both are absent in Period D.

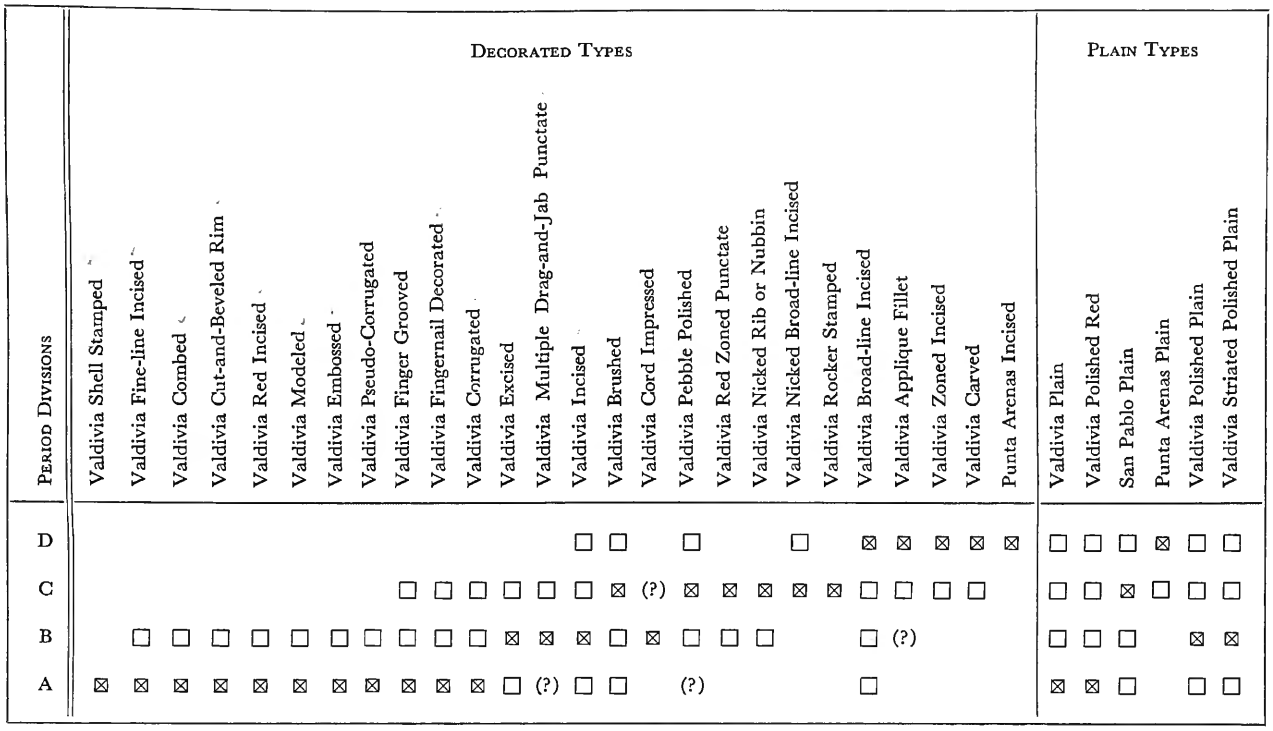

FIGURE 55.—Chronological distribution and period of maximum frequency of Valdivia Phase pottery types. ⊠ denotes maximum frequency, □ presence of the type.

Analysis of the evidence concerning earliest occurrence of the various common vessel shapes permits construction of a tentative scheme of vessel shape evolution during the Valdivia Phase (fig. 56). In certain groups of forms, the typological series reflects evolutionary change, characterized by increased angularity of the carination on bowls and of the camber on jars, and by loss of exterior thickening on everted jar rims. Also evident is the diminution in number and variety of vessel forms through time. Unique forms, such as the castellated rim vessel and spouted jar, are shown at the point where the level in which they occur fits the seriated sequence.

In addition to changes like the foregoing, which can be measured and graphically expressed, there are certain gradual alterations in the ceramic complex that become obvious only if a group of sherds from Period D is compared with those of Period A. Most striking is the decline in body wall thickness, particularly after Period C, but discernable as a general tendency throughout the Phase. Another "drift" is toward simplification or decreasing variability, evident in disappearance of exteriorly thickened and finger-pressed rims on jars and decline in frequency first of red slipping and then of polishing of the interior of jar rims and necks. Consciously produced unevenness of the rim in the form of lobes and castellations in Periods A and B gives way to irregularities resulting from sloppy workmanship in Periods C and D. There is no similar trend clearly evident in excellence of decoration; execution varies from good to bad throughout the sequence.

Recognition of these temporal differences in decoration and vessel shape makes it possible to estimate the chronological position of the two sites reported by other investigators: G–115 and G–117 (see locations on fig. 2). Although a more complete analysis of material from G–115: San Pablo will ultimately be available, the preliminary report (Zevallos and Holm, 1960), supplemented by our brief examination of the material in Ecuador during 1961, contains sufficient information on chronologically significant features to permit a tentative evaluation. First, it is important to note that diagnostic Period A decorated pottery types are absent with the exception of Valdivia Modeled (fig. 57). In vessel shape, two typically early forms are represented: Form 14, jars with folded-over, finger-pressed rim, and lobed-rim varieties of bowls. However, tetrapod bases common in Periods A and B are not mentioned as occurring. These considerations appear to rule out an occupation during Period A. At the opposite end of the scale, Valdivia Carved, Valdivia Zoned Incised and Punta Arenas Incised, types dominant during Period D, are not described or illustrated. The general character of the pottery, including body wall thickness, surface finish and execution of the decoration, does not resemble that characteristic of

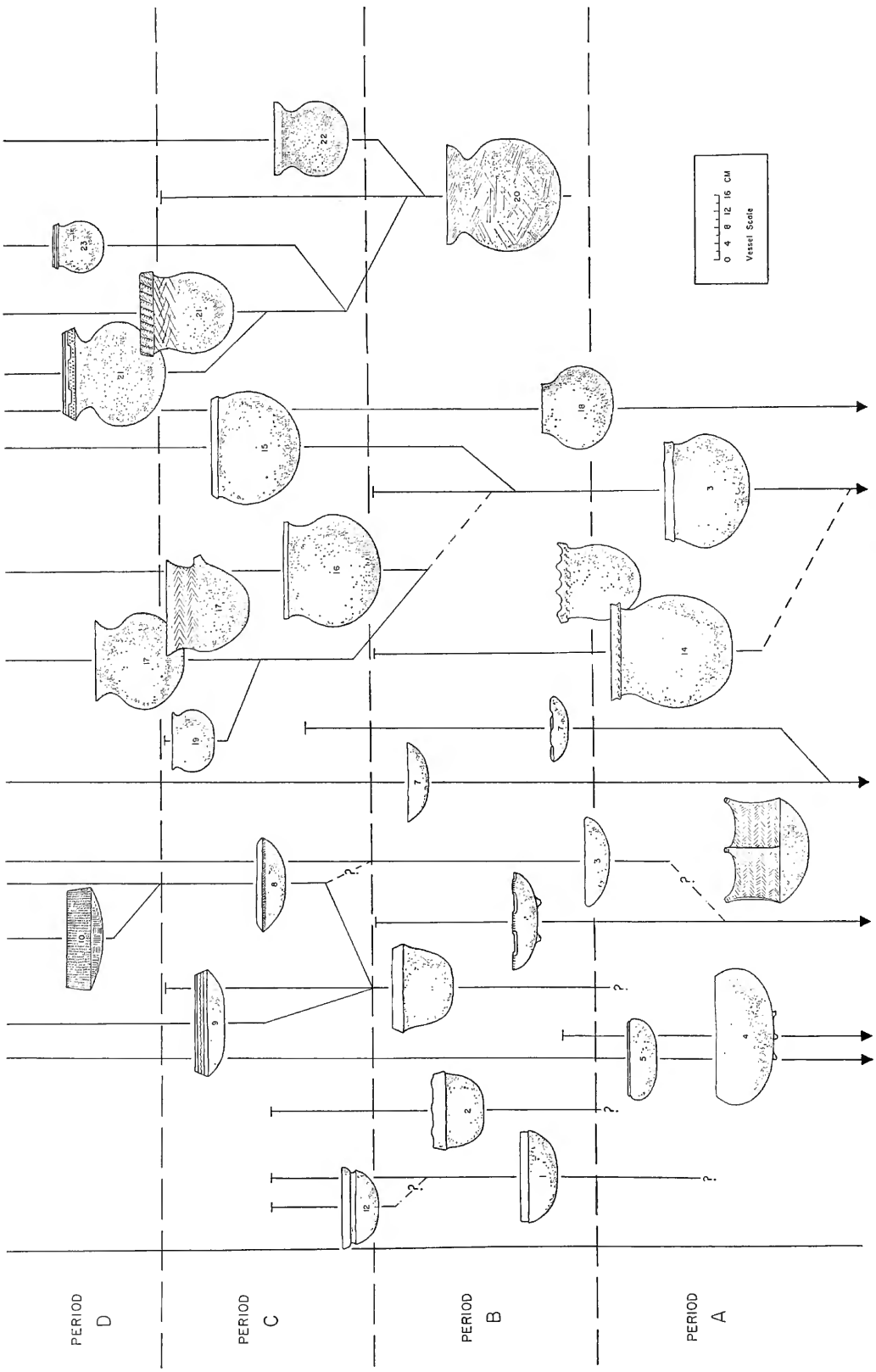

FIGURE 56.—Evolution of Valdivia Phase vessel shapes.

Period D. Enumeration of pottery types present at G–115 reveals that they include all those present during Periods B and C, and with three exceptions the types are those reaching their maximum popularity during these periods (fig. 57). The exceptions are: Valdivia Modeled, which is rare in Period B and absent thereafter; Valdivia Applique Fillet, which begins in Period C; and Valdivia Broad-line Incised, which is common throughout the sequence so that its late expansion is less chronologically significant than changes in frequency in other decorated types. Weighing of the evidence from vessel shape and decorative techniques and motifs leads to the conclusion that G–115 was occupied some time during Period B, probably during the latter part when the early decorated types had largely disappeared, and continued in use through Period C. There is no evidence that it persisted into Period D.

The sherd sample from Bushnell's site G–117 (see p. 22 and Bushnell, 1951, figs. 51, 52) is very small but several diagnostic decorated types are represented. Valdivia Applique Fillet, Valdivia Red Zoned Punctate, Valdivia Pebble Polished and Valdivia Broad-line Incised are included, all dominant types during Period D except Valdivia Red Zoned Punctate, which is typical of Period C but may have survived into Period D. One design shows a small rectangle formed by short incisions not meeting at the corners, a motif found in Punta Arenas Incised. Superposition of incision on pebble polishing (op. cit., fig. 52a) is a rare practice during late Period C. Common vessel shapes include cambered jars of Forms 21 and 22 and bowls of Form 8, all typical of Period D. When these data are considered in terms of the chronological position of the various traits, it seems reasonable to conclude that G–117 was occupied at the end of Period C or the beginning of Period D, before Valdivia Red Zoned Punctate disappeared but after Valdivia Applique Fillet became a major decorated type.

Early in Period C, sherds of Machalilla Phase plain and decorated pottery types make their appearance in Valdivia Phase refuse, reflecting the arrival of this new population on the Ecuadorian coast. The decorated types represented provide a basis for correlation between the seriated sequences of the two phases (see pp. 147–148).

Period Divisions	Decorated Types: Valdivia Modeled	Valdivia Excised	Valdivia Incised	Valdivia Brushed	Valdivia Pebble Polished	Valdivia Red Zoned Punctate	Valdivia Nicked Rib or Nubbin	Valdivia Nicked Broad-line Incised	Valdivia Rocker Stamped	Valdivia Broad-line Incised	Valdivia Applique Fillet
D			☐	☐	☐			☐		⊠	⊠
C		☐	☐	⊠	⊠	⊠	⊠	⊠	⊠	☐	☐
B	☐	⊠	⊠	☐	☐	☐	☐			☐	
A	⊠	☐	☐	☐						☐	

Figure 57.—Pottery types represented at G–115 and their period distribution in the Valdivia Phase sequence, based upon figure 55. ⊠ denotes maximum frequency, ☐ presence of the type.

Figurines

Type Descriptions

Two principal figurine classes can be differentiated by material of manufacture: stone and pottery. Stone figurines fall into three readily distinguishable types, which are descriptive entities as well as units with probable chronological significance. Pottery figurines are more variable and the number of descriptive types recognized depends on the features selected for emphasis. After a number of attempts at more detailed breakdown, a fourfold division was selected as the only one that showed significant chronological association.

Palmar Plain

Material: Shale, fine-grained sandstone or mudstone.

Method of Manufacture: Thin, flat slabs used in their natural form if approximately symmetrical, or with ends squared off to create a rectangular outline with slightly rounded corners.

Surface Treatment: Typically waterworn producing a smooth and even or slightly undulating surface and rounded edges. Shaped edges are similarly rounded. Surfaces sometimes show lengthwise scratches or striations (pls. 117 g–h, 187 h–j).

Anatomical Features (pls. 117 a–q, 187 h–j): No details of head or body are indicated in outline or by incision, and the identification of these objects as figurines is by analogy with the Palmar Notched type. Outline is rectanguloid with parallel straight or slightly convex sides and straight or slightly rounded ends; slightly irregular, with nonparallel or converging sides (pl. 117 f, h); or asymmetrical, with one side straight and the other parallel for part of the length, then slanting to meet the other side at a rounded point (pl. 117 l–m).

DIMENSIONS: Length 3.8–8.5 cm., width 1.1–3.2 cm., thickness 0.3–1.5 cm.

CHRONOLOGICAL POSITION: Limited to Period A (figs. 50, 64).

Palmar Notched

MATERIAL: Mudstone or shale.

METHOD OF MANUFACTURE: Naturally eroded, elongated slabs or flat stones carved into symmetrical shape.

SURFACE TREATMENT: Where shaping has been limited to straightening of sides, the waterworn surface is smooth and sometimes even. When shaping has been more extensive, the surface may show prominent lengthwise striations.

ANATOMICAL FEATURES (pls. 117 r–ee, 187g): The only anatomical detail is a central incision, nick or notch at one end, to give a suggestion of legs. Shaping in general is more consistent than in the Palmar Plain type, so that sides are more consistently parallel and straight to slightly convex. The upper or head end is square to rounded, and may be the same form as the lower end, or slightly broader or slightly narrower. One example has horizontal zigzag lines where the face would be (pl. 187g). Cross section is rectanguloid with angular or rounded corners, or ovoid. The notch varies from a parallel sided, narrow slit (pl. 117 r, u) to a V-shaped cut (pls. 117 s–t, 187g). Occasionally there is an incision on both faces sometimes with a shallow nick at the edge (pl. 117 x, cc). The edges of the nick are not smoothed over or rounded.

DIMENSIONS: Length 3.7–7.0 cm.; width 1.1–3.2 cm.; thickness 0.5–1.5 cm., majority 0.5–0.8 cm.

CHRONOLOGICAL POSITION: Limited to Period A (figs. 50, 64).

Palmar Incised

MATERIAL: Pale greenish mudstone or pink shale.

METHOD OF MANUFACTURE: Pebbles shaped to produce a symmetrical elongated form with slightly convex sides and flattened or slightly rounded ends. All examples show modification of the original outline and surface with correspondingly greater consistency in shape than in Palmar Plain and Palmar Notched types. In some cases, the lower end has been cut off usually at a slight slant rather than at right angles to the length.

SURFACE TREATMENT: Generally even, but sometimes leaving lengthwise striations or scratches. In some examples, the surface is smooth to the touch, but small pits remain visible.

ANATOMICAL FEATURES (pl. 118 a–j): All examples have incision on one surface typically showing recognizable facial features, and occasionally stylized arms. Incisions are 0.5–1.0 mm. in depth and up to 2 mm. wide. Execution varies from good, with symmetrical spacing, to crude and irregular. The nose is typically parallel sided, joining the horizontal eyebrows in a "T." Eyes and mouth are oval or rectanguloid with a central horizontal slit. Shallow vertical incisions sometimes border the mouth or cover the cheeks. Arm stylization is typically in the form of several concentric angular or curved U-shaped elements sloping downward from both sides toward the center front. A vertical line may run down the center from chin to base.

The lower end of the figurine is finished in two alternative ways. Some examples have short legs like those of Palmar Notched type, formed by a parallel-sided narrow notch (pl. 118 d, j). More commonly, the lower end is cut off cleanly about at the waist, which usually corresponds approximately to the greatest thickness of the figurine. Although the surface is flat, it is generally not horizontal but sloping from front to back or side to side (pl. 118, b, e–f, g). The top of the head, by contrast, is flattened in a plane perpendicular to the main axis of the body. Except for one example in which a vertical incision runs up the center of the back, the reverse side is smooth and plain.

Rare examples classified as Palmar Incised type have a band of geometric decoration instead of a face at one end.

DIMENSIONS: Length 2.8–9.3 cm.; width 1.3–4.2 cm.; thickness 0.4–2.5 cm.

CHRONOLOGICAL POSITION: Periods A and B (figs. 50, 64).

Valdivia

MATERIAL: Pottery; fine-grained sandy paste like that of Valdivia Plain, oxidized at the surface leaving a medium to dark gray interior.

METHOD OF MANUFACTURE: Two small cylindrical coils laid side by side form the foundation of the body and head. Although the coils are pressed together, fracture is frequent along the junction, particularly in the head (pl. 119 a–q). At the lower edge of the torso, the coils remain separated to form the legs. Thin strips and small lumps of clay were added to the coil foundation to round out the body and head. The front of the hair, framing the face, was added last when the surface was already beginning to dry, judging from the frequency with which it sloughs off (pl. 119 r–z).

SURFACE TREATMENT: Most of the body fragments show vertical smoothing tracks, and except for the crudest examples the surface is red slipped and partially or completely polished. The face and hair are unslipped, except in a few examples of zoned-red hair treatment. Unslipped surfaces are light tan, light orange or light gray and may show fire clouding.

ANATOMICAL FEATURES (fig. 65, a–i; pls. 120–124):

Head: The neck is often disproportionately long and the face is slightly raised above the neck plane, producing a slight chin. The top of the head is rounded or flattened, the sides typically curved or parallel. Eyes and mouth are represented by slits or gashes, and eyebrows by a thin line like that forming the eye or by a longer, arched incision, sometimes curving down at the sides. The face is flat and the nose is never shown either by relief or incision. The hair forms a frame on three sides of the face, projecting above it so that the face is inset to a depth of several millimeters. The back of the head is convex.

In constract to the highly stylized rendition of the face and body, hair styles are variable and sometimes

elaborate. About 60 percent of the heads have a simple hair style best described as a long bob, with bangs above the forehead and the hair falling straight at the sides and back to the shoulders or below (pls. 120–121, 122 a–d, g–h, 123 a–d, f–t, v–ii). In crude examples, hair surface is left smooth; in better executed ones it is covered with fine incisions suggesting individual hairs but not always running in a vertical direction. Occasionally a geometric pattern occurs that bears no resemblance to a hair arrangement (pls. 120 c–d, 121 a–b). About 20 percent of this type has a broad red-painted groove running from the top of the head down to the end of the hair at the back, suggesting a part (pl. 120 e–f, k–l). In some examples, hair is shorter at the sides, reaching to the shoulders, but falls to the waist at the back (pl. 120 a–b, e–f, k–l). Among more elaborate coiffures are the following:

1. Large loops, or hollow centered "buns" at the sides (pl. 122 e–f, k–l). The surface is not incised.
2. Hair hanging to the shoulder at one side but much longer on the other side and in back (pls. 122 i–j, 123 e, u).
3. A long bob, in which a broad incision like that usually employed to show a part, runs horizontally in an undulating pattern rather than vertically down the back (pl. 120 g–h). Fine incisions are slanting as if to indicate braiding.
4. Hair short in front and long in back, with a prominent ridge running from the top of the head down the back giving the effect of an exaggerated pigtail (pl. 122 o–r).
5. A coiffure of the common bobbed type, or of Variant 2, in which part or all of one side of the head is "shaved", red slipped and polished (pl. 121 g–h, o–p).
6. A tall ring or crown-like ornament on the top of the head, below which the hair falls in a long bob.

Rare examples are doubled-headed, the two heads typically rising from the shoulder one leaning slightly to each side (pl. 123 cc–ee). Both face forward. On all examples where both heads are present, they share a single body of the characteristic Valdivia type. One fragment appears to have had duplication of the torso as well (pl. 123 dd).

Torso: All bodies are nude, although zoned red paint on a few suggests the possibility of body painting. Sides tend to be straight, with little distinction between waist and hips. With a few exceptions, the sex is identifiable as female by the presence of prominent rounded breasts, often large in proportion to general body size (pls. 120 a, e, k, 124 e–j). A few torsos have a trianguloid patch of stippling in the pubic area (pl. 124c). Some have a conical projection on the lower abdomen of similar size and form to the breasts (pls. 122q, 123u, 124 a, h), which might be interpreted as indicative of male sex except that breasts are sometimes also shown. The rear of the torso is the most uniform feature. In all cases, the lower back curves outward slightly and is then cut inward sharply to form angular buttocks, which are rendered more realistic by a vertical incision up the center (pls. 120b, f, j, 122r, 124b).

Arms: Arms are treated in three principal ways:

1. A rounded applique strip attached at the shoulder curves down and across the front below the breasts, where a nick usually separates the two hands. The applique may be superficially applied or smoothed onto the torso so that the junction is obliterated (pl. 120 a, c, e, i, k, 121 a, g, 122m).
2. Expansion of the shoulder to a rounded nubbin or stub (pls. 120g, 122 i, o, 124 a, c).
3. Rarely, shoulders are rounded and any vestige of an arm is completely absent (pls. 122q, 123d).

Occasional aberrant examples occur. In a few cases, the right arm is in the normal position while the left one is raised so that the hand rests on the chin (pls. 121k, 123g). One shows traces of a former applique strip that ran down the sides and up the back.

Legs: With very rare exceptions, the figurines are standing, with the legs straight and separated. Leg form is approximately cylindrical except for a prominent bulge at the rear in the vicinity of the knee or just below it (pl. 124 e–f, l–cc). Below this, the leg tapers to a rounded stub. Rarely, the end is broadened to produce a foot (pl. 124 y, ee). A few fragments suggest a bent knee sitting or kneeling position (pl. 124 g, dd–ee).

DIMENSIONS: Significant measurements are difficult to obtain because of the fragmentary condition of most examples. Two complete figurines are 4.6 and 8.8 cm. long. Ten torsos, complete from neck to buttocks, range from 2.0–6.3 cm. in length. The smallest head is 1.7 cm. high; the largest 4.0 cm. high.

CHRONOLOGICAL POSITION: Possibly beginning at the end of Period A, this type is characteristic of Period B of the seriated sequence (figs. 49–50, 52, 64) and continues during early Period C. No correlation could be found between chronological position and crudity of execution.

San Pablo

MATERIAL: Pottery; fine sandy paste, breaking with a very irregular edge; incompletely oxidized surface, medium to dark gray core.

METHOD OF MANUFACTURE: The double coil foundation is characteristic and there is a tendency to separate down the midline. Sloughing off of added applique is a frequent form of breakage (see Valdivia type for details).

SURFACE TREATMENT: Finishing is variable, including polish, striated polish, even but unpolished or uneven surfaces. Smoothing is typically poorer on the back than on the front and the back of the head is often uneven. Less than one third of the examples are red slipped. When a slip is present it frequently covers the hair as well as the body, but the face is generally left plain. Unslipped surfaces are tan, or light to dark gray. Gray fire clouds often occur on tan surfaces.

ANATOMICAL FEATURES (figs. 58, 65 j–u; pl. 125):

Head: The head often rests directly on the shoulders, or is separated by a short neck. In the former case, the chin is receding (pl. 125 a–b, o–p); in the latter, it is sharply defined (pl. 125 u–v). The top of the head in front view may be curved (pl. 125 a, c, e), squared (pl. 125

i, k) or flared sideways so that the greatest breadth is across the top (pl. 125 m, s), which typically tilts backward. The face is convex and projects slightly to markedly forward beyond the plane of the hair. Typically, both sides slope toward a central ridge, which runs from forehead to chin and gives the suggestion of a nose. In a few the projection is limited to the nose region. Eyes and eyebrows are curved incisions of similar form and contour, applied so that the inner edge is slightly or markedly lower than the outer, creating a slanted effect. The mouth is a shorter horizontal cut. The back of the head is slightly to markedly concave from top to bottom, and concave to slightly convex from side to side. Hair frames the face, but in contrast to the Valdivia type is rarely detailed on the back of the head. Hair surrounds the face and is delimited by a slight projection of the surface or an incised line giving the effect of bangs across the forehead and falling straight or curving around at the sides. The hair surface may be textured with fine incisions (pl. 125 k–l), left smooth (fig. 58c; pl. 125 s–t), red slipped (pl. 125 u–v), or decorated with punctation or broad-line incisions (fig. 58b). A central part is rarely shown. More elaborate hair treatment, in which incision is zoned leaving the center front plain (fig. 58 a, d), or a strand hanging down the front at one side (Zevallos and Holm, 1960, pl. 15, lower center), is exceptional.

Torso: All bodies are nude. Width tends to narrow at the waist and increase in a realistic fashion at the hips. Small rounded breasts are typical, and stippling of the pubic area occasionally outlined by incision appears to be more common than in Valdivia type. The abdominal bulge also appears to be more frequent. An incision may curve from side to side at the waist (Zevallos and Holm, 1960, pl. 15, lower left, pl. 22, top right, and pl. 23, top left). The upper back is rounded and tapers into the legs, omitting the well defined buttocks characteristic of the Valdivia Type (pl. 125 b, p).

Arms: Arms are usually restricted to a rounded stubby projection at the shoulder (pl. 125 a, u) or are completely absent, the neck blending directly into the body (fig. 65 t–u). Rarely, applique ribs are added to show arms extending down the body at the side from the shoulder and curving forward near the waist, or the left arm is raised to the chin (Zevallos and Holm, 1960, pl. 19 top left).

Legs: Legs taper from a maximum diameter at attachment to the torso downward to a rounded end. Cross section is circular.

DIMENSIONS: No complete examples exist. Head length ranges from 2–6 cm.

CHRONOLOGICAL POSITION: Periods B and C (figs. 52, 64).

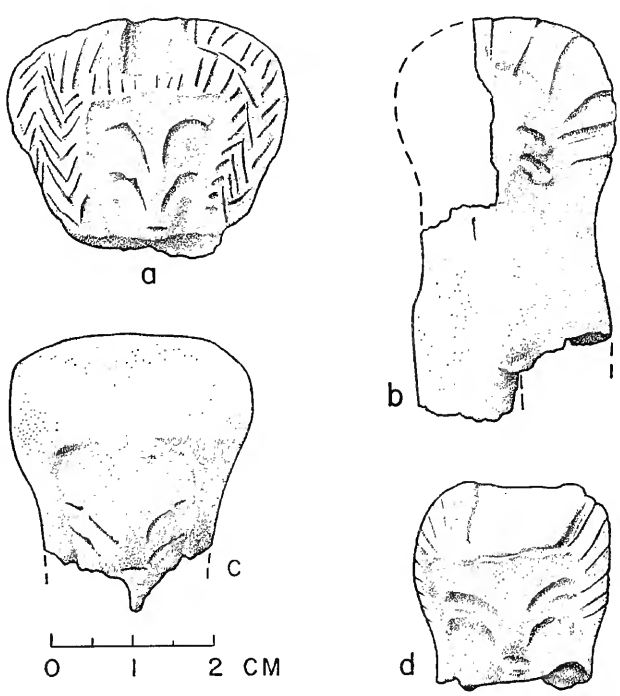

FIGURE 58.—Typical figurine heads of the San Pablo type.

Buena Vista

MATERIAL: Usually, pottery; rarely stone. Fine-grained sandy paste with numerous pin-size air pockets; medium to dark gray core.

METHOD OF MANUFACTURE: Double coil foundation is characteristic. Fracture between coil junctions is less common that in Valdivia and San Pablo types, but the two coils are often distinguishable on the irregularly broken edges. Small bits and fillets of clay were used to round out and expand the contours.

A few stone examples are executed from naturally eroded pebbles of suitable shape, in which working was restricted to incising the facial features and headdress. Rarely, some shaping may have been employed to improve symmetry.

SURFACE TREATMENT: Finishing is generally superficial, leaving unevenness and even pronounced roughness of the surface. A minority are better smoothed but a really smooth and even surface is rare. Polishing is minimal and usually confined to high portions of the uneven surface; most examples are unpolished. Red slipping is a very rare exception. Surface color is typically grayish, occasionally light brown or tan. Firing is poorly controlled causing a mottled effect.

ANATOMICAL FEATURES (figs. 59, 65, v–gg; pl. 126):

Head: The outline in front view typically expands from the neck upward, so that maximum width is across the flat or slightly curved top. Sideward expansion is generally accompanied by slight to marked backward curvature. The back of the head is the most poorly finished part of the surface and never continues the ornamentation applied on the front. The face is typically formed by two sloping planes meeting in a ridge down the center, which constitutes the nose. This prominence is more exaggerated and sharply delimited than in the San Pablo type, often beginning abruptly

just above the mouth and fading into the sloping forehead above the eyes. Eyes and eyebrows are typically drawn with fine incisions, but are often not parallel, symmetrically placed or uniform in length and width. The mouth may be indicated by a shorter cut or is absent. In crude examples, eyes and eyebrows may also be absent (pl. 126k). If head or hair ornamentation exists it is limited to a band across the top of the forehead; in many examples it is completely lacking. The simplest treatment is a horizontal or curved incision about half way between the eyes and the top of the head (fig. 59a; pl. 126 t–u). Sometimes the upper zone is decorated with parallel vertical incisions (pl. 126i), nicked applique ribs (pl. 126 e, g), or an incised line running down the center and toward one side. With rare exceptions, execution is crude. Fracture line in several examples suggests the original possessed two heads, rising side by side from a common torso (pl. 126 t–w).

Stone examples of this type typically consist only of a head, trianguloid in outline with the apex downward (pl. 118 k–r). Eyes, eyebrows (often absent) and mouth are straight or slightly curved incisions. The top of the forehead is usually set off by a horizontal incision and the area above filled with parallel vertical lines.

Torso: The torso is short in proportion to the head and legs, typically representing less than one-third of the total length. Small rounded breasts may occur, and when present occupy a major portion of the body surface. Punctation of the pubic area is rare. The back is superficially smoothed and shows no anatomical details (pl. 126 m, s).

Arms: Arms are totally absent.

Legs: Legs taper from a maximum diameter at the point of attachment toward a blunt point, and are circular in cross section. They are often bent slightly forward or slightly backward, and occasionally assume a sitting position. Length is frequently unequal (Zevallos and Holm, 1960, pl. 20 center, left and right). In a few examples, the body tapers from the head toward a central blunt end, producing the effect of a single leg.

DIMENSIONS: Length of complete pottery examples ranges from 3.5–8.0 cm., but several large heads suggest that maximum length may reach about 12 cm. Head length is 1.5–3.5 cm. Stone examples range from 3.5–7.3 cm. in length.

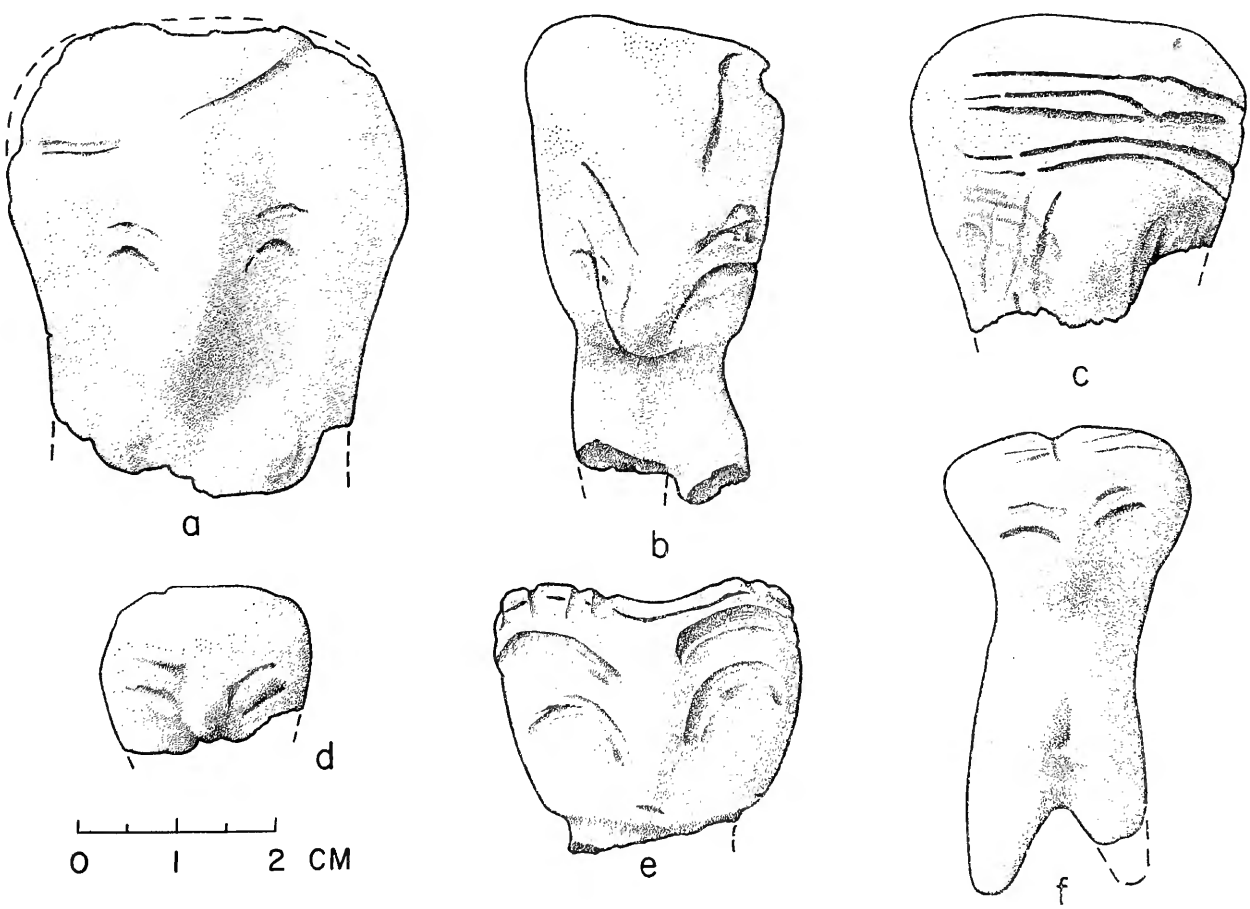

FIGURE 59.—Typical figurine heads of the Buena Vista type.

CHRONOLOGICAL POSITION: Occurring rarely in Period B, this type is characteristic of Period C (figs. 52, 64).

Punta Arenas

MATERIAL: Pottery.

METHOD OF MANUFACTURE: The small sample does not provide clear indications of presence or absence of a double coil foundation.

SURFACE TREATMENT: Smoothed but not even, with minor defects, pits, ridges and other regularities remaining. Red slipping and polishing are both absent.

ANATOMICAL FEATURES (fig. 65 hh–pp):

Head: The two examples are flattened and concave at the top, which is the region of maximum width. There is no true neck, the head expanding slightly to markedly from the shoulders. Eyes are represented by deep circular punctations; in one case the mouth is a thin horizontal incision, in the other it is not shown. The face is slightly convex in one, the curvature following the contour of the surface (fig. 65ll); in the other, the nose and mouth area is slightly rounded (fig. 65oo). No details of hair or headdress are shown.

Torso: The two torsos show variation in anatomical detail, and are of normal proportions. Both are flat and ovoid in cross section. One (fig. 65 hh–ii) has two low rounded breasts outlined in fine punctation and with a single punctate at the center. The pubic area has a shallow nearly vertical incision surrounded by fine punctation. The other torso is plain (fig. 65ll).

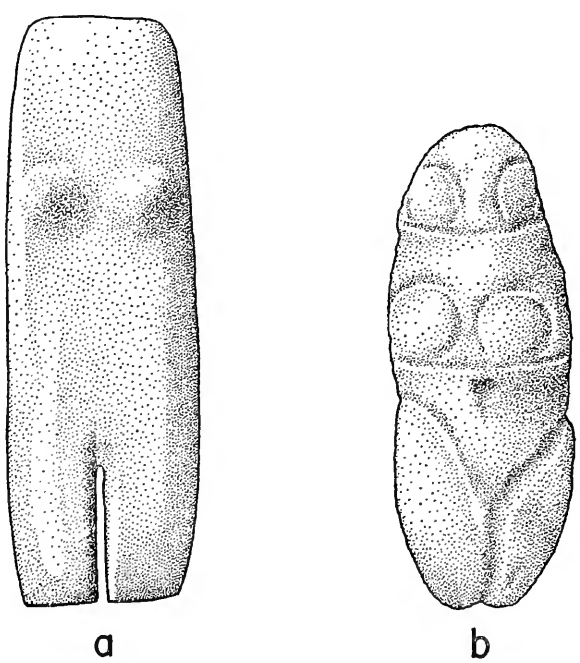

FIGURE 60.—Valdivia Phase figurines of unclassified types. *a*, Pottery figurine resembling the stone Palmar Notched type, length 5.2 cm. *b*, Rare stone variety, length about 4.3 cm. (after Zevallos and Holm, 1960, pl. 20).

Arms: A protrusion at each side on the shoulder is the only indication of arms. In one example, the front has two or three fine punctations (fig. 65ii); in the other, a perforation runs from front to back (fig. 65ll).

Legs: Legs are separated, rounded in cross section, and taper from a maximum diameter at the junction with the body toward the flattened end (fig. 65 hh–jj). The degree of taper is less than in the Buena Vista type.

DIMENSIONS: None is complete. One body, including torso and legs, is 5 cm. long.

CHRONOLOGICAL POSITION: Restricted to Period D (figs. 52, 64).

Unclassified

A few figurines differ sufficiently in style to put them outside the range of variation included in each of the types recognized for the Valdivia Phase.

Two pottery figurines, one complete and one incomplete (lower half missing), resemble the stone Palmar Notched Type except for the addition of small conical breasts on the front about a third of the distance from the upper end (fig. 60a). Outline is similar to that of the stone examples, but thickness is greater. The surface is even and polished, leaving vertical striations. Length of the complete example is 5.2 cm. Both are from G–31 and date from Period B.

A stone figurine, shaped from a thin sandstone slab, is of particular interest because of its unique eye treatment (fig. 61). Outline follows the rectanguloid form of the early stone types, with the addition of indentations at the sides to indicate the waist, and a shallow vertical incision to separate the legs. The chest is adorned with two large hemispherical breasts. The head is set off by cutting back the neck area, leaving an angular chin line. Cutting back at the sides and top outlines a hemispherical face that contains two ovoid eyes outlined by incisions that continue downward at the outside. A horizontal incision through the center completes the eye treatment. Sculpturing at the sides of the head and body defines a narrow ridge, which from the shoulder downward somewhat resembles the arm treatment on the Valdivia type but fails to continue across the center of the front. Detail on the back is restricted to a groove separating the head from the body. Existing length (head and torso) is 12 cm. The figurine is from Period B levels of G–31, Cut J.

Several stone figurines have a cylindrical form slightly tapering to rounded ends (fig. 60b). The head is set off from the neck by a shallow groove. Two circular breasts are on the upper part of the front, the inner edges abutting. Legs may be set off by incisions that run from the hips downward toward the center where they meet and continue as a single line separating the legs. The head may be plain or

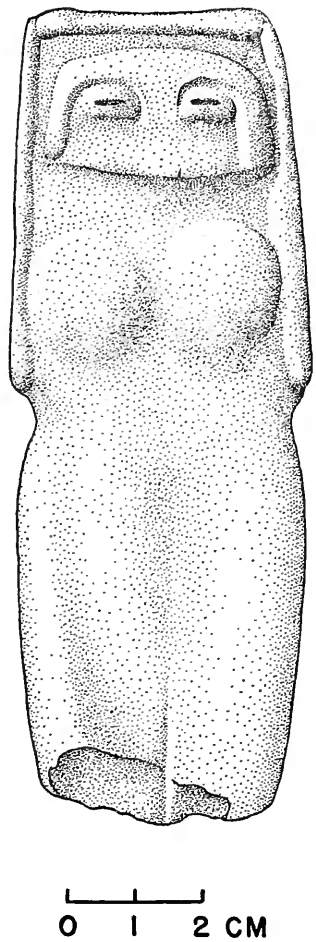

FIGURE 61.—Unique Valdivia Phase stone figurine.

slightly flattened from the midline toward the sides producing a ridge to mark the nose. Curved incisions may represent eyes. Length is about 4.5 cm. Examples date from Period C.

A few pottery figurines have a cylindrical head shape, with the top flat or concave, set off from the body by a well defined neck (fig. 62). The body is like that associated with the San Pablo Type, tapered inward at the waist on the sides, with small rounded breasts. One lacks arms; the other has them raised against the sides of the head. Facial features are distinctive. Eyes and mouth are short horizontal cuts, while a continuous incision or ridge curves from the side up over the eyes to meet at the center and extending down to eye level to form the nose. All are fragmentary. Examples come from Periods B and C.

A few unique stone examples apparently reflect random experimentation, perhaps the equivalent of doodling. In some cases, the form may have been suggested by the shape of the unworked stone.

Figurine Stools

Two small zoomorphic pottery objects recovered from stratigraphic excavations at G–31 have been tentatively identified as figurine stools. They are of similar form, with flattened, polished tops or backs and four small feet. Projections at the ends, corresponding to head and tail are damaged or broken off.

The smaller of the two examples, from G–31, Cut H, Level 1.20–1.30 meters, is the more realistic (fig. 63 d–f). Existing length is 5.2 cm., which excludes the broken-off tail. Width at the center of the back is 2.5 cm., height 1.5 cm. The back has been flattened, and forms an angular junction with the nearly vertical sides. The legs are slightly splayed outward and conical in form, coming to a blunt tip. The neck and head are bent slightly downward and the nose, which was directed downward, is missing. The surface is dark brown to gray-brown in color, unpolished except on the back, which is striated polished lengthwise. Fine, parallel, scratchlike incisions run down the sides and across the bottom, but run across the top only on the neck. Two similar incisions run lengthwise on the underside (fig. 63f). Broader lines, 0.5–1.5 mm. in width, were used to draw a cross on one end of the back and a semicircle at the center of each side. Execution of the decoration is slapdash, lines not being equally spaced, straight or evenly parallel. The object rests firmly on the feet so that the back and top are level.

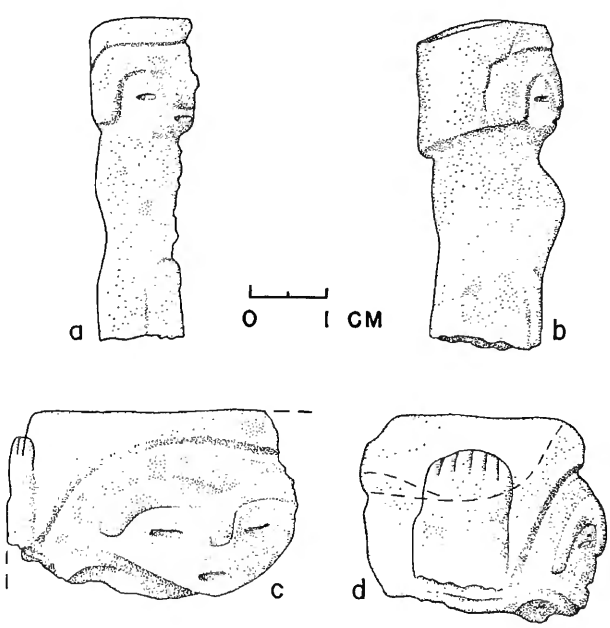

FIGURE 62.—Two examples of a rare unclassified type of Valdivia Phase pottery figurine.

The second example (fig. 63 a–c), from G–31, Cut F, Level 20–40 cm., is shorter in length but taller and broader than the one just described. Existing length is 4.5 cm., width at the center 3.0 cm., height ranging from 2.0 cm. at one side to 2.3 cm. at the other because of the slope of the back. The back is flattened and joins the convex sides at a well defined angle. The four small conoidal feet are more stubby and set closer together, but allow the object to rest firmly. Projections at both ends are broken off, one having been turned sharply upward (fig. 63b). The surface color is medium to dark brown, slightly fire clouded at one end, and striated polished lengthwise. Polishing is most complete on the back and upper sides. Around and between the legs, the surface is uneven. None of the defects on the surface are suggestive of decoration.

Chronological Distribution and Evolution of Figurine Types

Figurines were recovered from almost all excavations in Valdivia Phase sites, the principal exception being the lower levels of G–31, Cut A, where the excavated area was too small for the relatively rare early stone types to be represented. This temporally defined sample is supplemented by a large collection of fragments from surface collections and nonstratigraphic tests, which assist in establishing variation within the types and occasionally include kinds not present in the stratigraphic excavations. When occurrence of figurine types is plotted according to the seriated sequences based on ceramic change, correlations between certain of the types and period subdivisions are clearly evident.

On the first seriation chart, including the small early tests at G–31 (fig. 49), only figurines of the classic Valdivia type appear. The chart covers Periods A and B and the early part of Period C. Figurines make their appearance shortly after the beginning of Period B and continue for the rest of the sequence. Larger scale excavations, represented by Cut J, Sections D and E at the same site, show that all of the stone figurines types and all but the latest of the pottery ones are actually present at G–31 (fig. 50). Palmar Plain type is distributed from the bottom until the end of Period A, and although the sample is small per level it suggests a tendency toward decline from a maximum frequency at the beginning of the Period. Palmar Notched type, in which one end is notched, seems to begin slightly later. Palmar Incised type, the most elaborate stone type, is very rare so that its apparent absence during the first half of Period A may not be a true reflection of its chronological duration. Three examples occur in Period B levels. Since no similar prolongation is evident in Palmar Plain and Palmar Notched types in spite of higher frequency of occurrence, it is likely that this represents a real persistence rather than upward migration through disturbance of the refuse of the kind manifested by many of the decorated pottery types. The pottery figurines are clearly associated with Period B, only three examples of the Valdivia type occurring in later Period A levels. It also seems clear that the Valdivia type is characteristic of Period B, half of the levels producing 7 or more fragments. Sporadic occurrence of fragments of the San Pablo type and a single example of the Buena Vista type suggest that the inception of these types may be of Period B date.

The third chart (fig. 52), compiled by seriation of stratigraphic samples from single period sites, sheds further light on the chronological distribution of figurine types. The Valdivia type is the only one associated with Period B, and except for a single fragment is absent from Period C levels. The San Pablo type and Buena Vista type both occur throughout Period C, with the latter slightly more frequent. The seeming sporadic occurrence is attributable to absence of a typological breakdown for figurines from G–54, Cut 2. Period D is represented only by the Punta Arenas type, which is restricted to this part of the sequence.

Coordination of the evidence from these three seriations into a single pattern produces a better picture because of differential coverage exhibited by the various excavations. Unfortunately, the interdigitation employed for the pottery sequence cannot be adopted without modification because of the small figurine sample from most levels. However, substituting Period A levels from G–31, Cut J for those of Cut A supplies missing information on this part of the sequence. Because of differences in sample size resulting from differences in excavated area, and the impossibility of minimizing these by converting the totals to percentages due to the small samples, the graphic presentation employs a vertical line extending from earliest to latest occurrence (fig. 64). Where it is uncertain whether an early or late appearance reflects migration in the refuse or actual persistence of the type, the line is broken.

Certain details of body finish and leg form also show temporal differences when plotted in terms of presence and absence. Red slipped surface is restricted to Periods B and C, being characteristic of the Valdivia type and occasionally associated with the San Pablo type. Plain or unslipped surface is typical of the late figurines and is correlated with Periods C and D. The distinctive bulge at the rear of the leg is characteristic of the Valdivia type and shows a similar

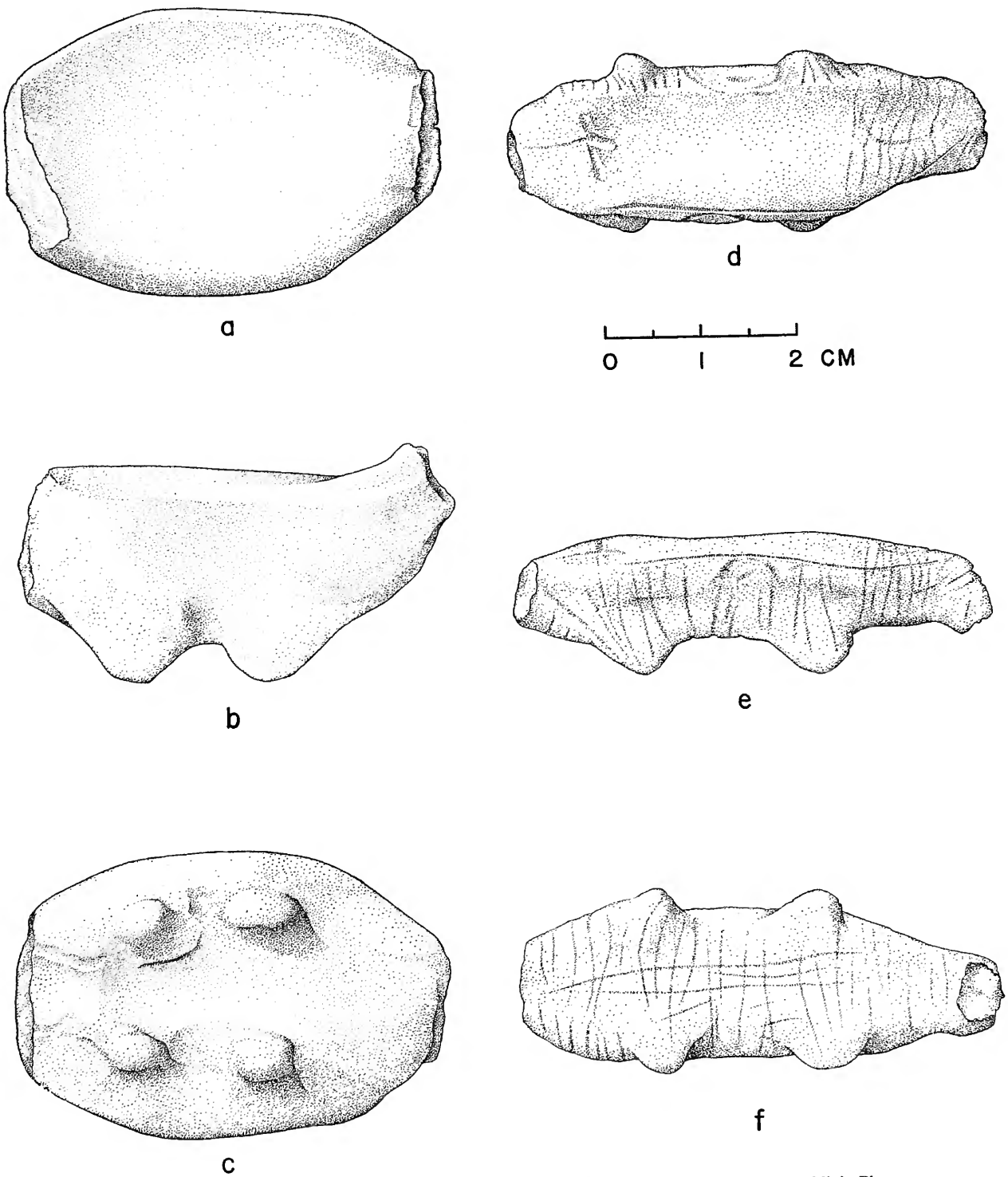

FIGURE 63.—Top, side and bottom views of two probable pottery figurine stools from the Valdivia Phase.

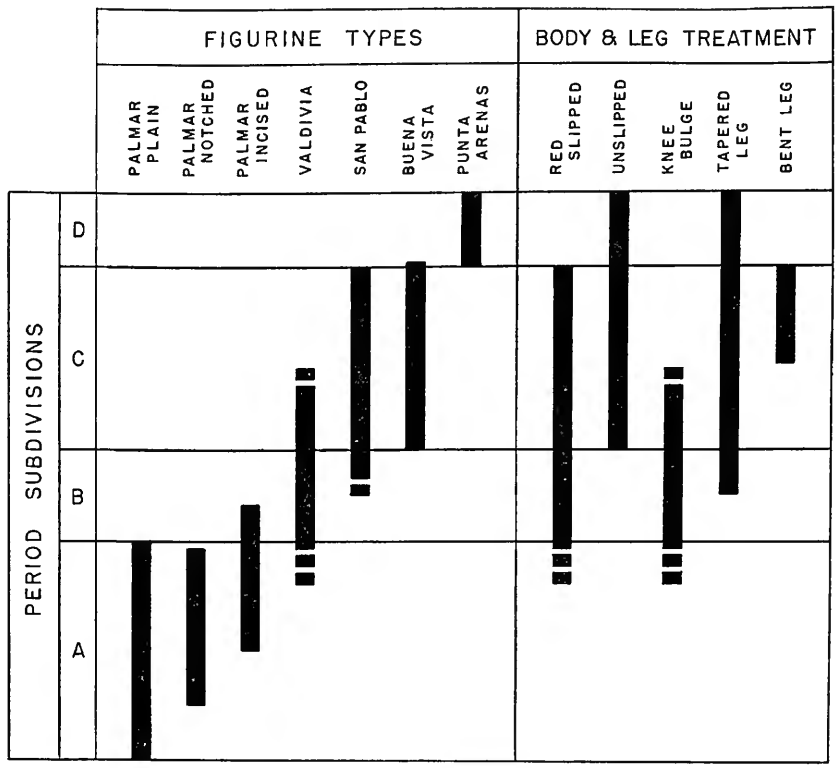

FIGURE 64.—Temporal distribution of figurine types and details of body treatment during the Valdivia Phase. Bars connect earliest and latest occurrence. Dotted extensions reflect uncertainty as to whether terminal occurrence is the result of artificial mixture or actual presence. Levels are arranged in seriated order based on changes in pottery type frequency.

temporal restriction, while the straight leg persists through Period D. Bent legs implying a seated position were recovered only from the latter part of Period C, as represented at G–54.

In addition to evidence from our own investigations, more than 2,000 figurine fragments were recovered from excavations at G–115. Sixty-one of those illustrated (Zevallos and Holm, 1960, pl. 15–24) are classifiable into types. Thirty-two represent the Valdivia type, twenty the San Pablo type, and nine the Buena Vista type. None of the early stone types appear to have been found. The Valdivia type is dominant during Period B but extends into early Period C, when the other two are diagnostic (Appendix 1, table 13), a chronological distribution paralleling that derived from the pottery type analysis for G–115 (p. 95). A number of seated fragments also occur (op. cit. pl. 25), a variant that appears to be limited to Period C. The single figurine from G–117 represents the Buena Vista type, also agreeing with the late temporal position indicated by the pottery types.

Two small zoomorphic objects have been tentatively identified as figurine stools because their size corresponds to that of seated figurine fragments, and the flat top conflicts with the relatively naturalistic modeling of the rest of the body, suggesting a specialized function. In form, these objects resemble some of the zoomorphic stools from later periods and cultures of northwestern and lowland South America.

When the chronological distribution of the seven types of figurines is analyzed in terms of evolutionary trends, two principal foci of change are evident: one, from a dominance of stone types in Period A to a dominance of pottery types thereafter; and the other, from one type to another in a continuous series. Examination of each of these foci in more detail will bring to light some of the problems in explanation of the origin and development of the figurine complex.

The three types of stone figurines form an obvious evolutionary series, from an unadorned smooth thin slab (Palmar Plain type), to a hint of anthropomorphic significance in the form of rudimentary legs (Palmar Notched), to a stylized but unmistakable rendering of facial and occasionally anatomical features (Palmar Incised). Along with increased attention to anthropomorphic detail goes increased shaping of the form, a worked rectanguloid block being substituted for the naturally eroded, elongated pebble characteristic of Palmar Plain. The stone is always a soft variety, easily trimmed and cut.

Identification of the unworked flat slabs as figurines of Palmar Plain comes in part from recognition of this evolutionary sequence, in which they are the logical

antecedent to Palmar Notched. However, additional support comes from the fact that natural rocks of this specific form are restricted to levels identified with Period A. If they were not selected, or were selected for some other function, then it might be expected that they would occur with similar frequency throughout the deposit.

In the evolution of stone figurines, the most abrupt transition is between Palmar Notched and Palmar Incised types, in which the faceless slab is provided with a highly stylized and very well executed face. In a few examples a geometric pattern replaces the face, and it is possible that these represent a transitional form. On the other hand, vessels of Valdivia Broad-line Incised and Valdivia Excised occasionally are decorated with faces of very similar style, raising the question of whether one served as a prototype for the other. Valdivia Broad-line Incised examples do not come from seriated levels, but the chronological position of this motif in Valdivia Excised (Appendix 1, table 12) is approximately the same as that of Palmar Incised figurines, suggesting that the two may be expressions of the same influence dating from early Period A.

Although the three stone types form a logical evolutionary series, and their periods of maximum frequency tend toward a sequential pattern, the small size of the sample and approximate coincidence of the initial appearances of Palmar Notched and Palmar Incised types permits an alternative view that they may represent contemporary variants of greater or lesser crudity, reflecting differences in the skill of the maker or in the use for which the figurine was intended, rather than change through time.

The earliest pottery figurines, represented by the Valdivia type, are very different in appearance from the abstract stone ones, and no stylistically transitional form is evident. An interesting crossover is represented by two unclassified pottery figurines from Period B, which combine diagnostic characteristics of Palmar Notched with a pottery medium of execution, but this sheds no light on the origin of the Valdivia type. Except for a few examples in the late levels of Period A, which may be attributed to downward migration in the refuse, Valdivia figurines are restricted to Period B and early Period C. Judging from the frequency with which fragments occur, this is the time when figurines played their major role. The Valdivia type is also the most artistic and the best made of the figurine types, with typically polished red surfaces and a high degree of anatomical detail, particularly notable in the realistic rendition of the back. Although standardized in body detail, Valdivia figurines are outstanding for their variety of hair treatment and relatively realistic appearance (fig. 65 a–i). They constitute a unique and remarkable feature of Period B Valdivia culture.

In the seemingly random variation in excellence and alternative treatments of anatomical details, there is a drift in the direction of projection of the face and simplification of the back, which leads to the San Pablo type (fig. 65 j–u). Here the distinctive squared buttocks and bulging back of the leg are absent. The breasts of the Valdivia type are retained and stippling of the pubic area is more frequent. Whereas in the Valdivia type, hair execution is as detailed at the back as at the front, in the San Pablo type it is usually shown only on the front. The back of the head, formerly convex and curving inward toward the top, has become concave, with the top projecting slightly or markedly toward the rear. The diagnostic criterion for purposes of classification is the plane of the face, which projects above the framing hair, often to a grotesque degree. The nose, rarely even hinted at in the Valdivia type, is suggested by a medial ridge or represented by a hooklike prominence from forehead to mouth. Execution of eyes and eyebrows is variable, but there is a tendency to a slanting orientation, the inner end of the incision being lower than the outer one. Surfaces tend to be poorly polished, especially at the back, and red slipping is not typical.

Further changes in the direction of simplification result in the Buena Vista type (fig. 65 v–gg). Here the hair ceases to frame the face, and if shown at all is depicted by a horizontal zone across the forehead. Increased stylization of the head and loss of anatomical detail produce an unrealistic result. Some of the better executed examples incorporate simplified survivals of earlier characteristic features, such as occasional zoning of the hair (although without red slipping), and lateral projection of the shoulder area to suggest arms, but complete arms are never shown. The double coil foundation construction continues. Most double-headed figurines are of the Buena Vista type.

In Period D, there is a notable diminution in the frequency with which figurine fragments are encountered in the refuse. Only three examples represent this part of the sequence, and they are variable among themselves and unlike those of Period C. Because of this, the Punta Arenas type cannot be described with the same confidence as the other figurine types, but there are several apparently diagnostic features (fig. 65 hh–pp). The top of the head is flattened and slightly concave so that the sides tend to rise in points—a tendency discernible in some examples of the Buena Vista type. Facial features, instead of formed by incisions, are small circular punctates. The body is unpolished and unslipped, and the legs are conical tapering to a flattened tip.

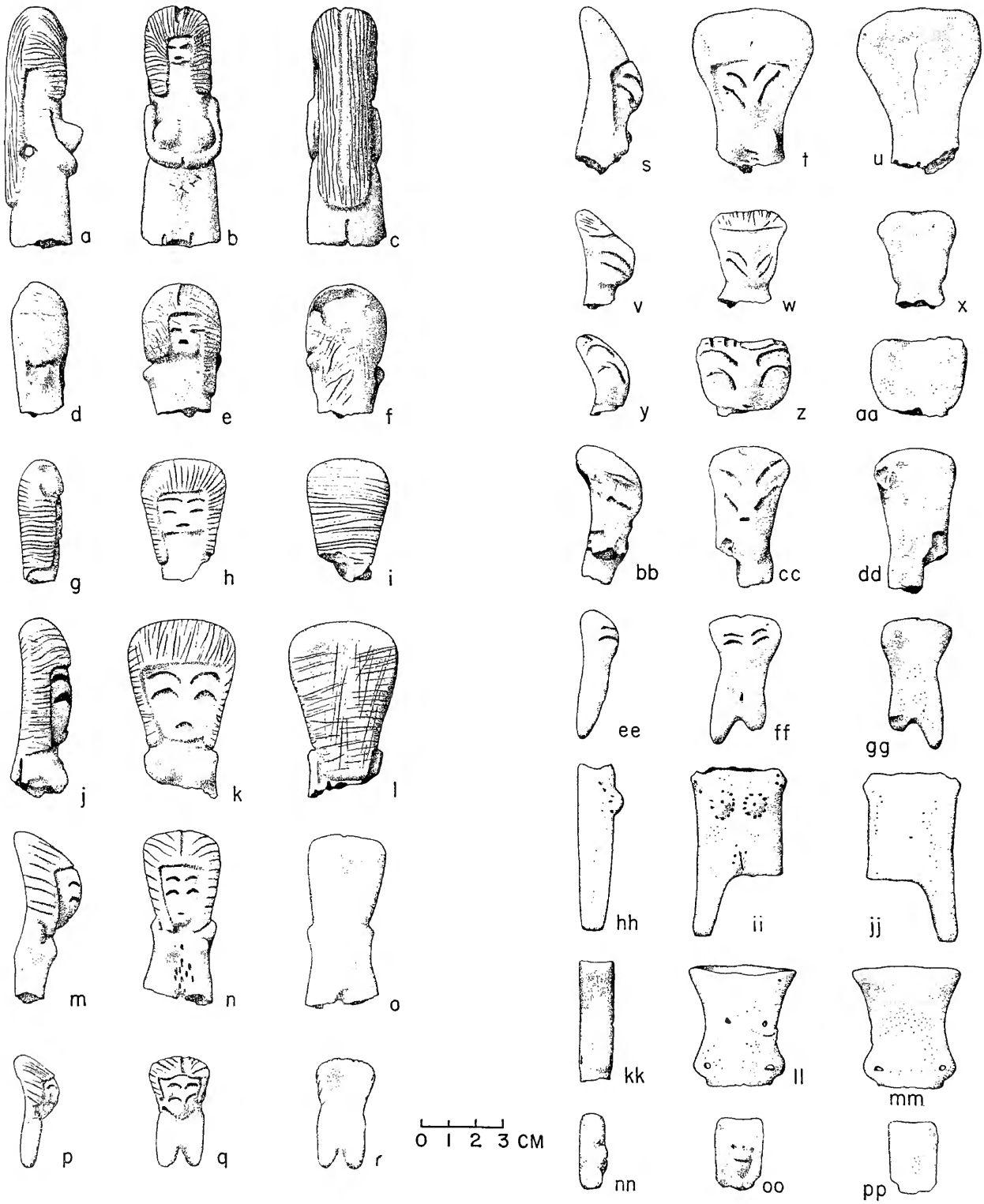

FIGURE 65.—Evolutionary changes in figurine style during the Valdivia Phase. *a–i*, Valdivia type. *j–u*, San Pablo type. *v–gg*, Buena Vista type. *hh–pp*, Punta Arenas type.

Miscellaneous

Worked Sherds

Aside from figurines, the only artifacts of pottery recovered from sites of the Valdivia Phase are disks fashioned from flat sherds representing almost exclusively plain pottery types. Of the 44 examples tabulated, 19 are Valdivia Polished Plain, 11 Valdivia Polished Red, 5 Valdivia Striated Polished Plain, 4 Valdivia Plain, 2 San Pablo Plain, 2 Valdivia Brushed and 1 Valdivia Incised. Diameter ranges from 1.9 to 5.5 cm. Four have central perforations, and one more is incompletely perforated. One is from the end of Period B at G–88; the remainder are from Period C levels at G–54. Similar disks are reported from G–115 (Zevallos and Holm, 1960, p. 10). The rarity of perforated examples appears to rule out use as spindle whorls.

Unfired Clay Objects

Six small flattened lumps of well dried but unfired clay (pl. 19 k–n) were recovered from different levels during excavations at G–54. Outline is generally circular but asymmetrical, as indicated by the dimensions of unbroken examples: 2.0 by 2.4 cm.; 2.5 by 2.8 cm.; and 3.5 by 3.8 cm. The margin is typically interrupted by several V-shaped notches, where it was "torn" when the lump was flattened. Thickness ranges from 5 to 15 mm., with only one thicker than 10 mm. Surfaces are not smoothed or polished, and one shows traces of what look like finger prints.

DIAGNOSTIC FEATURES AND PERIOD SUBDIVISIONS OF THE VALDIVIA PHASE

Although the Valdivia Phase exhibits considerable change through time, it is possible to describe general characteristics that are applicable throughout its time span, and which distinguish it from other archeological complexes on the Ecuadorian coast.

Sites are located at the margin of salitres, within a few kilometers from the present shore. The principal component of the refuse is marine mollusks, with the Venus clam (*Anomalocardia*) the dominant genus. Crab and fish remains are also characteristic. Occasional lenses containing charcoal and numerous fire-cracked stones are residue from hearths. There was no direct evidence of house type, but the markedly sloping terrain at some of the sites, and occasional fragments of sun dried mud with stick, twig and grass impressions suggest that floors may have been raised on piles, and walls may have been of wattle and daub construction.

Evidence for reconstruction of the subsistence pattern of the Valdivia Phase is unfortunately incomplete, both because of failure of some excavators to preserve for analysis faunal remains from many of the excavations and because of destruction by the climate of vegetal materials. Restriction of sites to the shore, the abundance of shell and fish remains in the refuse, and the predominance among recognizable stone and shell artifacts of objects relating to fishing all lead to the conclusion that the sea was the principal subsistence resource. Knowledge of practices among recent food gathering groups and comparative evidence from the adjacent dry coast of Peru in the preceramic period support the inference that terrestrial plant food sources must also have been exploited. The presence of fishhooks and weights, either net or fishline, implies cord. Since wild cotton is found along the Guayas coast today, and domesticated cotton makes its earliest appearance on the north Peruvian coast about 2500 B.C. (Engel, 1963a, p. 10), it can be postulated that cotton was known by peoples of the Valdivia Phase. Whether it was gathered or planted remains an unanswered question. Other plants associated with incipient agriculture in Peru could have been grown, perhaps more readily, in the wetter climate of the Ecuadorian coast. Occasional grinding stones are the only direct evidence, however, of utilization of some kind of plant food. Animal bones are frequent only in Period C, but their scattered occurrence throughout the sequence attests to what could have been postulated, namely that terrestrial fauna were exploited as an additional source of food. How these animals were captured remains questionable. The absence of stone projectile points can be interpreted as reflecting manufacture of these in a perishable material, and a single bone point supports this inference. It is probable, however, that snares or other trapping devices were also employed. Undoubtedly a combination of food sources was tapped, with the abundant seafood providing a sufficiently reliable staple to permit long residence in the same place for populations as small and scattered as those of the Valdivia Phase.

As might be expected of a food gathering tradition, stone, bone and shell artifacts are relatively crude and nondescript, with the exception of implements asso-

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ciated with fishing. Most stone tools are shaped only to the extent needed to produce a working edge, and although differences in length and contour suggest classification into knives, blades, scrapers, choppers and other general categories, this functional subdivision is not characterized by shape uniformities implying manufacture in accord with a culturally defined norm. Greater standardization of sandstone saws and bulbous reamers results in large part from characteristics of the stone. Net or line weights are the most consistent in shape and size, but here uniformity not only has a functional advantage but is created simply by selection of similarly shaped waterworn pebbles.

The only numerous shell artifacts are fishhooks of a distinctive circular form, in which the point is separated by a narrow gap from the bevelled and slightly expanded head. Size is variable, but small in comparison with hooks of the Machalilla Phase, suggesting a difference in the kind of fishing done by the two groups. Identification of species represented by fish remains indicates that fishing was done not only from land or in shallow water, but also in deeper water, implying some kind of watercraft.

Bone utensils are the rarest, and limited to a few antler tip awls or punches. Since fish and animal bones occur in the refuse, this scarcity of bone tools cannot be accounted for wholly on the ground of poor preservation, although bone is the most perishable of the raw materials represented.

On the basis of what has survived, it could be concluded that the Valdivians made little use of personal ornament. Shell beads and pendants are rare, perhaps reflecting an attitude that shells were "garbage", and consequently not suitable for jewelry. A few whole shells were perforated for attachment or suspension, and rarely, fragments of larger shells were worked into pendants. Aside from these objects, personal ornamentation must have been by perishable methods.

There is no direct evidence of weaving. If spindle whorls were employed, they must have been of gourd or other perishable material; sherd disks that might have served this purpose are typically unperforated. Cord imprints on pottery are restricted to a single rim with a simple twisted cord and several sherds with imprints identified tentatively as braided cord, all from Period B. If the identification as braid is correct, variations in impressions on different sherds indicate that complicated types of braiding were created.

Among the objects of daily use, pottery vastly outnumbers all other kinds of material. A variety of vessel shapes and decorative techniques form the basis for identification of the relative chronological position of sites. Surfaces are even and often polished; 21 percent of the undecorated sherds have a polished red slip. Decoration is limited to plastic techniques, but nearly all known methods are represented. Incision, either broad or narrow, is most common. Other techniques include corrugation, fingernail and fingertip impression, excision, applique fillet, shell scraping, shell stamping, finger grooving, rocker stamping, punctation, drag-and-jab with a multiedged tool, "pebble polishing" and combing. Broad-line incisions and excised areas are sometimes filled with red ocher. Different combinations of decorative technique and surface treatment create a varied result that is distinctive, attractive and generally competently executed. Decoration is common throughout the Phase, but especially during Period C, when few vessels were left entirely plain. Lobed rims and folded-over finger-pressed rims are typical of Periods A and B. Compared with later Ecuadorian archeological complexes, bowls and jars are small. Wide mouthed forms are characteristic, and distinctive features include angular (carinated) shoulders on bowls and cambered rims on jars. Small tetrapod feet are characteristic of rounded bowls of Periods A and B; well defined concave bases of jars of Periods B and C. A unique Period C trait is a spout at the shoulder. Bottles are totally absent in any form throughout the Phase. There is no evidence, direct or indirect, that pottery vessels served any but a domestic function.

The only evidence of ceremonial life is in the form of small anthropomorphic figurines of stone or pottery. Stone figurines, restricted to Period A, are stylized and standardized as compared to pottery examples, which begin with Period B. Although considerable modification takes place in the pottery figurine style during Periods B and C, the double coil foundation and small size remain characteristic. The earliest pottery figurines are the best executed, although variation from fine to crude is a continuum. The abundance of fragments in the refuse suggests that a figurine may have been manufactured for use only once, and having served its purpose became valueless and was discarded. Such a situation exists among present day Chocó, Chamí, Emberá and Cuna Indians of Colombia, as described by Reichel-Dolmatoff (Evans, Meggers, Estrada, 1959, p. 10). Here, wooden figurines are carved for curing ceremonies, in which they play an important role. As soon as the ceremony is over, however, they lose their potency and are often thrown on a trash heap immediately. Since curing ceremonies are the most frequent kind of religious activity, many figurines are produced and discarded during the course of a year. If the figurines were of pottery instead of wood, the remains would accumulate as they did in Valdivia Phase sites with the passage of time.

The figurines, particularly the Valdivia type which is the most realistic, are of interest for the light they shed on dress and hairstyle. Except for an occasional belt, bodies are nude and seldom show any patterning in surface finish that could be interpreted as representing body paint. Coiffures, by contrast, are varied and some times complicated. A "pageboy" style is most common, with bangs at the front and hair falling to the shoulder at the sides and back, sometimes evenly, other times longer at the back. Other styles include a single braidlike extension at one side or down the back; "shaved" sections on the head, red slipped and polished; a large coil or "bun" at each side; and a crownlike effect, concave at the center. The hair area is typically covered with fine incision, often conforming to the vertical direction of real hair, but sometimes applied in abstract rectilinear patterns. In San Pablo figurines, and more markedly in Buena Vista figurines, execution becomes more abstract and simplified, until they bear no resemblance to any persons living or dead.

Burial in the habitation site was one method of disposal of the dead, but the relatively small number of skeletons encountered suggests that other methods or other burial grounds were also employed. All of the skeletons were adults, interred in graves excavated to sterile soil. Discovery of a jar containing remains of an infant suggests that urn burial may have been the practice for very young children. Where position was recognizable, legs were tightly flexed and arms extended along the sides. Orientation was not consistent, and although most of the skeletons were lying on the right side, at least one lay on the left side. In many cases, disarrangement and decomposition of the bones were too great for reconstruction of original position. Sherds and occasionally a figurine fragment came from the adjacent earth, but evidence of grave goods was unquestionable only in one burial, where a polished stone ax was beneath the bones of the lower arm (pl. 12b).

Although the continuity of Valdivia Phase culture is obvious, certain changes take place during the long term of its existence that permit characterization of the complex by periods. A few decorative techniques and vessel shapes are excellent time markers because of their relatively restricted temporal distribution, and in a small surface sample a single sherd of one of these types can suggest the period of occupation at a Valdivia Phase site. In terms of such "period markers", and ignoring continuities exhibited by the majority of the cultural elements, the periods can be characterized as follows:

PERIOD A:
Site location: Junction of salitre and shore.
Stone artifacts: (None diagnostic).
Shell artifacts: Waterworn scoops.
Bone artifacts: (None diagnostic).
Pottery types: Valdivia Fine-line Incised, Valdivia Red Incised, Valdivia Combed, Valdivia Shell Stamped, Valdivia Finger Grooved, Valdivia Corrugated, Valdivia Cut-and-Beveled Rim.
Vessel shapes: Castellated jar rim, folded-over and finger-pressed jar rim, lobed bowl rim, tetrapod base.
Figurine types: Palmar Plain, Palmar Notched and Palmar Incised.

PERIOD B:
Site location: Junction of salitre and shore.
Stone artifacts: Sinkers, paint stones, saws.
Shell artifacts: Waterworn scoops, bowl.
Bone artifacts: (None diagnostic).
Pottery types: Valdivia Multiple Drag-and-Jab Punctate, Valdivia Cord Impressed.
Vessel shapes: (None diagnostic).
Figurine types: Valdivia.

PERIOD C:
Site location: Inner edge of salitre.
Stone artifacts: Choppers.
Shell artifacts: Shaped scoops, pecten pendant.
Bone artifacts: Antler and sawfish tooth awl, antler projectile point (?)
Pottery types: Valdivia Nicked Broad-line Incised, Valdivia Nicked Rib or Nubbin, Valdivia Rocker Stamped, Valdivia Red Zoned Punctate.
Vessel shapes: Cambered jars, spouted jar, convex-walled carinated bowl.
Figurine types: San Pablo and Buena Vista.
Other: Sherd disks.

PERIOD D:
Site location: Inner edge of salitre.
Stone artifacts: (No evidence).
Shell artifacts: (No evidence).
Bone artifacts: (No evidence).
Pottery types: Valdivia Carved, Valdivia Applique Fillet, Valdivia Zoned Hachure, Punta Arenas Incised.
Vessel shapes: Concave-walled carinated bowl.
Figurine types: Punta Arenas.

At the beginning of Period C, pottery of Machalilla Phase types begins to appear in the Valdivia Phase refuse. Valdivia Phase sherds in Machalilla Phase sites attest to an exchange that was probably not limited to pottery vessels. Amicable relations appear to have been maintained between the two populations until the advent of a new group revolutionized life on the Ecuadorian coast and brought an end to both the Valdivia and Machalilla Phases.

The Machalilla Phase

DESCRIPTION OF SITES AND EXCAVATIONS

Description of the Machalilla Phase is based on surface collections and stratigraphic excavations at two sites, M–28: Machalilla and G–110: La Cabuya, supplemented by a small surface collection from G–112. The area occupied by these sites extends along the coast from south Manabí Province into northern Guayas Province (fig. 2). Machalilla Phase pottery has been reported by other investigators from the Santa Elena Peninsula.

G–110: La Cabuya

The coast south of the Valdivia Valley curves westward to a point, forming the southern limit of the broad Valdivia Bay. The land rises steeply behind a narrow beach, becoming a nearly vertical cliff at the point, where it is subject to constant erosion by the sea (pls. 1, 2b). At the point, the ground is thickly strewn with large boulders, completely obliterating the sandy beach. South of the point is a smaller bay that today is a good fishing ground. The land slopes gradually backward away from the brink of the cliff, and is covered at the present time by dense xerophytic vegetation, including cactus. Sherds are sparsely scattered over a generally circular area extending from the brink backward (fig. 66). Tests indicated that the depth and concentration of the deposit was greatest at the edge of the cliff, where a large sherd sample was gathered (fig. 66, test). Three stratigraphic excavations and a trench were made to secure information on composition of the refuse deposit.

Cut 1, 1.5 by 1.5 meters, was placed 3 meters in from the edge of the cliff near the center of the point (fig. 66). The upper 5 cm. of soil was lumpy; below, it became loose, powdery clay of a light gray color. Shells, principally representing the Venus clam (*Anomalocardia subrugosa* Sby.), were present in about the same proportion as at the Valdivia Phase site of G–54. Sterile dark gray clay was encountered at a depth of 70 cm. At the east side of the excavation, a poorly preserved human skeleton (Skull M–1; pl. 196) appeared at the bottom of the refuse deposit. Arrangement seemed to be flexed, but the condition of the bones was too fragmentary to permit detailed observations. No artifacts were associated as burial goods.

Cut 2, 2 by 2 meters, was excavated 2 meters in from the edge of the cliff and 5 meters southwest of Cut 1. Soil and refuse conditions were similar to those in Cut 1. Sterile clay appeared at a depth of 40 cm. toward the bank and 50 cm. on the inward side.

Cut 3, 2 by 3 meters, was placed at the edge of the summit north of Cut 1 (fig. 66). Below the surface root mass, sherds were abundant. Small lumps of red and yellow ochre were recovered from Level 20–30 cm. Sterile soil appeared at 40 cm.

In order to check the composition of the deposit on the inland side, a test trench was excavated 25 meters east of Cut 2 (fig. 66). Originally 3 by 1 meters in a northeast-southwest direction, it was later extended about 2 meters toward the southeast. Depth of the refuse was 50–70 cm.; composition was similar to that at the opposite edge of the site.

A burial (M–2) encountered by workmen and left in situ was removed under our direction at the southwest side of Cut 2. Bones were badly crushed and poorly preserved, lying only 10–20 cm. below the surface. The head was toward the west, and the position of tibia and fibula suggested a flexed position of the legs. Sherds were wedged around the bones and several fishhook fragments were found in close proximity, but it

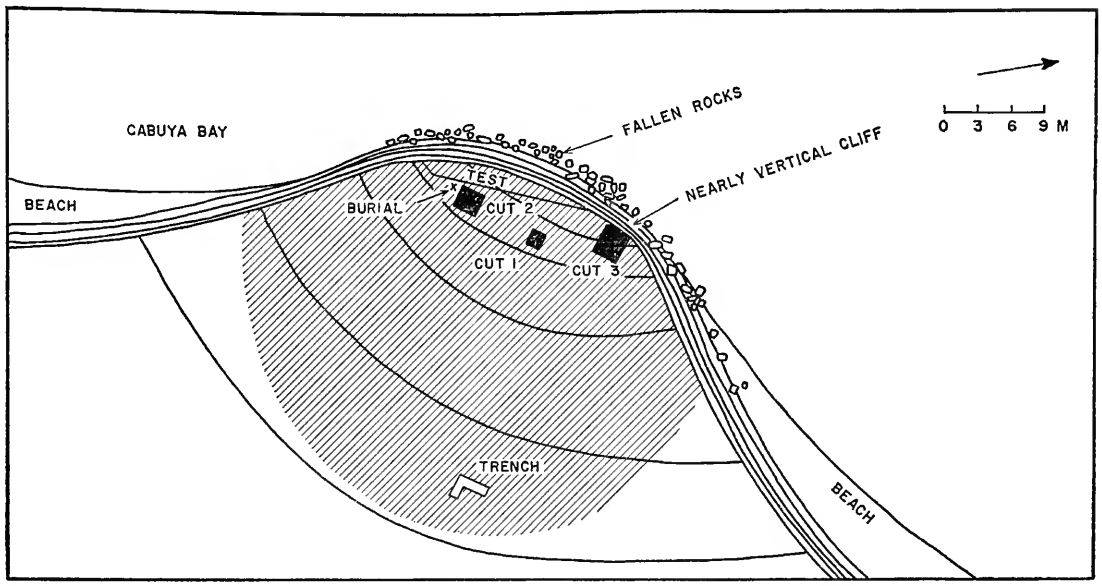

FIGURE 66.—Sketch map of G–110: La Cabuya, a Period C site of the Machalilla Phase, showing extent of the refuse and location of excavations.

could not be determined whether or not this association was accidental.

G–112

A small surface collection made by Estrada from a site at the margin of the salitre behind the present Ayangue Bay (fig. 2) included pottery types identifying it as of Machalilla Phase origin. No tests were made to determine the area or depth of the deposit.

M–28: Machalilla Cemetery

The modern village of Machalilla occupies a small bay along the coast of Manabí Province (fig. 2). The present area of occupation is between the shore and a group of low hills (Estrada, 1958, mapa no. 5). Behind and to the north and south are three archeological sites representing different cultures, indicating that the bay was a favored place of habitation over a long period of time.

The northernmost site, where Machalilla Phase pottery is found, is the only one located on high land. It extends over the flanks of the hill partly appropriated for the modern cemetery, placing it at the northern edge of the former beach, judging by the situation along the Guayas coast. Six small stratigraphic tests made under the supervision of Julio Viteri indicate that the deposit varies in depth between 40 and 120 cm., with sherds sparse below about 80 cm. No burials or other unusual features were encountered in the excavations. A large surface collection was made to increase the sherd sample from the site.

Data from Other Investigations

Although details are incomplete, data from excavations by Bushnell and Disselhoff indicate that the distribution of the Machalilla Phase extends to the northern side of the Santa Elena Peninsula. No sites have yet been reported farther to the south.

Bushnell (1951, pp. 17–21) describes pottery and other artifacts recovered from Engoroy cemetery, near La Libertad. Illustrated sherds belong to Ayangue Incised and the description mentions Cabuya Black-on-White. A figurine head fragment believed to be associated is somewhat more realistic than those from G–110, but shows the Machalilla type of coffee-bean eye and prominent nose, as well as a series of perforations at each side (op. cit., fig. 3n).

Disselhoff (1949, pp. 347, 351) investigated 5 shell middens at La Carolina. His work followed that of Bushnell, and he indicates that it includes the same sites. The illustrations show principally Regional Developmental Period material, but both late Valdivia Phase sherds (op. cit., Tafel I) and late Machalilla Phase sherds (op. cit., Tafel I, II, IV) can be identified. The Machalilla Phase is represented by Ayangue Incised, characteristic of Period C. Motifs 1, 2, 3 and 5, and vessel forms 1 and 2 can be recognized. Of these, Motif 5 is a late Period C diagnostic (see p. 119).

DESCRIPTION OF ARTIFACTS

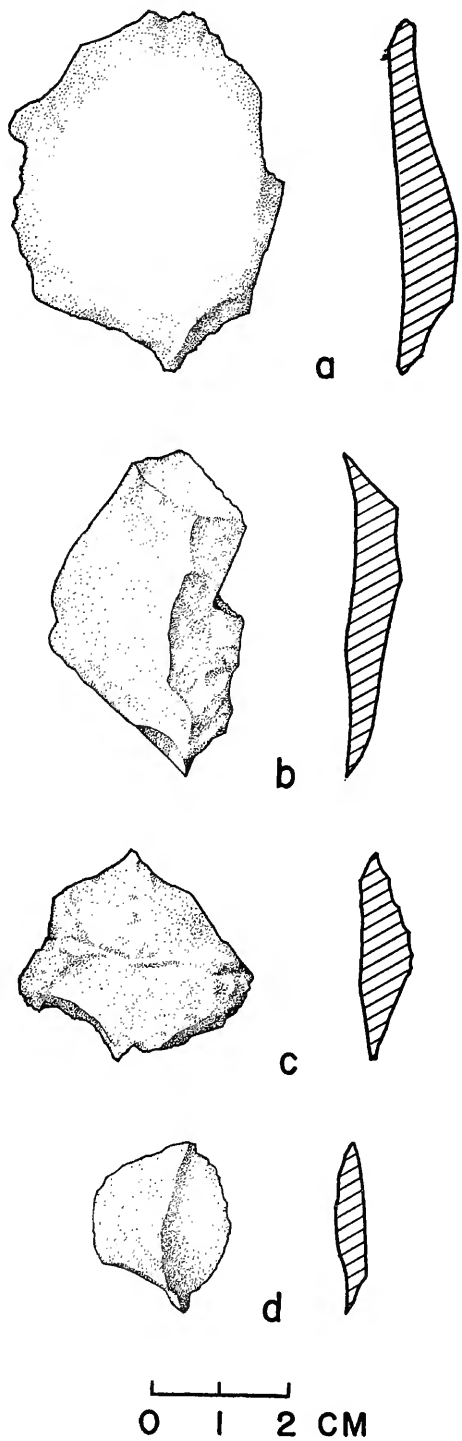

FIGURE 67.—Gravers from the Machalilla Phase.

Stone Artifacts

On the basis of rock material, type of artifact, or method of manufacture, it is impossible to distinguish stone artifacts of the Machalilla Phase from those of the Valdivia Phase. In order to reduce repetition, only unusual features and dimensions are indicated here. If the description is the same only the type is listed with the figure and plate reference. The reader is referred to descriptions of Valdivia Phase stone artifacts for details of material, form and method of manufacture (pp. 26–34). Provenience and frequency of stone artifacts are given by type in Appendix 1, table 17.

ABRADERS.

BLADES OR KNIVES.

CHOPPERS.

CORES.

GRAVERS (fig. 67).

GRINDING STONES (pl. 127).—The only grinding stone is a large piece of roughly pecked, coarse sandstone conglomerate formed into a loaf-shaped mano that was rubbed back and forth in a rocking motion that produced well marked wear on the long edge. Finger and thumb grips were created by pecking pits 1.5 cm. deep and 2.0–2.5 cm. in diameter on one surface and a generally oval region 10 by 5 cm. and 1.0 cm. deep on the opposite surface. The pecked edges have also been partially rubbed over and smoothed. The amount of wear implies that this mano was rubbed across a large grinding slab, but none was found during the limited excavations at G–110. The hand stone came from miscellaneous testing at the site conducted by local workmen and was assigned to the surface collection. It measures 25.5 cm. long, 10.5 cm. high, and 7.0 cm. wide, and weighs 2.4 kilograms.

HAMMERSTONES (fig. 68).

"JAKETOWN PERFORATORS."

PAINT STONES.—Irregular fragments of hematite (red) and limonite (yellow) may have been a source of pigment. (Only hematite came from Valdivia Phase refuse.)

PEBBLE POLISHING STONES (pl. 128).

REAMERS (fig. 69).

SAWS (fig. 70).

SCRAPERS (fig. 71).

MISCELLANEOUS STONE.—A variety of burnt fragments of sandstone, sandstone conglomerates, and indurated clay (mudstone) was found throughout the refuse of the Machalilla Phase, probably representing rocks used in supporting cooking pots.

Chronological Distribution of Stone Artifacts

Since the sample of stone artifacts is limited to Period C of the Machalilla Phase, and to a single site, G–110, it is not possible to read any chronological significance into the seriated position of the artifacts (Appendix 1, table 17). Nor is the absence of a few types associated with the Valdivia Phase likely to be reliable indication of a difference between the two Phases. For example, all of the excavations at Valdivia Phase sites produced only 4 notched sinkers; given the same relative frequency of these objects in the Machalilla Phase, the amount of digging is too small to expect any to be found.

The only unusual artifact is a large two-handed, loaf-shaped grinding stone (pl. 127) showing advanced wear from rubbing against a resistant surface, probably a flat stone. No object of similar shape has been reported either from the contemporary Valdivia Phase or from later coastal Ecuadorian cultures, so that it seems likely to be a diagnostic Machalilla Phase implement. There is no evidence as to what material may have been ground.

Shell Artifacts

Limited excavations in Machalilla Phase sites produced the same types of worked shell objects as occur in the Valdivia Phase. The major difference is that fishhooks appear to be more common and are typically larger. Pendants, beads and other objects of personal adornment are very rare. To avoid repetition, classification follows categories established for Valdivia Phase shell artifacts (see pp. 37–40), and only unusual features are described here. Similarities and differences in the objects associated with the two Phases can be evaluated by comparing figure 19 and pls. 21–24 with pls. 129–130.

Abraders and Polishers

Group A, cut and abraded fragments, mostly *Spondylus* or conch (*Strombus*) shells, includes most examples. Some of these fragments almost appear as if incompletely worked after they had been sawed from a larger section of shell. Five fragments are from various stratigraphic levels in the seriated sequence (Appendix 1, table 8) and three are from the surface of G–110.

Only one fragment of Group B, a waterworn piece of conch shell used as a polisher, came from the surface collection at G–110.

Bead

One small shell has the edges rounded and the center perforated. The perforation is 1.3 cm. in diameter and the object is oval, measuring 2.2 by 2.5 cm. It does not appear to be a shell fishhook blank since the type of shell and natural contours, with the sides tapering upward to a smaller diameter at the top than at the bottom, does not occur among fishhooks. Although worn and reshaped so that identification of species cannot be certain, it is clearly one of the class Gastropoda.

Bracelet

PLATE 129Q

An 8 mm. wide gently curving section has been cut out of a shell with natural grooves on the surface. The

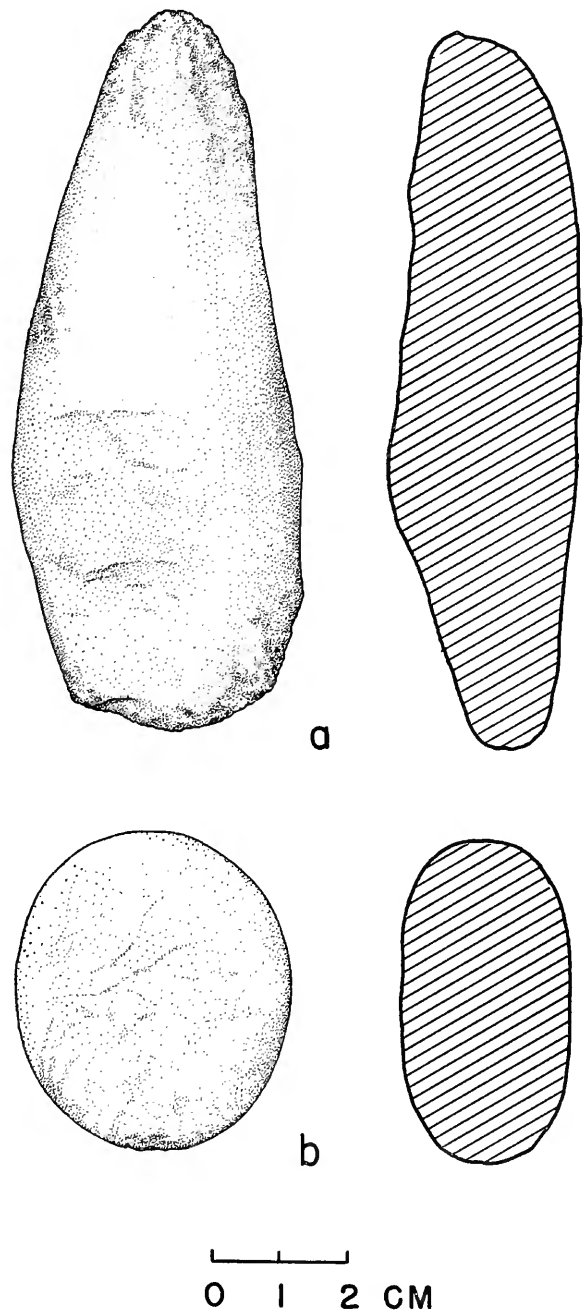

FIGURE 68.—Small hammerstones from the Machalilla Phase.

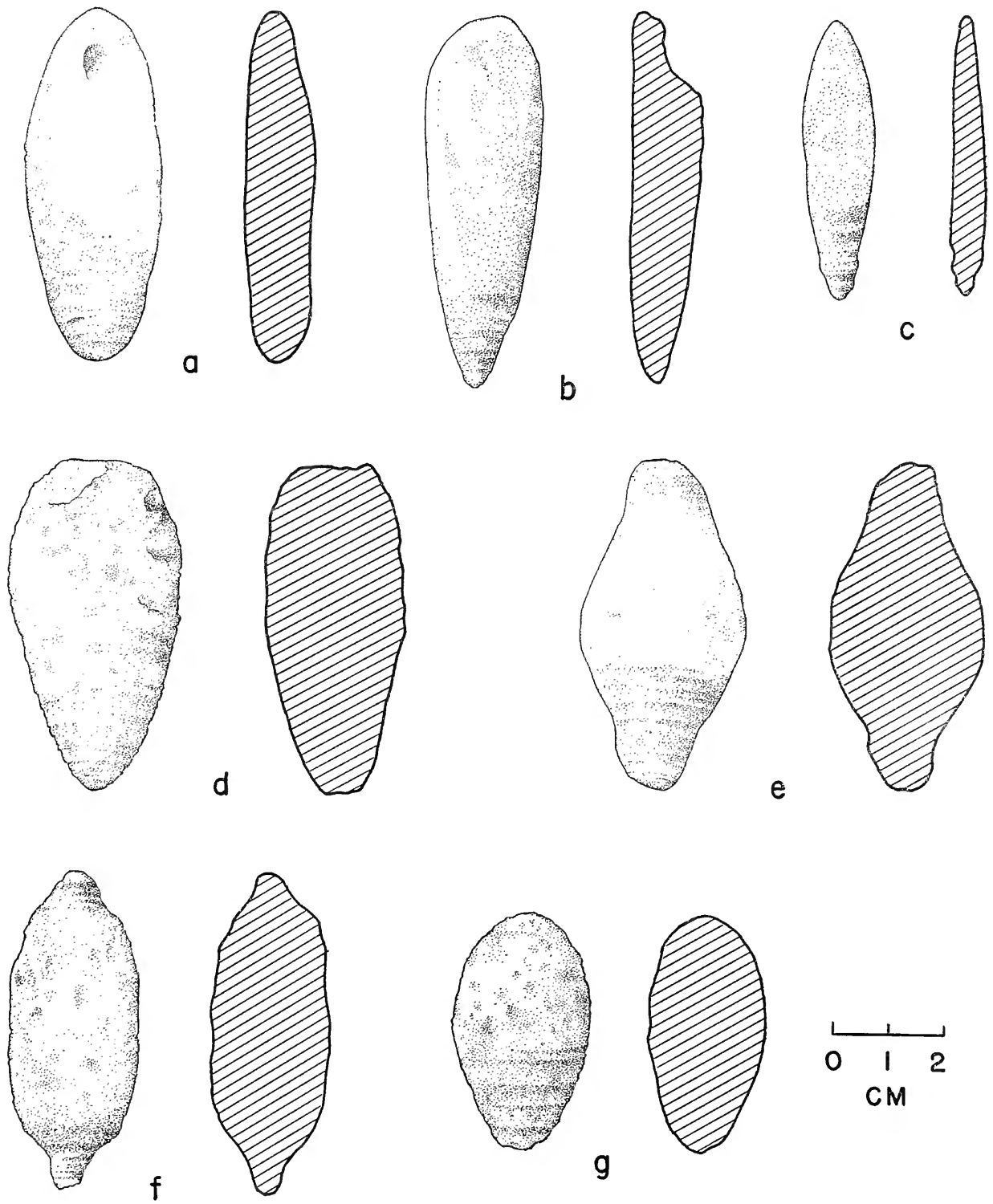

FIGURE 69.—Fishhook reamers from the Machalilla Phase.

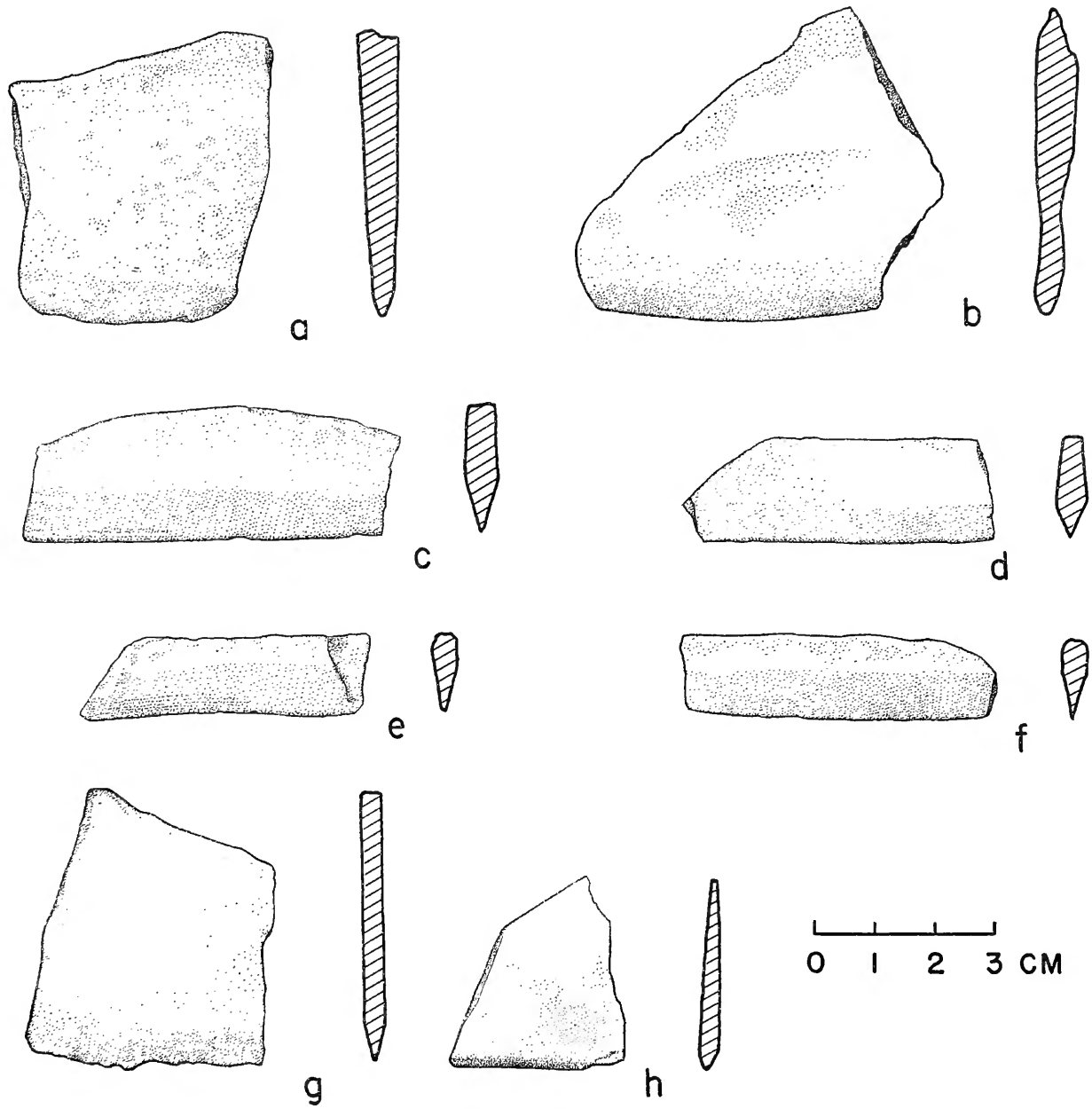

FIGURE 70.—Sandstone saws from Machalilla Phase.

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fragment is 5 cm. long, suggesting that the reconstructed oval bracelet could have been as large as 8 by 5 cm. Natural thickness of the shell makes the bracelet 5 mm. thick. The edges are well smoothed, erasing saw marks. The piece is too reworked and shaped for identification of type of shell.

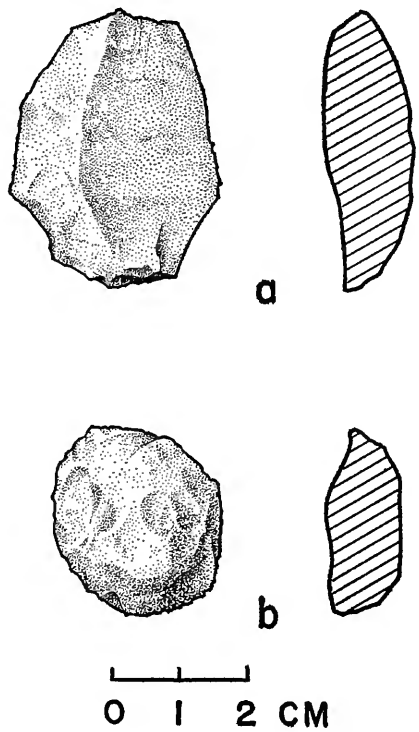

FIGURE 71.—Snub nosed scrapers from the Machalilla Phase.

Disks

One disk fragment (Appendix 1, table 8), well polished on all sides and edges, measures 4.5 by 4.0 by 1.0 cm. thick. It is broken on one side, suggesting an originally ovoid contour. The shell is pearl oyster (*Pinctada mazatlanica* Hanley).

Fishhooks

PLATE 130

The complete size range of fishhooks made of pearl oyster found in the Valdivia Phase occurs here. Also there is a category of thick, large hooks that are unique to the Machalilla Phase. Five of the hooks resemble the small to medium Valdivia Phase variety and 22 represent the larger type (Appendix 1, table 8). Two lips of land snail shells (*Porphyrobaphe iostoma* Sby.) may have been deliberately shaped into fishhooks, but they also could be an accidental shape resulting from natural fracture and erosion.

The large fishhooks are oval, with exterior diameters of 6.5 by 5.0, 5.0 by 4.0, 4.0 by 3.5 cm. Shank and back range from 7–11 mm. thick and 1.0–1.4 cm. wide, tapering to a short point and a flattened shank.

Fishhook Blanks

PLATE 129 G–P, R–S

Eight blanks from G–110 surface and 16 from levels of the seriated sequence show all the degrees of working exhibited by Valdivia Phase specimens, from rough shaping to circular with edges abraded to incompleted perforation (pl. 129 g–p, r–s). All were shaped from pieces of pearl oyster (*Pinctada mazatlanica* Hanley).

Pendant Blanks

PLATE 129 A–F

Although no finished pendants were encountered in Machalilla Phase sites, a number of elongated blanks unsuitable for fishhook manufacture are sufficiently similar in form to shaped pendants from the Valdivia Phase (pl. 23 c, j–k) to suggest they may be unfinished examples of similar ornaments. One conch fragment has well smoothed edges and is symmetrical except for a slanting termination at the wide end (pl. 129c). The others are *Spondylus* and pearl oyster.

Chronological Distribution of Shell Artifacts

Because of limitations of the sample to Period C of the Machalilla Phase, it is not possible to suggest temporal differences in the occurrence of any of the shell artifact types. The complex is generally similar to that of the Valdivia Phase, but shows two significant differences. The most striking is in the size of the fishhooks, three-quarters (22 of 29 specimens) of which are considerably larger than the maximum Valdivia Phase size. The use of larger hooks may be correlated with either a different mode of fishing or emphasis on a different kind of fish.

In view of the small size of the Machalilla Phase shell artifact sample, the occurrence of a fragment apparently belonging to a bracelet is noteworthy, particularly since none was identified in Valdivia Phase remains. The absence of such Valdivia Phase items as scoops and pendants, on the other hand, may be the result of inadequate sample size rather than failure of these kinds of artifacts to be made and used in the Machalilla Phase.

Bone and Tooth Artifacts

The only artifact in this category is a cut and drilled canine tooth of a medium sized carnivore, possibly a dog (fig. 72). The surfaces have been greatly modified by polishing, removing diagnostic features. The tooth is cut off straight across the root end, which measures 1.0 by 0.8 cm. A 2 mm. diameter hole drilled from

each side, 5 mm. below the cut edge, created a perforation that would have permitted stringing of the tooth to be worn as a pendant. Total length is 2.8 cm.

Although antler fragments came from the refuse at G–110, none showed working or evidence of use.

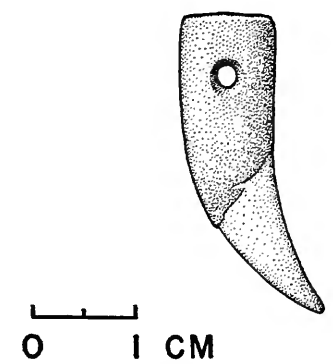

FIGURE 72.—Carnivore tooth perforated for suspension from the Machalilla Phase.

Pottery Artifacts

Pottery Type Descriptions

The pottery of the Machalilla Phase has been classified into six undecorated and sixteen decorated types, on the basis of differences in temper, surface treatment, technique and motif of decoration. Although incorporating a certain amount of variation in care and skill of workmanship, the pottery complex exhibits several diagnostic characteristics that can be summarized briefly. Construction is by coiling. In general, surface finish is even, smooth, and shows some polish. Body walls are typically thin, especially on decorated or polished vessels, numerous examples falling between 2.5 and 4.0 mm. Such thin-walled sherds are not fragile or easily broken, indicating a high tensile strength for the paste. However, wall thickness is variable over small areas and rims are slightly to markedly unlevel. It seems likely that complete vessels, if existent, would show some degree of asymmetry, particularly when undecorated.

Principal techniques of decoration are fine incision and red banding, the latter comprising about half of the decorated sherds. Similar rectilinear motifs, such as cross-hatch, zoned parallel lines and slanting parallel lines, are typical regardless of technique of execution. Several minor decorated types combine incision or punctation with red bands or zones. A rare late type is black-on-white painting. The other common embellishment is nicking, gashing or addition of small nubbins to the angular shoulder of bowls or jars, often in combination with other techniques of decoration. Decoration is less frequent than in the late Valdivia Phase, decorated sherds averaging 18–22 percent of the total per level.

Vessel shapes are characterized by angular shoulder treatment, evident in several varieties of carinated bowls and by a tendency to abrupt change of contour at the shoulder of jars. Spouts, both cylindrical and stirrup, are rare but diagnostic. Absence of recognized basal sherds implies bases were rounded or slightly flattened, continuing the general contour of the body wall.

Pottery types have been designated by the binomial system and descriptions are arranged in alphabetical order with the Spanish name in parenthesis for ease in cross referencing. Information on frequency and provenience of the various types is given in Appendix 1, table 16.

Ayangue Incised
(*Ayangue Inciso*)

PASTE:

Method of manufacture: Coiling.

Temper: Very fine sand, possibly natural constituent of the clay, often indistinguishable but sometimes visible as white specks in a gray paste. Rare particles up to 0.5 mm. in diameter, usually pinpoint in size. Evenly distributed.

Color: Majority have a medium to dark gray core, oxidized adjacent to both surfaces in an even tan to dark brown band. Rarely, sherds are completely oxidized.

Texture: Fine grained, compact; breaks cleanly at right angle to the surface.

Firing: Incompletely to completely oxidized.

SURFACE:

Color: Typically brown to dark gray, occasionally tan to cream. Interior similar shade to exterior except where fire clouded. Occasional sherds have a thin red slip.

Treatment: Exterior polished or striated polished leaving horizontal tracks, producing an even, smooth and sometimes glossy finish. Better finished on decorated area. Interior typically less polished, occasionally remaining slightly uneven, with polishing tracks more prominent. Surfaces tend to be less polished than average on bowls of Form 1.

Hardness: 4–4.5.

FORM:

Rim: Exteriorly thickened, direct, everted or cambered, with rounded, flattened or tapered lip.

Body wall thickness: 2.5–6.0 mm. on unthickened areas; increasing to a maximum of 10 mm. at the shoulder on some forms.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Open bowl with rounded bottom, high angular shoulder produced by marked body wall thickening, short vertical rim with rounded or flattened lip. Rim diameter 10–22 cm. (fig. 73–1). Decoration restricted to exterior between rim and shoulder.
2. Carinated bowl with rounded bottom, angular slightly thickened shoulder, insloping upper wall, upturned rim with rounded or flattened lip. Mouth

diameter 14–20 cm. (fig. 73–2). Decoration restricted to exterior above shoulder.

3. Carinated bowl with rounded bottom, slightly thickened angular shoulder, insloping upper wall slightly concave on the exterior, direct rim, rounded lip. Mouth diameter 16–22 cm. (fig. 73–3). Decoration restricted to exterior above shoulder.
4. Carinated bowl with rounded bottom, angular slightly thickened shoulder, nearly vertical upper wall slightly concave on exterior, direct rim, rounded lip. Rim diameter 20–24 cm. (fig. 73–4). Decoration restricted to exterior above shoulder.
5. Carinated bowl with rounded bottom, prominent shoulder produced by abrupt thickening of the body wall, sloping inward sharply before joining the outflaring upper wall, direct rim, rounded or tapered lip. Rim diameter 16–24 cm. (fig. 73–5). Decoration restricted to exterior above shoulder.
6. Bowl with rounded bottom, angular shoulder, short nearly vertical wall and everted rim producing a broad insloping band. Rounded lip. Exterior rim diameter 24–30 cm. (fig. 73–6). Decoration restricted to rim top.
7. Jar with rounded bottom, high angular shoulder, constricted mouth and everted rim with rounded or tapered lip. Maximum body diameter 18–28 cm. (fig. 73–7). Decoration restricted to exterior between base of neck and shoulder.
8. Jar with rounded body, slightly constricted waist, cambered rim, insloping to rounded lip. Interior wall

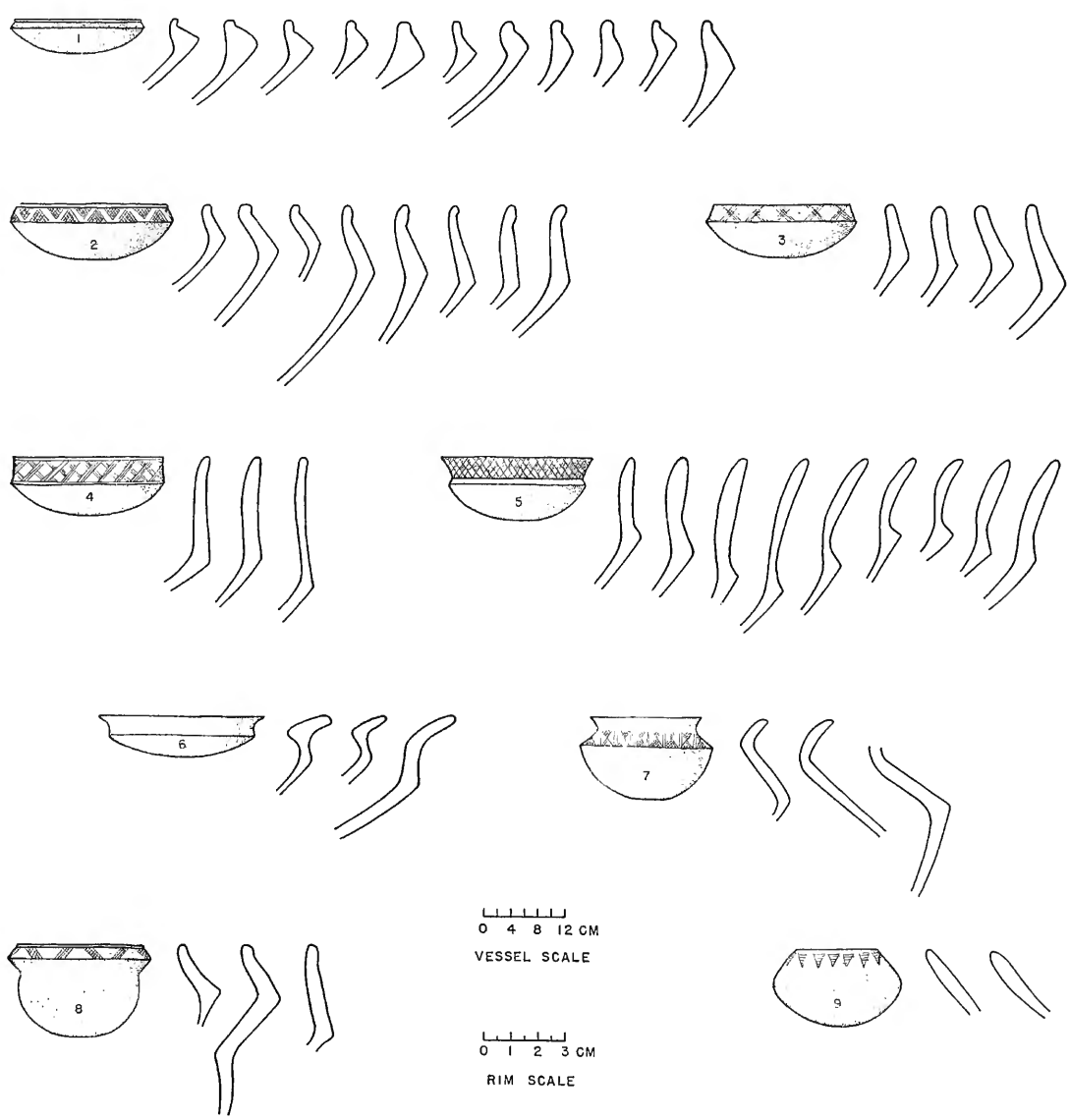

FIGURE 73.—Rim profiles and reconstructed vessel shapes of Ayangue Incised.

is typically angular, exterior rounded at "waist". Rim diameter 14–18 cm. (fig. 73–8). Decoration restricted to exterior between lip and camber.

9. Globular jar with rounded shoulder, insloping upper wall, direct or slightly expanded rim, rounded or tapered lip. Mouth diameter 12 cm. (fig. 73–9). Decoration restricted to upper exterior.

DECORATION (pls. 131–134):

Technique: Fine, sharply incised lines drawn when the surface was sufficiently dry to leave a clean cut. Edges are often dragged. Incisions vary in width from pencil-line thickness to 0.5 mm. Short lines are typically straight; longer ones are often slightly curved. Execution ranges from equally spaced to markedly irregular and unparallel; overshot or undershot junctions are typical of cross hatch. Occasional designs incorporate fine punctates with incision.

Motif: With rare exceptions, designs are composed of straight parallel lines. The exceptions are represented by typical designs with the addition of a row of concentric arcs (pls. 131 c, g, m, 132e) and occasional substitution of zoned punctate for zoned hachure (pls. 133p, 134 l–n). Typical motifs include:

1. Triangles placed apex up or apex down, or alternating one up and one down, filled with cross hatch or parallel hachure (pls. 131, 132 a–h).
2. Groups of four to six parallel lines slanting in alternating directions with terminations overlapping or separated (pl. 132 i–y).
3. Diamonds delimited by single or multiple intersecting slanting lines (pl. 133 a–n).
4. Cross hatch in a solid band or in slanting zones (pl. 133 o–v).
5. Checkerboard composed of alternate vertical and horizontally hachured squares (pl. 134 a–d, g).

Although complicated patterns may include several motifs, a typical vessel illustrates only one.

Associated techniques: Occasionally, carinated bowls have embellished shoulder treatment (pls. 132 a, c, i–j, l–n, 133t, 134x).

TEMPORAL DIFFERENCES WITHIN THE TYPE: With the possible exception of Motif 5, which is largely restricted to the end of Period C, no temporal differences are evident in decoration. In vessel shape, Form 5 is limited to the latter part of Period C and consequently diagnostic of the Late Machalilla Phase.

CHRONOLOGICAL POSITION OF THE TYPE: Absent from the early part of the Machalilla Phase, Ayangue Incised becomes a popular decorated type in Period C, and continues with increasing frequency into the succeeding Chorrera Phase (fig. 89).

Cabuya Black-on-White
(*Cabuya Negro sobre Blanco*)

PASTE:

Method of manufacture: Coiling.

Temper: Fine sand or occasionally white sand, with size of particles ranging from very fine to pinpoint size. Some

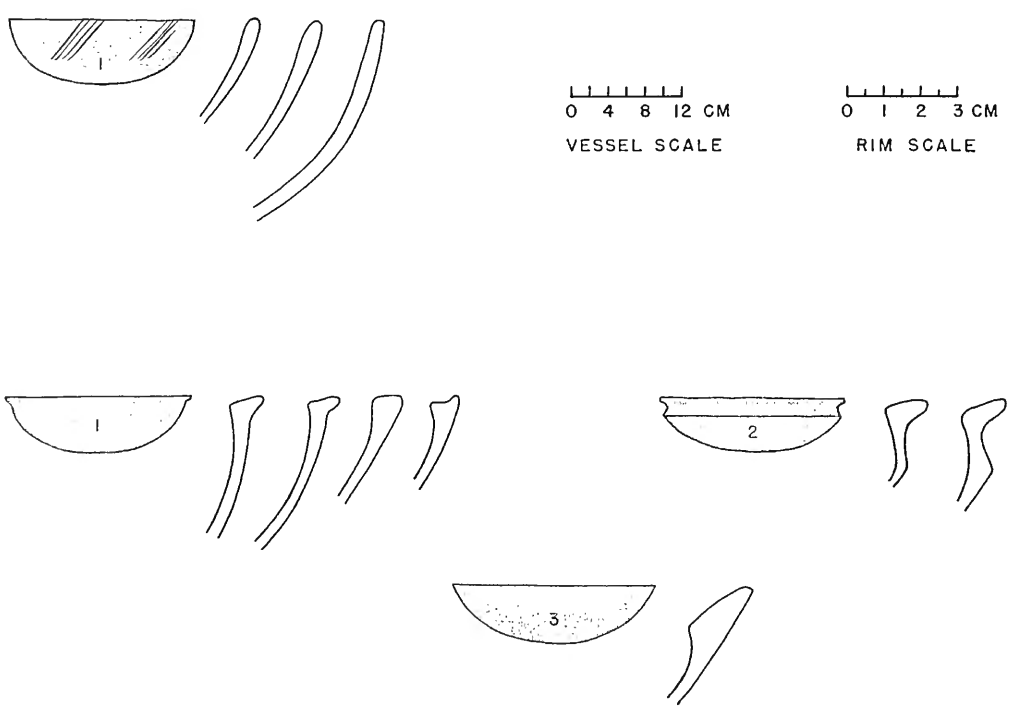

FIGURE 74.—Rim profiles and reconstructed vessel shapes of rare Machalilla Phase decorated types. *Top*, Cabuya Black-on-White. *Bottom*, Cabuya Finger Pressed Rim.

sherds have no visible temper.

Texture: Compact, typically fine grained.

Color: Orange or gray-brown through the cross section; rarely, orange along both surfaces leaving a gray core of even width.

Firing: Incomplete to complete oxidation.

SURFACE:

Color:

Slipped surface: Cream to whitish.

Unslipped surface: Light orange, light tan, light gray, whitish; gray tone typical of polished surfaces.

Treatment:

Slipped surface: White slip varying from paper thin coating obliterating the underlying surface and easily seen in cross section to a streaky wash of uneven thickness incompletely and unevenly masking the underlying orange color resulting in a mottled effect. Polishing striations running parallel to the rim remain visible but not prominent; polishing is most complete on thickest slip and results in an even, smooth finish.

Unslipped surface: Even but unpolished, or striated polished but not always sufficiently to remove pits and scars.

Hardness: 4–4.5.

FORM:

Rim: Direct with rounded lip.

Body wall thickness: 2–5 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Shallow bowl with upcurving wall, direct rim and rounded lip. Rim diameter 16–22 cm. (fig. 74–1 top). Decoration on exterior.
2. Several small body sherds with unpolished plain interiors may be from jars, but in the absence of rims this identification is uncertain. Decoration on the exterior.

DECORATION (pl. 135 a–e):

Technique: Narrow black lines on a white slipped surface. Color is clearly black on about 50 percent, dark reddish-brown on the remainder. Line width varies from 0.5–2.5 mm., with consistency of width more characteristic of narrower lines. Seven examples have narrow lines, between 0.5 and 1.0 mm.; three have wider lines, between 1.0 and 2.5 mm. Variation in width is caused by failure to maintain consistent pressure or even flow of paint, and a single line may increase and decrease markedly in width over a short space. This defect is more evident in wider lines, which may also terminate in an expanded "blob". Lines are relatively straight and parallel, again more precisely drawn at the narrow end of the range. Polish subsequent to painting does not cause streaking as in Machalilla Red Banded, but results in a differential effect of weathering so that eroded lines frequently present a dotted appearance. Two sherds have a red band or zone in addition to black-on-white decoration. Because of their rarity, and because the vessel shape is the same as that associated with black-on-white painting (Form 1) they have been included here rather than left as unclassified.

Motif: Bands composed of four to six straight parallel lines, or rectilinear zones filled with straight parallel lines are characteristic.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Absent from the early part of the Machalilla Phase sequence (fig. 89).

Cabuya Finger Pressed Rim
(*Cabuya Decorado con Dedo*)

PASTE:

Method of manufacture: Coiling.

Temper: White sand (cf. Cabuya Plain).

Texture: Compact, fine grained.

Color: Gray, gray-brown or orange-brown through the cross section.

Firing: Incompletely oxidized.

SURFACE:

Color: Medium gray, tan or gray-brown, often variegated rather than solid because of fire clouding and polishing striations. About half have a streaky red slip leaving exposed portions of the underlying surface.

Treatment: Striated polished, with well defined marks running parallel to the rim. Variation extends from total coverage to incomplete polish leaving narrow unpolished streaks between the striations. Either treatment leaves an even surface, smooth but not slick to the touch.

FORM:

Rim: Everted, expanded, or interiorly thickened with rounded lip.

Body wall thickness: 2–4 mm.; increasing to 6 mm. at carination.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Bowl with rounded bottom, walls curving upward to everted or expanded rim, rounded lip. Rim diameter 20–22 cm. (fig. 74–1 bottom). Decoration on rim top.
2. Carinated bowl with rounded bottom, angular shoulder, slightly insloping upper wall, everted rim with rounded lip. Rim diameter about 24 cm. (fig. 74–2 bottom). Decoration on rim top.
3. Bowl with rounded bottom, walls sloping upward to interiorly thickened rim, rounded lip. Rim diameter 22 cm. (fig. 74–3 bottom). Decoration on lip and rim interior.

DECORATION (pl. 135 f–i):

Technique: Pressing along the top of expanded or everted rim to produce a continuous row of ovoid depressions. Pressure usually causes horizontal expansion resulting in slight lobing of the lip. Depressions are shallow (less than 0.5 mm. deep) and polished like the adjacent surface. Dimensions vary between 5 by 9 mm. and 6 by 10 mm. Margins are usually not sharply defined, rounding on to the adjacent surface.

Motif: Row of depressions along the center of the flat rim top (pl. 135 g–i), or rarely on the lip (pl. 135f).

Associated techniques: Incisions of the type associated with

Machalilla Incised may border the depressions (pl. 135 f, h).

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Absent from the early part of the Machalilla Phase sequence (fig. 89). Although the sample is too small to be conclusive, it appears probable that Cabuya Finger Pressed Rim is limited to Period C.

Cabuya Plain
(*Cabuya Ordinario*)

PASTE:

Method of manufacture: Coiling.

Temper: Angular, opaque white sand particles from pinpoint size to 5 mm. in diameter and rarely to 8 mm. are characteristic of 75 percent of the sherds. The remaining 25 percent have sand with few white particles. In both varieties temper is abundant, and the contrast between the white inclusions and a dark paste is striking. Mixture is insufficient to produce even distribution, and larger grains show a tendency to clustering. Occasional sherds contain finely ground shell particles in addition to sand.

Texture: Sandy but not friable, compact, with very rare fissure-like air pockets lying parallel to the surface.

Color: Light to dark orange throughout the cross section; medium to dark gray throughout the cross section; occasionally fired orange along one or both surfaces leaving the remainder gray.

Firing: Incompletely to completely oxidized.

SURFACE:

Color: Buff, light to medium orange, red-orange, brown, gray-brown, medium to dark gray. Interior may be similar in shade to exterior or at opposite end of the range. Fire clouding may produce abrupt contrasts in color.

Treatment: Scraped to remove gross irregularities and obliterate coil junctions, but leaving an uneven finish with frequent scars, pits and rough areas. A few sherds have limited polish, but remain too uneven to be classified as polished. Temper grains remain visible especially on the exterior. The interior may show fine parallel scraping marks. Superficial smoothing is reflected in inequality of wall thickness over small areas.

Hardness: 4–4.5.

FORM:

Rim: Direct or everted with rounded or tapered lip. Rim is unlevel and poorly circular, making diameter estimates difficult on small sherds.

Body wall thickness: Typically 2.5–9.0 mm.; occasionally reaching 1.2 cm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Bowl with rounded bottom, slightly angular slightly thickened shoulder, nearly vertical convex upper wall, direct rim with tapered lip. Rim diameter 12–20 cm. (fig. 75–1).
2. Carinated bowl with rounded bottom, angular shoulder, concave insloping upper wall, direct rim and rounded lip. Rim diameter 16–20 cm. (fig. 75–2).
3. Rounded bowl with constricted direct rim, rounded lip. Rim diameter 16 cm. (fig. 75–3).
4. Wide mouthed jar with flattened bottom, rounded shoulder, constricted mouth, everted rim with tapered or rounded lip. Junction of rim and neck may form a sharp angle on the interior. Rim diameter 20–26 cm. (fig. 75–4).
5. Jar with rounded body, constricted neck and everted rim with rounded, tapered or (rarely) flattened lip. Rim diameter 6–14 cm. (fig. 75–5).

TEMPORAL DIFFERENCES WITHIN THE TYPE: The range of variation in surface finish remains similar throughout the duration of the Machalilla Phase, but more poorly smoothed examples show a decline in frequency.

CHRONOLOGICAL POSITION OF THE TYPE: The principal unpolished plain type of the Machalilla Phase (fig. 89).

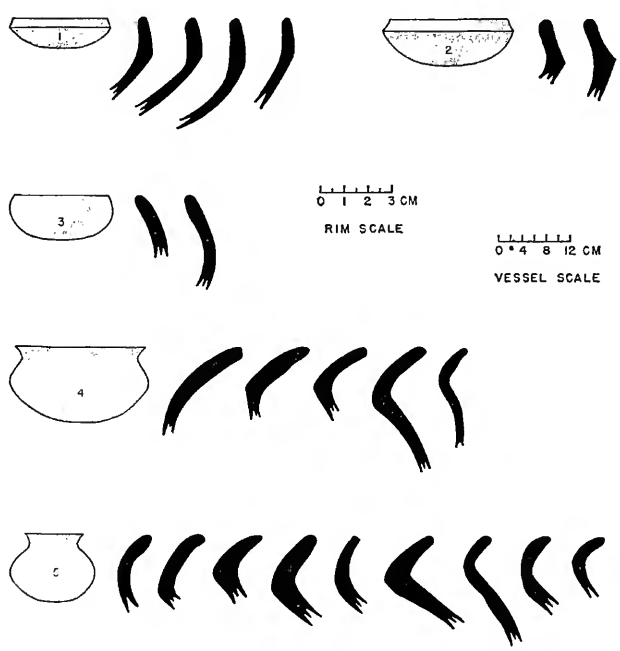

FIGURE 75.—Rim profiles and reconstructed vessel shapes of Cabuya Plain.

Chorrera Incised
(*Chorrera Inciso*)

PASTE: Like Chorrera Plain (p. 122), see that type description for details.

SURFACE:

Color:

Interior: Light to medium gray, or light tan.

Exterior: Medium to dark gray, or red.

Treatment:

Interior: Even, unpolished.

Exterior: Well polished producing a smooth, even finish

slick to the touch; occasionally polishing striations may remain visible.

Hardness: 4–4.5.

FORM: Only four sherds are represented. One is the everted rim of a constricted neck jar (rim diameter 10 cm.); the rest appear to be from bottles or spouted jars, by analogy with similar Chorrera Phase examples.

DECORATION (pl. 135 j–n):

Technique: Incisions ranging from fine scratches to 0.5 mm. in width cutting through the polished surface to the lighter subsurface. Depth is less than 0.3 mm. Lines are sharply defined, occasionally with dragged places along the margin, but this is not typical. Width varies slightly because of variable pressure. Parallelism is good, but spacing of parallel lines not equal. Overshot or undershot intersections are rare.

Motif: Straight parallel lines 3–10 mm. apart filling zones bounded by lines of similar width. Zones are separated by plain areas (pl. 135 l–n).

TEMPORAL DIFFERENCES WITHIN THE TYPE: None.

CHRONOLOGICAL POSITION OF THE TYPE: Beginning in Period C of the Machalilla Phase, this type becomes characteristic of the following Chorrera Phase (fig. 89).

Chorrera Plain
(Chorrera Ordinario)

PASTE:

Method of manufacture: Coiling.

Temper: Fine sand similar in color to the paste and discernible only on close inspection. Rare particles may reach 2 mm. but size is typically less than 1 mm. Rare isolated white grains may occur.

Texture: Compact, fine grained, not sandy to touch.

Color: Medium to dark gray through the cross section or fired orange along one or both surfaces leaving a gray or brownish core. A few are orange or orange-brown throughout the cross section.

Firing: Incompletely to completely oxidized.

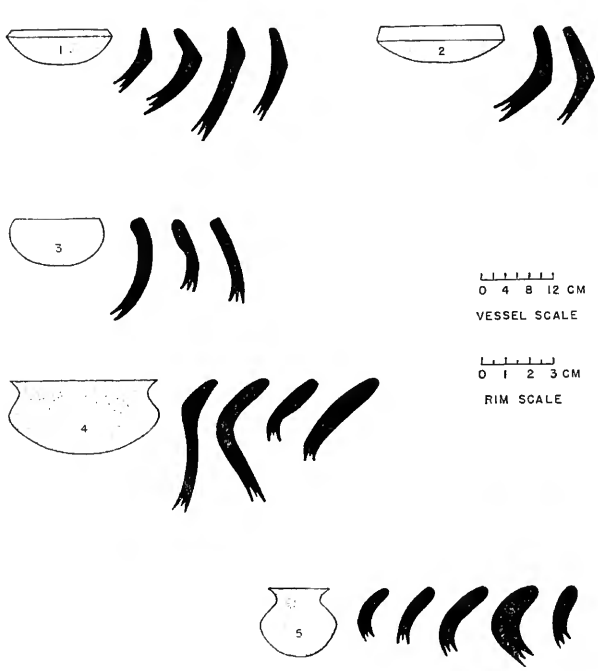

FIGURE 76.—Rim profiles and reconstructed vessel shapes of Chorrera Plain.

SURFACE:

Color: Light orange, orange-brown, brown, gray-brown or medium to dark gray, with interior and exterior generally similar in shade. Some mottling results from fire clouding.

Treatment: Smoothed leaving even but unpolished, or incompletely smoothed leaving defects and tracks. Smoothing is better than in Cabuya Plain, producing more uniform wall thickness.

Hardness: 4–4.5.

FORM:

Rim: Direct, tapering or everted, with rounded or flattened lip.

Body wall thickness: 3–6 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Bowl with rounded bottom and high angular shoulder created by decreasing body wall thickness and slightly insloping the upper wall to a tapered, rounded or flattened lip. Rim diameter 14–24 cm. (fig. 76–1).
2. Carinated bowl with rounded bottom, slightly angular shoulder, insloping convex upper wall, direct rim, flattened lip. Rim diameter 20 cm. (fig. 76–2).
3. Globular bowl with slightly constricted direct or interiorly thickened rim, flattened lip. Rim diameter 14–24 cm. (fig. 76–3).
4. Wide mouthed jar with flattened bottom, rounded shoulder, slightly constricted mouth, everted rim with tapered, rounded or flattened lip. Rim diameter 20–28 cm. (fig. 76–4).
5. Jar with rounded body, constricted neck and everted rim with rounded lip. Rim diameter 8–14 cm. (fig. 76–5).

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: A minor plain type during the Machalilla Phase, Chorrera Plain becomes an important type during the succeeding Chorrera Phase (fig. 89).

Machalilla Burnished Line
(Machalilla Bruñido)

PASTE: On Chorrera Plain or Cabuya Plain (p. 121); see those type descriptions for details.

SURFACE:

Color: Light tan, orange-brown, gray-brown, reddish brown, or medium gray, with mottling sometimes resulting from polishing variation.

Treatment: Even and smooth or slightly abrasive to the touch. Striated polished on bowl exteriors; unpolished on jar interiors.

Hardness: 4–4.5.

FORM: Restriction of patterning to one surface indicates that bowls and jars are represented, but there are no rims. Body wall thickness is 4–6 mm. except for one jar sherd with a thickness of 11 mm.

DECORATION (pl. 136 a–j):

Technique: Burnished lines on interior of bowls and exterior of jars varying from narrow (0.5–1.0 mm.) marks leaving a distinct groove to a 1–2 mm. wide line, polishing but not depressing the surface. Textural contrast is enhanced by strong color differentiation resulting from firing, burnished lines being much darker gray or reddish brown than the adjacent unburnished surface.

Motif: Burnished lines of variable width cross and intersect in a random and haphazard manner, occasionally accidentally resolving into crude crosshatch in small zones. Most of the lines cluster along three general axes, but spacing is unequal, resulting in uneven size and distribution of burnished and unburnished zones.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Scattered erratically throughout the seriated sequence of the Machalilla Phase (fig. 89), this type has been recognized because of its possible significance as an ancestor of burnished line decoration in later coastal Ecuadorian ceramic complexes.

Machalilla Double-line Incised
(Machalilla Inciso Doble Línea)

PASTE AND SURFACE: About 50 percent red slipped on decorated surface and in the case of bowls on the interior also; remainder polished or striated polished. See type descriptions of Machalilla Polished Red (p. 130), Machalilla Polished Plain (p. 129) and Machalilla Striated Polished Plain (p. 137) for details.

FORM:

Rim: Direct, exteriorly thickened or everted with rounded, tapered, or flattened lip.

Body wall thickness: 0.3–1.1 cm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Carinated bowl with flattened bottom, high prominent shoulder produced by exterior thickening of the wall, upper wall sloping inward to exteriorly thickened rim with rounded lip. Mouth diameter 22 cm. (fig. 77–1). Decoration on exterior above carination.
2. Carinated bowl with flattened bottom, angular shoulder not thickened at carination, insloping upper wall, exteriorly thickened rim with rounded lip. Mouth diameter 14 cm. (fig. 77–2). Decoration on exterior above carination.
3. Carinated bowl with flattened bottom, angular unthickened to slightly thickened shoulder, insloping upper wall slightly concave on the exterior, tapering rim, rounded lip. Mouth diameter 18–22 cm. (fig. 77–3). Decoration on exterior above carination,
4. Carinated bowl with rounded bottom, angular shoulder slightly thickened to produce a curved interior wall, insloping upper wall slightly convex on the exterior, direct rim, tapering or rounded lip.

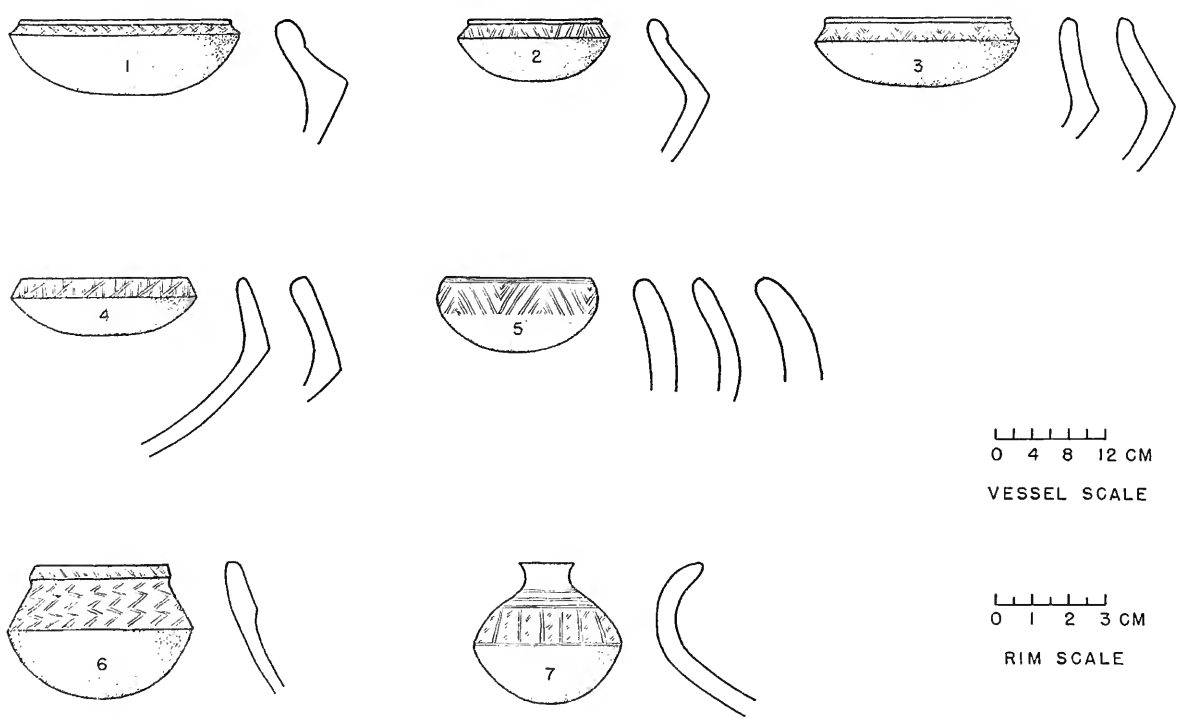

FIGURE 77.—Rim profiles and reconstructed vessel shapes of Machalilla Double-line Incised.

Mouth diameter 18–20 cm. (fig. 77–4). Decoration on exterior above carination.

5. Rounded bowl with slightly incurving upper wall, constricted direct rim, rounded or tapered lip. Mouth diameter 16–20 cm. (fig. 77–5). Decoration on upper exterior, extending below region of maximum diameter but not covering the bottom.
6. Jar with rounded bottom, angular shoulder, insloping upper wall, exteriorly thickened rim, flattened lip. Mouth diameter 14 cm. (fig. 77–6) . Decoration on exterior rim thickening and upper wall, probably not extending below shoulder.
7. Jar with rounded bottom, slightly angular shoulder, constricted neck, everted rim and tapered lip. Rim diameter 6 cm. (fig. 77–7). Decoration beginning at base of neck and extending downward, probably ending at or slightly below shoulder.

DECORATION (pls. 137–138):

Technique: Paired incisions not always equally spaced or evenly parallel, but sometimes too regular to have been drawn independently, suggesting use of a double-ended tool with the points not rigidly fixed allowing some independent fluctuation. Incisions are very fine to 1 mm. in width and shallow, often resembling scratches. Application when the surface was dry is indicated by jagged margins, chipping off the adjacent surface. Intersections of incisions are often overshot and poorly executed. Spacing of paired lines may be so close as to obliterate their dual nature, producing the effect of a series of parallel lines. Typical designs are spaced so as to emphasize the double line effect.

Motif: Straight paired lines of different lengths are combined to produce a variety of patterns, of which the following are most frequent:

1. Crosshatch (pl. 138a).
2. Zigzag (pls. 137c, h, j, 138 b–d).
3. Diagonal zones filled with vertical lines (pl. 138 e–f)
4. Parallel, horizontal, or vertical lines and short diagonal strokes (pls. 137g, 138 h–i).
5. Zoned parallel lines (pl. 137 d–e).
6. Concentric rectangles (pl. 138 o–p).

Associated techniques: Double-line incision may be combined with red banding, the incision applied either to red or to plain areas. Some bowls have embellished shoulder treatment. One jar body sherd has low relief ridges and nubbins incorporated in the red banded and incised design.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible in the small sample available.

CHRONOLOGICAL POSITION OF THE TYPE: Restricted to Period C in the seriated sample available (fig. 89), but probably beginning in Period B (see p. 141).

Machalilla Embellished and Red Zoned
(*Machalilla Rojo en Zonas*)

PASTE AND SURFACE: Like Cabuya Plain except that surface finish on exterior is more even and may show a slight polish; see Cabuya Plain (p. 121) for detailed description.

FORM:

Rim: Everted with rounded or tapered lip.

Body wall thickness: 4–7 mm., increasing to 8–12 mm. at junction of neck and body.

Base: Probably rounded or slightly flattened.

Vessel shape reconstructed from sherds:

1. Jar with globular body, constricted neck and everted rim. Junction of neck and body wall may be angular on the interior. Interior neck diameter 4–6 cm.

DECORATION (pl. 142 g–k):

Technique: Rim red slipped beginning at the angular interior junction with the body wall and continuing down the exterior to the base of the neck or about 1 cm. farther along the body wall. Slip is like that characteristic of Machalilla Polished Red, and polished horizontally leaving parallel striations. Embellishments are of three types:

1. Irregular punctates of generally ovoid form and variable size (pl. 142 i–j).
2. Ovoid nubbins, 3–5 mm. long and rarely exceeding 1 mm. in elevation (pl. 142g).
3. "Molded" circular nubbins 3 mm. in diameter and less than 1 mm. in elevation (pl. 142 h, k).

Motif: A single row of embellishments typically occurs just below the limit of the slip on the exterior. One example has a double row of punctates; another has the embellishments just inside the border of the slip.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Techniques 1 and 2 are restricted to Period C, Technique 3 to Period A (table B), paralleling temporal differences evident in Machalilla Embellished Shoulder (table C).

TABLE B.—*Temporal distribution and frequency of techniques of Machalilla Embellished and Red Zoned decoration*

Period	*Seriated sequence*	*Technique of Embellishment*		
		1	*2*	*3*
C	G–110, Cut 1, 10–20 cm.	–	–	–
	G–110, Cut 2, 0–20 cm.	2	1	–
	G–110, Cut 1, 20–30 cm.	–	–	–
	G–110, Cut 1, 30–50 cm.	–	2	–
	G–110, Cut 1, 50–70 cm.	–	–	–
	G–110, Cut 2, 20–40 cm.	–	1	–
B	G–112	–	–	–
A	M–28, Cut 1, 0–20 cm.	–	–	–
	M–28, Cut 1, 20–40 cm.	–	–	1

CHRONOLOGICAL POSITION OF THE TYPE: Very rare but present throughout the Machalilla Phase (fig. 89).

Machalilla Embellished Shoulder
(*Machalilla Decorado Plástico*)

PASTE AND SURFACE: On Machalilla Polished Plain (p. 129), Machalilla Striated Polished Plain (p. 137) or rarely Machalilla Polished Red (p. 130); see those type descriptions for details.

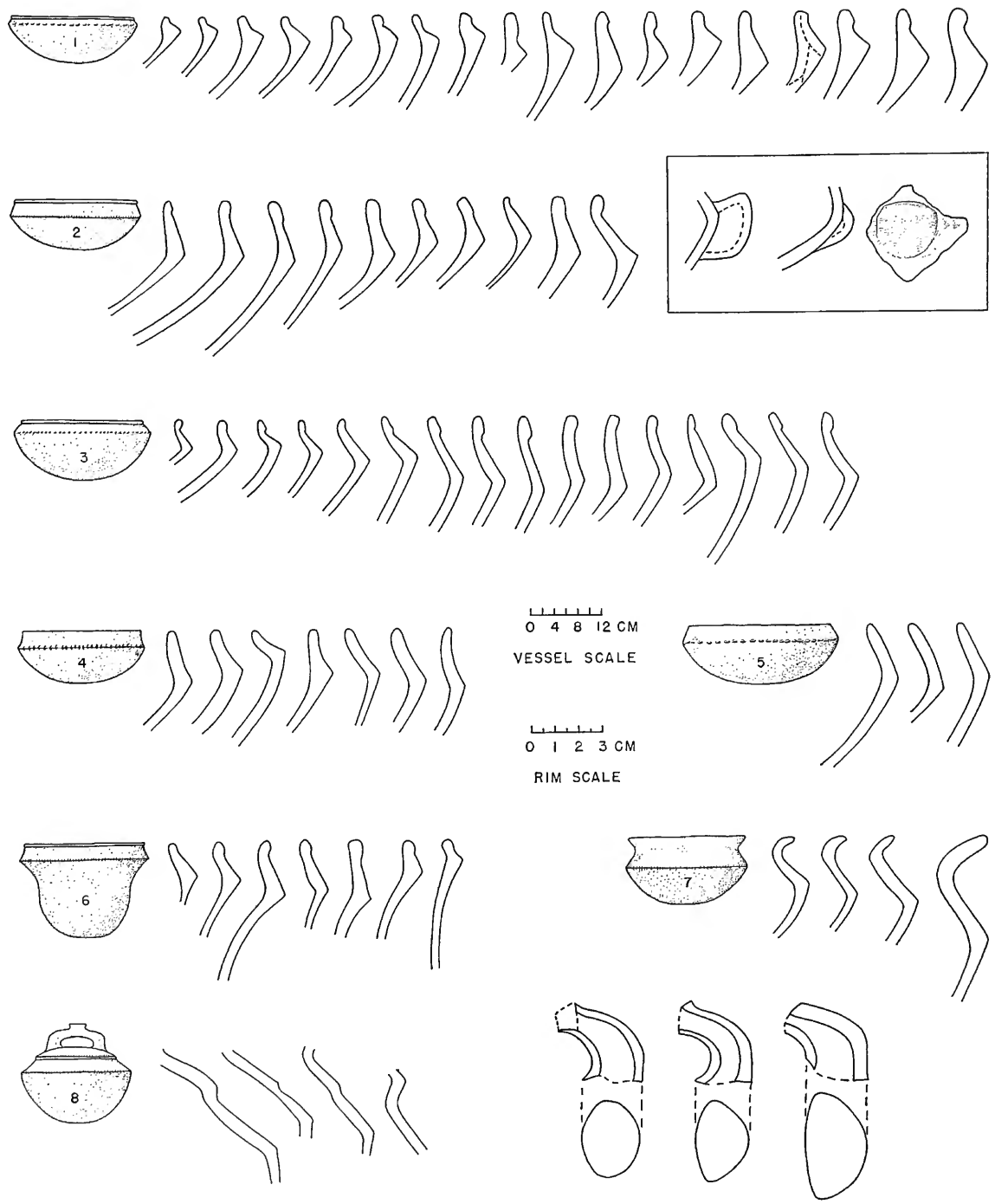

FIGURE 78.—Rim profiles and reconstructed vessel shapes of Machalilla Embellished Shoulder.

FORM:

Rim: Exteriorly thickened, direct or everted, with rounded or tapered lip.

Body wall thickness: 2.5–7.0 mm., increasing to a maximum of 1.3 cm. at carination on bowls of Form 1.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Carinated bowl with rounded bottom, high angular shoulder produced by pronounced body wall thickening, short insloping upper wall, upturned rim with rounded lip. Rim diameter 8–28 cm. (fig. 78–1). Decoration restricted to shoulder.
2. Carinated bowl with rounded bottom, angular shoulder slightly thickened to produce curved interior wall, insloping upper wall, exteriorly thickened rim, rounded lip. Rim diameter 14–30 cm. (fig. 78–2). Decoration restricted to shoulder.
3. Carinated bowl with rounded bottom, angular unthickened shoulder, insloping upper wall, exteriorly thickened rim, rounded or tapered (rarely flattened) lip. Rim diameter 12–26 cm. (fig. 78–3). Decoration restricted to shoulder.
4. Carinated bowl with rounded bottom, angular shoulder, insloping upper wall concave on the exterior, direct rim, rounded or tapered lip. Rim diameter 16–24 cm. (fig. 78–4). Decoration restricted to shoulder.
5. Carinated bowl with rounded bottom, slightly angular shoulder, insloping upper wall convex on exterior, direct rim, rounded or tapered lip. Rim diameter 16–24 cm. (fig. 78–5). Decoration restricted to shoulder.
6. Cambered jar with rounded bottom, upper wall sloping outward to angular junction, then insloping to exteriorly thickened rim, rounded or tapering lip. Rim diameter 8–26 cm. (fig. 78–6). Decoration restricted to angular camber.
7. Jar with rounded bottom, angular shoulder, insloping upper wall, everted rim, rounded lip. Rim diameter 12–26 cm. (fig. 78–7). Decoration restricted to shoulder.
8. Stirrup spout jar with rounded bottom, high angular shoulder, stirrup spout with everted rim, rounded lip. Shoulder diameter 16–22 cm. (fig. 78–8). Majority have a second "tier" above the shoulder; decoration applied to both angles.

DECORATION (pls. 139–142 a–f, 143):

Technique: Embellishment of the angular shoulder in one of six techniques:

1. Nubbins, small polished bumps from barely visible to 7 mm. in diameter and 2 mm. elevation, occurring continuously or in pairs (pl. 139).
2. Gashes, 2–4 mm. wide, less than 1 mm. deep, applied continuously but not equally spaced (pls. 140, 141 a–b, g–j).
3. Nicks or cuts, typically about 1 mm. wide, 2–5 mm. in vertical dimension, sharply defined, spaced 3–6 mm. apart (pl. 141 c–f).
4. "Molded" flat-topped nubbins, typically approximately 2 mm. in diameter, occasionally 5 mm. diameter, but uniform in size on a single specimen, applied in a continuous row spaced 1–5 mm. apart, with spacing varying little on a single sherd (pl. 142 a–f).
5. Slight undulation, probably resulting from poorly defined gashes.
6. Row of punctation just above angular shoulder.

Motif: Row of embellishments of one of the six techniques along the carination or shoulder of the vessel. Only one technique occurs on a single specimen.

Associated techniques: Embellishments may occur on the angular shoulder of carinated bowls with incised or painted decoration; in such cases, the sherd has been classified in one of the above types rather than as Machalilla Embellished Shoulder.

A few sherds have large bosses projecting from the angular shoulder (fig. 78, insert; pl. 143). These are approximately 2.5 cm. in diameter, typically flattened on the upper side, and project 0.5–1.5 cm. from the shoulder. Interior is hollow and opens into the interior of the vessel.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Analysis of frequency of techniques according to the seriated sequence shows that Technique 4 is restricted to Period A (table C). Technique 6 is absent during the same period. The remaining techniques occur throughout the Phase, and frequencies are too small to be reliable indications of changes in popularity.

TABLE C.—*Temporal distribution and frequency of techniques of Machalilla Embellished Shoulder decoration*

Period	*Seriated sequence*	*Technique*					
		1	*2*	*3*	*4*	*5*	*6*
C	G–110, Cut 1, 10–20 cm.	2	–	1	–	2	–
	G–110, Cut 2, 0–20 cm.	5	14	8	–	–	1
	G–110, Cut 1, 20–30 cm.	2	2	2	–	2	1
	G–110, Cut 1, 30–50 cm.	–	5	4	–	2	–
	G–110, Cut 1, 50–70 cm.	3	1	2	–	2	5
	G–110, Cut 2, 20–40 cm.	18	26	4	–	1	2
B	G–112	–	–	–	–	–	–
A	M–28, Cut 1, 0–20 cm.	27	36	30	17	15	–
	M–28, Cut 1, 20–40 cm.	17	16	10	5	5	–

CHRONOLOGICAL POSITION OF THE TYPE: Machalilla Embellished Shoulder occurs in the maximum frequency of 9 percent in the early part of the Machalilla Phase, and continues to decline in popularity thereafter (fig. 89).

Machalilla Finger Punched
(*Machalilla Modelado*)

PASTE AND SURFACE: One Machalilla Striated Polished Plain (p. 137), one Machalilla Polished Red (p. 130); see

those type descriptions for details. One appears to have been shell tempered plain. Surfaces are poorly smoothed and uneven.

FORM:

Rim: Direct with tapered or flattened lip.

Body wall thickness: 4–6 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shape reconstructed from sherds:

1. Shallow bowl with wall curving outward and upward to direct rim, tapered or flattened lip. Rim diameter estimated at 18–20 cm. (fig. 79–1).

DECORATION (pl. 136 k–l):

Technique: Wall punched inward from exterior just below lip producing an indentation that varies from a deep hole to a concavity in the rim profile. In one example the depression is circular, 1.5 cm. in diameter, 3 mm. deep (pl. 136l); in another, it is ovoid, 2.0 cm. long, 1.1 cm. wide and 7 mm. deep (pl. 136k); in a third, pressure has pushed the lip inward over a 2.5 cm. wide area without a clearly defined depression.

Motif: A single depression at or about 2 mm. below the lip; incompleteness of vessels makes it impossible to judge whether another may have been placed on the opposite side.

TEMPORAL VARIATION WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Present with extreme rarity throughout the duration of the Machalilla Phase (fig. 89).

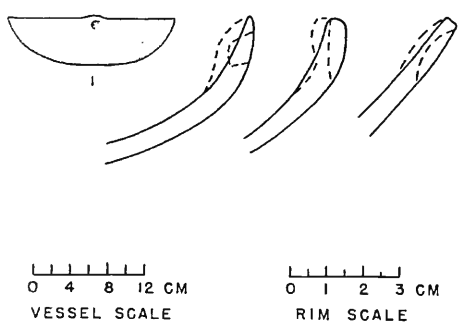

FIGURE 79.—Rim profiles and reconstructed vessel shapes of Machalilla Finger Punched.

Machalilla Incised
(Machalilla Inciso Pulido)

PASTE AND SURFACE: Similar to fine sand tempered, well polished examples of Machalilla Polished Plain. Incompletely oxidized firing typical.

FORM:

Rim: Direct or slightly expanded with rounded lip.

Body wall thickness: 1–4 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Rounded jar with constricted mouth, direct or expanded rim, rounded lip. Some examples have a slight shoulder. Mouth diameter 6–12 cm. (fig. 80–1). Decoration restricted to incision adjacent to lip; rarely applied to small zones on the body.
2. Carinated bowl with rounded bottom, slightly thickened angular shoulder, concave upper wall, slightly everted rim with rounded lip. Rim diameter 12–14 cm. (fig. 80–2). Decoration restricted to exterior above shoulder.
3. Carinated bowl with rounded bottom, high angular thickened shoulder, upper wall insloping to slightly thickened rim, rounded lip. Rim diameter 16 cm. (fig. 80–3). Decoration restricted to exterior above shoulder.

Rare vessel shapes reconstructed from sherds:

1. Jar with rounded body, constricted neck and everted rim. Interior neck diameter 8 cm. Decoration on exterior below neck.

DECORATION (pl. 144 a–v):

Technique: Shallow polished incisions 1.0–2.5 mm. wide, drawn with a smooth ended tool that left a sheen like that on the adjacent surface. Parallel lines are evenly spaced and straight on some examples; uneven in width and not regularly parallel on others. Intersections may be overshot. A few examples exhibit red coloring in the incision, a treatment that may have been typical but is fugitive because of application subsequent to firing.

Motif: Groups of parallel, straight or curved lines, closely (2–3 mm. apart) or widely (10–13 mm. apart) spaced, may cover the design area (pl. 144 i–p, s–t) or occupy zones separated by plain sections (pl. 144 c, q). On vessels of Form 1, a single incision typically borders the exterior of the lip (pl. 144 b, d). More elaborate patterns occasionally occur (pl. 144 h, u–v).

Associated techniques: Vessels of Form 2 may have embellished shoulder treatment.

TEMPORAL DIFFERENCES WITHIN THE TYPE: Vessel Form 2 is typical of the early part of the seriated sequence; Form 1 of the latter part.

CHRONOLOGICAL POSITION OF THE TYPE: Rare but present throughout the duration of the Machalilla Phase (fig. 89).

Machalilla Incised and Punctate
(Machalilla Inciso y Punteado)

PASTE AND SURFACE: Similar to fine sand-tempered variety of Machalilla Polished Plain (p. 129); see that type description for details.

FORM:

Rim: None identified; body contour suggests everted rim or a stirrup spout.

Body wall thickness: 3–6 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shape reconstructed from sherds:

1. Jar with angular shoulder, constricted neck and everted rim or possibly stirrup spout. Shoulder diameter 14–20 cm.

DECORATION (pl. 144 w–z):

Technique: Combination of fine incision and punctation. Incised lines range in width from fine scratches to 0.5 mm. and are too shallow to be evident in cross

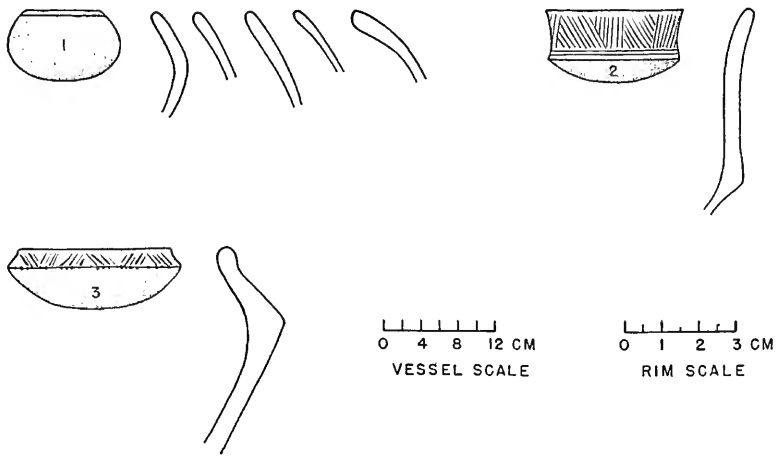

FIGURE 80.—Rim profiles and reconstructed vessel shapes of Machalilla Incised.

section. The bed may be polished or unpolished. Lines are not perfectly straight or evenly parallel, and may vary in width. Punctates are shallow and most frequently circular, but may be elongated or trianguloid. Diameter is from 0.5 to 2.0 mm., with size being relatively consistent on a single example. Spacing is from adjacent to 3 mm. apart.

Motif: Diagonal bands composed of three rows of punctates alternating with incised lines (pl. 144 x–y); variations include two rows of punctation with an intervening incision (pl. 144w), and four rows of punctation separated by four incised lines (pl. 144z). Decoration is restricted to the exterior above the shoulder.

Associated techniques: The angular shoulder may have embellished shoulder treatment, either nicks or gashes.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Rare and restricted to the early part of the Machalilla Phase (fig. 89).

Machalilla Incised and Red Zoned
(*Machalilla Inciso y Rojo en Zonas*)

PASTE: Fine sand tempered, see Chorrera Plain (p. 122) for details.

SURFACE:

Color: Unslipped areas tan or light to dark gray; small fire clouds typical. Slipped areas dark, rich red.

Treatment: Exterior slightly more even and better finished than interior. Interior of bowls usually red slipped, generally giving a striated appearance because of incomplete coverage. Unslipped interiors are striated polished, or on jars unpolished. Exterior polished on red slipped areas, unpolished where not slipped on about 75 percent of examples. On the remainder, slipped and unslipped zones are equally polished.

Hardness: 4–4.5.

FORM:

Rim: Direct, expanded or everted, with tapered, flattened or rounded lip.

Body wall thickness: 2.5–7.0 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Carinated bowl with rounded bottom, angular to rounded shoulder, insloping upper wall convex on the exterior, direct or slightly expanding rim with rounded or flattened lip. Mouth diameter 12–24 cm. (fig. 81–1). Zoned decoration restricted to exterior above shoulder.
2. Rounded jar with incurving upper wall, constricted mouth, direct or expanded rim, rounded or tapered lip. Mouth diameter 12–24 cm. (fig. 81–2). Zoned decoration restricted to upper exterior.
3. Jar with rounded bottom, angular shoulder, constricted mouth, everted rim with rounded lip. Rim diameter 22–34 cm. (fig. 81–3). Zoned decoration restricted to area between neck and shoulder, and upper rim interior.

DECORATION (pl. 145 a–k, m–o, t–u):

Technique: Zones containing incision separated by zones of solid red or red banding. Incisions average wider than in Ayangue Incised, often about 1 mm. Width tends to be greatest at the center, tapering off toward both ends. Edges sometimes dragged or thrown up leaving a low ridge. Lines are straight, generally parallel but not equally spaced, with overshot ends frequent.

Motif: Two principal combinations of incision and red zoning occur with about equal frequency. In one, a single or double incision borders the red zone, either at the junction or slightly inside the unslipped area (pl. 145 b, e–g). In the other, several slanting parallel lines run in alternating directions generally leaving a plain area between them (pl. 145 a, c–d, h–i). A rare variant alternates a plain band containing an incised line running parallel to its length and a red band of similar width (pl. 145 k, m–o) either on the everted rim interior of jars or on the exterior body. Occasionally, a continuous incised line alternates with a punctate (pl. 145j) or a dashed one (pl. 145 t–u).

Associated techniques: Vessels of Forms 1 and 3 may have nicks or gashes as embellishments of the shoulder, but these appear to be typically discontinuous and placed to coincide with the incised areas, rather than continuous as in Machalilla Embellished Shoulder.

TEMPORAL DIFFERENCES WITHIN THE TYPE: The only motif represented in the early part of the sequence is the rare alternating band on the exterior body (table D). It is perhaps significant for reconstructing the evolution of this type that the alternating band treatment frequently incorporates both incised lines and rows of punctate, whereas incision and punctation are not associated in examples from Periods B and C.

TABLE D.—*Combined temporal distribution of minor motifs of Machalilla Incised and Red Zoned and Machalilla Punctate and Red Zoned*

Period	*Seriated sequence*	*Jar rim interior*	*Alternating bands*
C	G–110, Cut 1, 10–20 cm.	–	1
	G–110, Cut 2, 0–20 cm.	1	2
	G–110, Cut 1, 20–30 cm.	–	–
	G–110, Cut 1, 30–50 cm.	–	–
	G–110, Cut 3, 0–20 cm.	1	–
	G–110, Cut 1, 50–70 cm.	–	1
	G–110, Cut 2, 20–40 cm.	3	8
B	G–112	–	–
A	M–28, Cut 1, 0–20 cm.	–	2
	M–28, Cut 1, 20–40 cm.	–	–

CHRONOLOGICAL POSITION OF THE TYPE: Machalilla Incised and Red Zoned is characteristic of Periods B and C. It is absent during Period A, except for two sherds representing an untypical variety of the type, in which red bands alternate with incisions (fig. 89; pl. 145k–l).

Machalilla Plain
(*Machalilla Ordinario*)

PASTE:

Method of manufacture: Coiling.

Temper: Coarse sand containing both angular and water-worn particles, frequently pale orange or whitish in color making a strong contrast with the paste color. Particles of 2–4 mm. abundant and even small sherds contain one or more 5–8 mm. in diameter (pl. 146). Large particles may lie in the center of the cross section or adjacent to the surface.

Texture: Very coarse but compact and not friable; appearance of concrete aggregate.

Color: Usually brown, gray-brown or orange through the cross section; sometimes oxidized along one surface, usually exterior, and dark gray along the other. Rarely, medium or dark gray throughout.

Firing: Incompletely to completely oxidized.

SURFACE:

Color: Brown, gray-brown, medium or dark gray; occasionally orange-brown or grayish tan. Extremely variable over small areas because of fire clouding and unequal polishing. Interior and exterior typically similar shade except when interior is blackened.

Treatment (pl. 146): Smoothed leaving uneven finish with pits, scars, rough areas and protruding temper grains, especially of larger sizes. Coarse crackle radiates from exposed temper particles, which typically lie with a flat facet parallel to the surface. Polishing striations are often visible parallel to the diameter, especially on the exterior. Polishing may produce a low luster in spite of poor smoothing.

Hardness: 4–4.5.

FORM:

Rim: Direct or everted with rounded or tapered lip.

Body wall thickness: 4.5–8.0 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Wide mouthed jar with flattened bottom, rounded shoulder, slightly constricted neck and everted rim with tapered or rounded lip. Rim diameter 18–24 cm. (fig. 82–1).
2. Rounded bowl with slightly constricted direct rim, rounded lip. Mouth diameter 24–26 cm. (fig. 82–2).

TEMPORAL DIFFERENCES WITHIN THE TYPE: None evident.

CHRONOLOGICAL POSITION OF THE TYPE: Typical of Period A of the seriated sequence of the Machalilla Phase; rare thereafter (fig. 89).

Machalilla Polished Plain
(*Machalilla Pulido*)

PASTE:

Method of manufacture: Coiling; occasional coil junction breaks leaving a slightly convex or concave edge.

Temper: Fine to medium white sand, occasional particles to 3 mm. Moderate to abundant quantity, with larger particles more frequent in sherds with abundant temper. About 25 percent have fine paste with no visible sand grains.

Texture: Compact, fine grained, with occasional pinhole air pockets. Breaks typically straight and clean, at right angle to surface.

Color: Variation from orange or light tan through the cross section to solid medium gray, with intermediate examples showing oxidation along both surfaces leaving a gray core of even width.

Firing: Incomplete to complete oxidation.

SURFACE:

Color: Polished surfaces tan, light orange, orange-brown, gray-brown, light to dark gray. Fire clouding may produce extreme variation on a single sherd and often causes a mottled appearance. Reddish-brown tones are sometimes difficult to distinguish from red-slipped surfaces. Unpolished surfaces (jar interiors) may be similar to the exterior or at the opposite end of the color range.

Treatment: Exterior of jars and both the exterior and interior of bowls polished producing a slick texture and gloss on uneroded examples. Polishing striations are obliterated or unobtrusive. Surface is even to touch, although minor flaws may remain visible. Floating is frequently not sufficient to conceal fine white temper particles. Bowl interiors occasionally striated polished; jar interiors unpolished.

Hardness: 4–4.5.

FORM:

Rim: Exteriorly thickened or everted, with rounded, tapered or flattened lip.

Body wall thickness: 2–6 mm., occasionally reaching a maximum of 10 mm. at thickened shoulder of Form 1.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Bowl with flattened bottom, angular shoulder slightly thickened to produce a curve on the interior, concave insloping upper wall, slightly everted rim with flattened or tapered lip. Rim diameter 14–24 cm. (fig. 83–1).
2. Bowl with flattened bottom, slightly angular shoulder, nearly vertical slightly convex upper wall, direct rim with rounded or tapered lip. Rim diameter 14–22 cm. (fig. 83–2).
3. Carinated bowl with rounded bottom, unthickened to slightly thickened angular shoulder, exteriorly thickened rim with rounded or tapered lip. Rim diameter 14–18 cm. (fig. 83–3).
4. Globular jar with constricted mouth, exteriorly thickened or slightly everted rim, rounded lip. Mouth diameter 12–18 cm. (fig. 83–4).
5. Jar with rounded body, constricted neck and everted rim with rounded or tapered lip. Rim diameter 8–16 cm. (fig. 83–5).

TEMPORAL DIFFERENCES WITHIN THE TYPE: Tan to orange surface color is most frequent in the early part of the seriated sequence.

CHRONOLOGICAL POSITION OF THE TYPE: One of the common plain types during the Machalilla Phase, continuing into the succeeding Chorrera Phase (fig. 89).

Machalilla Polished Red
(*Machalilla Rojo Pulido*)

PASTE:

Method of manufacture: Coiling.

Temper: Abundant fine to coarse, typically whitish sand. Particles typically less than 0.5 mm., but occasionally reaching 4 mm. in diameter. Larger grains are angu-

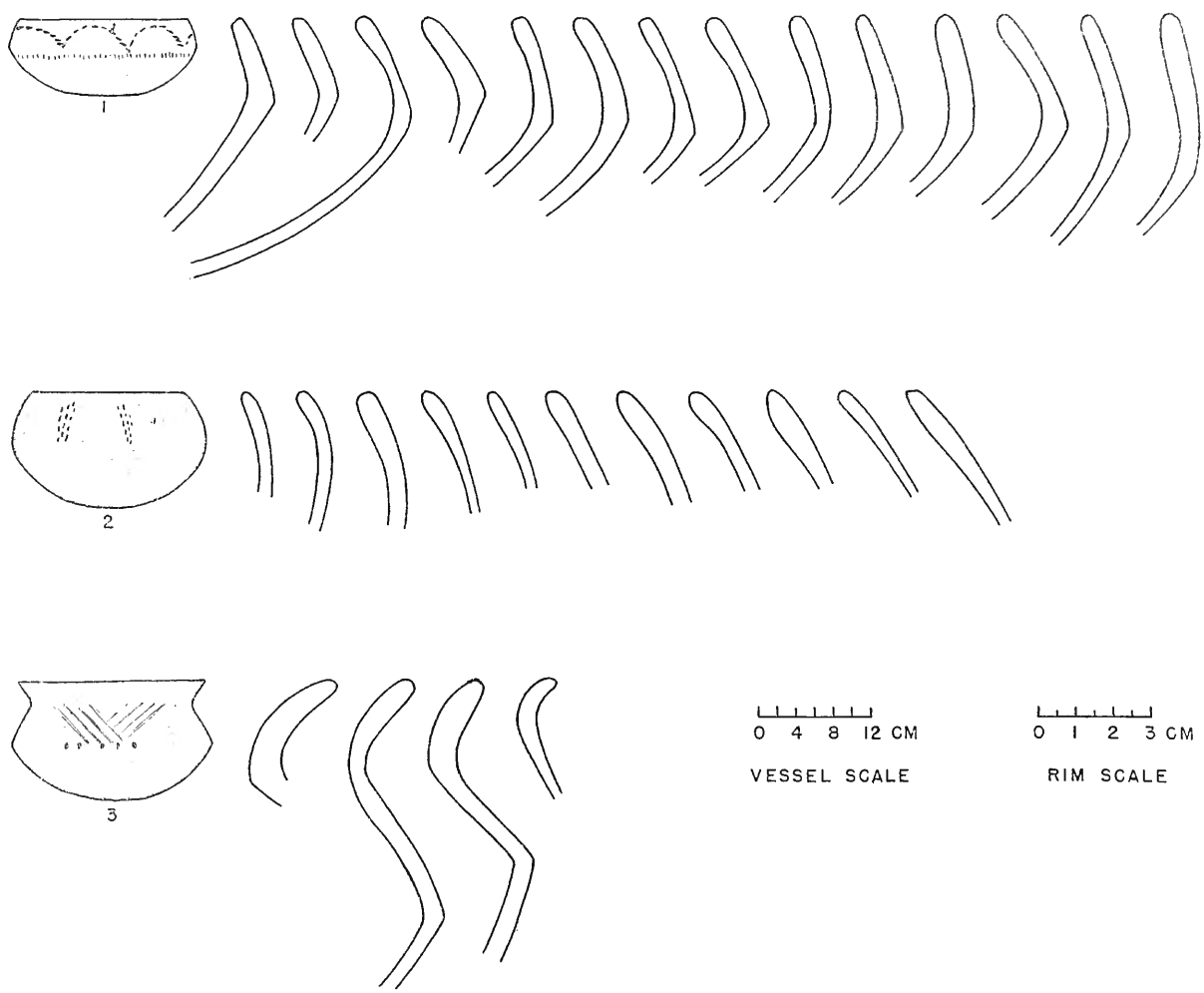

FIGURE 81.—Rim profiles and reconstructed vessel shapes of Machalilla Incised and Red Zoned, and Machalilla Punctate and Red Zoned.

lar with flat facets. A minority of sherds has fine sand blending into paste color.

Texture: Sandy, generally compact except for occasional fine fissures at coil junctions. Temper grains show a tendency to clustering but distribution is not markedly uneven.

Color: About 50 percent are light to medium orange through the cross section; the remainder are fired orange to 1 mm. from both surfaces or along the exterior only leaving a medium gray core. Typically an oxidized band is sharply defined, and even in width.

Firing: Incompletely to completely oxidized.

SURFACE:

Color:

Slipped surface: Dark rich red to reddish brown, varying because of differences in thickness of coating and firing.

Unslipped surface: Light orange, tan, buff; light, medium or dark gray.

Treatment:

Slipped surface: Slipping ranges from thin but even coating to streaky application incompletely obliterating the underlying surface. Polishing varies from complete but typically leaving clearly defined parallel striations, to superficial and limited to high spots on an unlevel surface. Best polished surfaces are correlated with most evenly applied slip, but even on these white temper grains may remain visible. Although even surfaces may feel smooth and slick, differential effects of polishing are expressed in variegation of coloring. Fine crackle is characteristic of variegated surfaces. Rare sherds exhibit vertical rippling reminiscent of Valdivia Pebble Polished in addition to horizontal striations. Slip applied to exterior and neck interior of jars, exterior and interior of bowls.

Unslipped surfaces: Even but unpolished, with temper grains typically less visible than on slipped surface. Occasionally striated polished on the interior of bowls slipped only on the exterior. Some jar interiors show fine brushlike scraping marks.

Hardness: 4–4.5.

FORM:

Rim: Direct or everted with rounded, tapered or flattened lip.

Body wall thickness: 3–8 mm., occasionally reaching 10–15 mm. on the body of large jars or thickened portions of neck.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Large bowl with flattened bottom, high angular thickened shoulder, tapering inward to slightly upturned rim, rounded lip. Rim diameter 22–30 cm. (fig. 84–1). Red slipped on interior and exterior.
2. Large bowl with flattened bottom, high angular shoulder tapering inward to rounded lip. Rim diameter 22–30 cm. (fig. 84–2). Red slipped on interior and exterior above shoulder.
3. Carinated bowl with rounded bottom, angular unthickened shoulder, convex insloping upper wall, direct rim with rounded lip. Rim diameter 8–22 cm. (fig. 84–3). Red slipped on interior and exterior.
4. Carinated bowl with rounded bottom, angular unthickened to slightly thickened shoulder, insloping concave upper wall, direct rim with rounded or flattened lip. Rim diameter 14–22 cm. (fig. 84–4). Red slipped on interior and exterior, or lip and exterior.
5. Globular jar with slightly constricted mouth, direct rim, rounded lip. Mouth diameter 12–18 cm. (fig. 84–5). Red slipped on interior and exterior.
6. Jar with flattened bottom, rounded to slightly angular shoulder, constricted neck and everted rim with rounded lip. Junction of neck and body is typically angular on the interior. Rim diameter 8–16 cm. (fig. 84–6). Red slipped on exterior, continuing over onto interior as far as angular junction of neck with body.
7. Wide mouthed jar with flattened bottom, rounded to slightly angular shoulder, insloping upper wall,

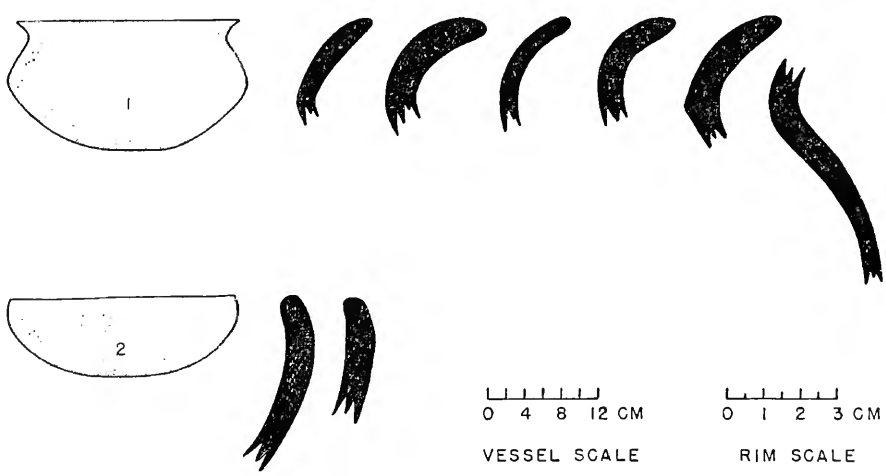

FIGURE 82.—Rim profiles and reconstructed vessel shapes of Machalilla Plain.

everted rim with rounded or flattened lip. Junction of rim and body wall typically angular on the interior. Rim diameter 22–32 cm. (fig. 84–7). Red slipped on exterior, continuing over onto rim interior as far as angular junction with body.

Rare vessel shape reconstructed from sherds:

1. Carinated bowl with rounded bottom, thickened angular shoulder, insloping upper wall, exteriorly thickened rim with rounded lip. Rim diameter 10–22 cm. Red slipped on interior and exterior.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Present throughout the Machalilla Phase with slightly increasing frequency; continuing to increase in the succeeding Chorrera Phase (fig. 89).

Machalilla Punctate
(*Machalilla Punteado*)

PASTE AND SURFACE: On Machalilla Striated Polished Plain (p. 137), see that type description for details.

FORM:

Rim: Direct with rounded or flattened lip.

Body wall thickness: 2.5–7.0 mm.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Bowl with rounded bottom, angular unthickened to slightly thickened shoulder, insloping upper wall, direct rim with rounded or flattened lip. Rim diameter 14–18 cm. Decoration on exterior above shoulder.
2. Jar with rounded body, constricted neck and everted rim. Interior neck diameter 4–8 cm. Decoration on exterior above shoulder.

DECORATION (pl. 147 a–i):

Technique: Three distinct kinds of punctates are represented:

1. Small, circular impressions 1.0–1.5 mm. in diameter, 1–2 mm. deep, arranged 1–5 mm. apart in horizontal rows (pl. 147 a–d).
2. Rectanguloid marks, 1.0–2.5 mm. long and 1–2 mm. wide, squarish in outline, often slightly shallower at one end, arranged 1–2 or 2–3 mm. apart (wider spacing correlated with larger punctates) in relatively straight rows (pl. 147 g–i).
3. Long, narrow, trianguloid marks filling zones bordered by fine incised lines. Punctates 2–3 mm. long, 1 mm. maximum width tapering toward one end,

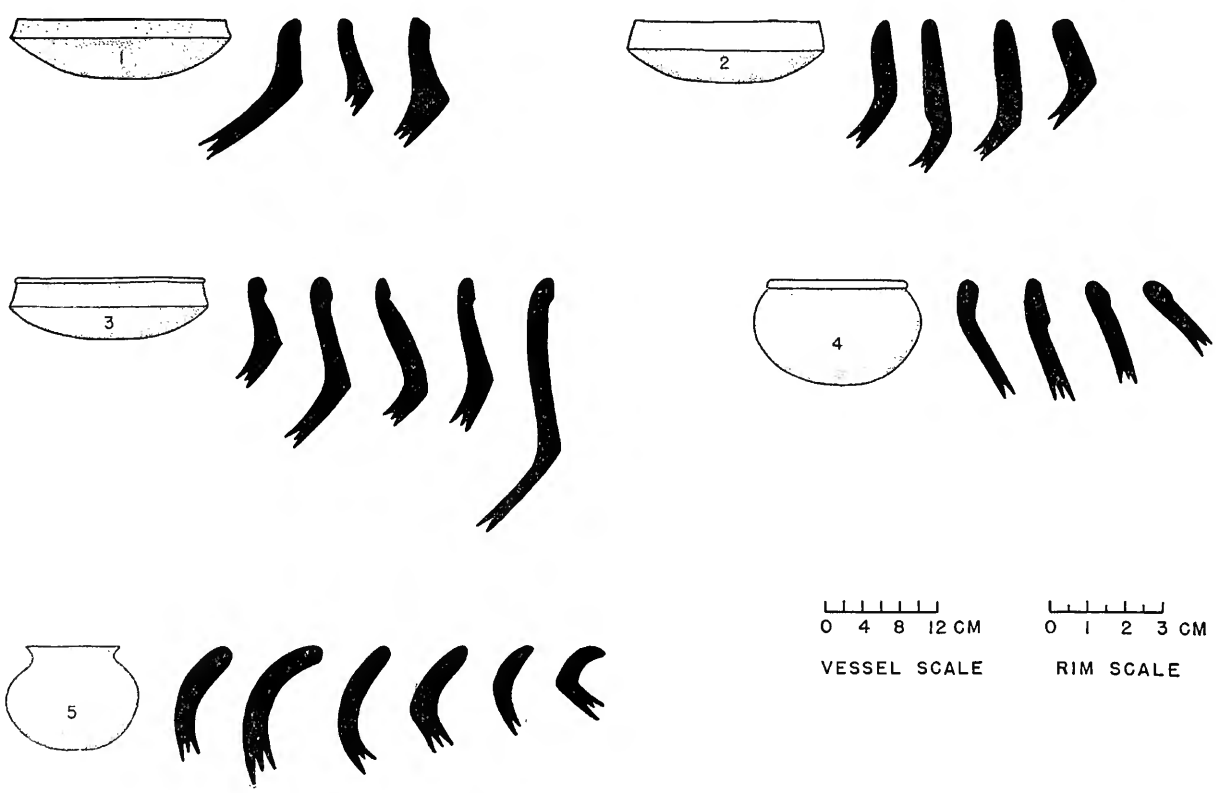

FIGURE 83.—Rim profiles and reconstructed vessel shapes of Machalilla Polished Plain.

placed 1–3 mm. apart in straight rows. Incisions fine, sharply defined, with dragged edges; long lines tend to be crooked (pl. 147 e–f).

Motif: Techniques 1 and 2 are typically not accompanied by incision; punctations occur in double parallel rows or occupy areas of the vessel wall, the extent undeterminable because of the small size of the sherds. Technique 3 occurs in rectilinear bands or zones bounded by one or two incised lines.

Associated techniques: Two bowls have embellished shoulder decoration in the form of gashes. One of these and another sherd have large "bosses" at the shoulder.

Temporal Differences Within the Type: Technique 1 is limited to Period A of the seriated sequence; Techniques 2 and 3 are limited to Period C (table E).

Chronological Position of the Type: Present in minor frequency throughout the Machalilla Phase seriated sequence (fig. 89).

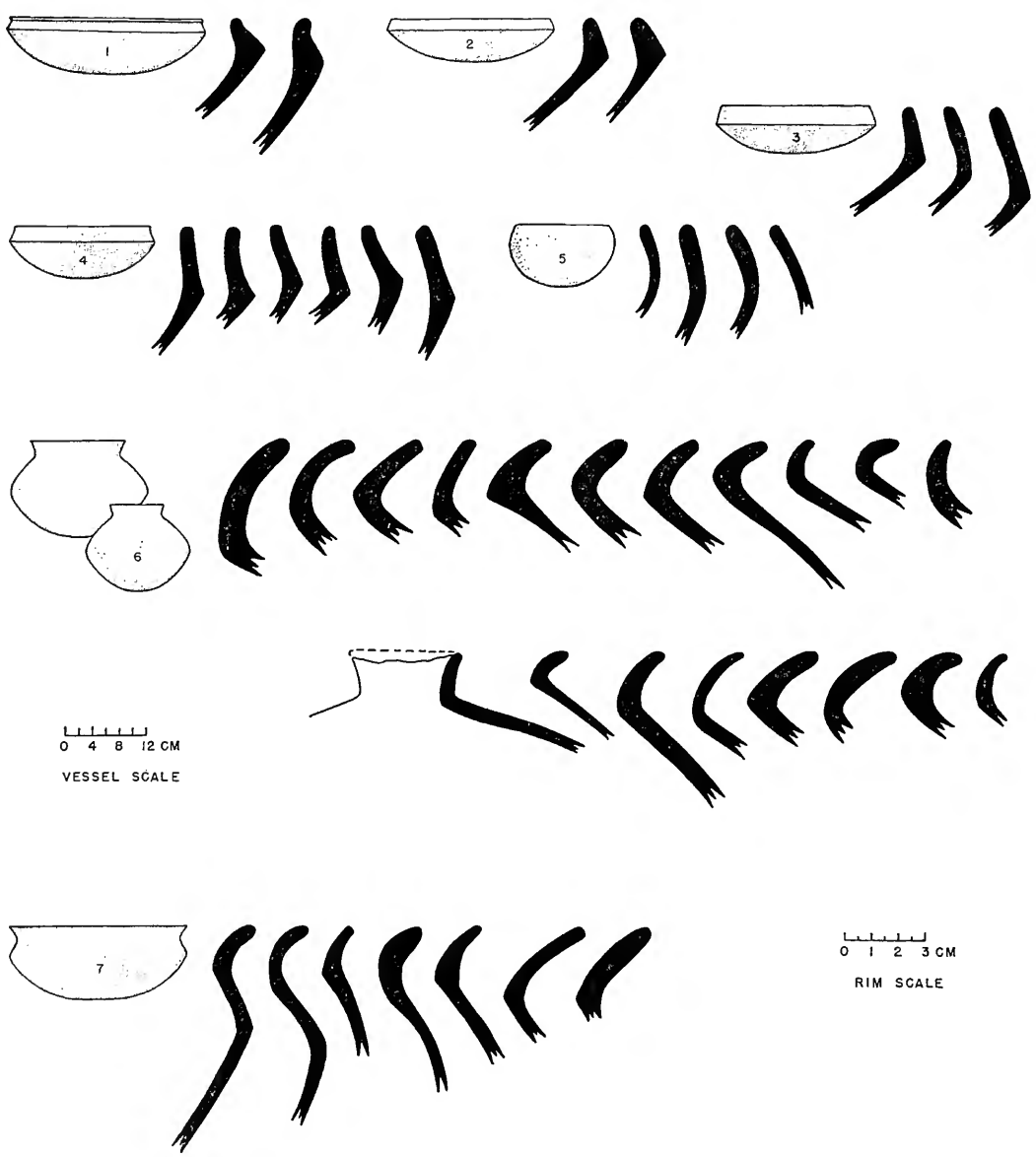

Figure 84.—Rim profiles and reconstructed vessel shapes of Machalilla Polished Red.

TABLE E.—*Temporal distribution and frequency of techniques of Machalilla Punctate decoration*

Period	*Seriated sequence*	*Technique 1: Small circular*	*Technique 2: Rectanguloid*	*Technique 3: Trianguloid zoned*
C	G–110, Cut 1, 10–20 cm.	–	–	–
	G–110, Cut 2, 0–20 cm.	–	–	–
	G–110, Cut 1, 20–30 cm.	–	–	–
	G–110, Cut 1, 30–50 cm.	–	1	–
	G–110, Cut 3, 0–20 cm.	–	–	–
	G–110, Cut 1, 50–70 cm.	–	1	1
	G–110, Cut 2, 20–40 cm.	–	–	–
B	G–112	–	–	–
A	M–28, Cut 1, 0–20 cm.	2	–	–
	M–28, Cut 1, 20–40 cm.	1	–	–

Machalilla Punctate and Red Zoned
(*Machalilla Punteado y Rojo en Zonas*)

PASTE: Fine sand tempered; see Chorrera Plain (p. 122) for details.

SURFACE: Similar to Machalilla Incised and Red Zoned; see that type description for details.

FORM: Same as Machalilla Incised and Red Zoned (fig. 81 and p. 128).

DECORATION (pls. 145 l, p–s, 148):

Technique: Alternation of zones of polished red with zones bordered by or filled with punctates. Red usually solid, sometimes pattern of bands 3–8 mm. wide and streaked by polish subsequent to application. Punctates are in the form of elongated gashes, 3–6 mm. long and generally 1 mm. wide. Rarely, width may reach 2 mm. Arrangement in straight rows is end to end, with separation from adjacent to 4 mm. apart. In curved rows, horizontal orientation may be retained, with succeeding punctates in slightly staggered position (pl. 148 a, n). Rows tend to be regular when bounding areas but more random when filling zones. Marks are deep, sharply defined and rarely show pushed up edges or ends.

Motif: Typically, one or two parallel rows of punctate border a red band or solid red area, falling at the junction or just inside the unslipped area (pl. 148 a, d, f–g, j, n, t). Occasionally the unslipped zone may be almost filled with punctation (pl. 148 c–h, k, l, s, u). Two rare variants are a single or double row of punctations between two red bands on the rim interior of jars of Form 2 (pl. 148 o–p), and alternating bands of red and punctate on the body of large jars (pl. 145 l, p–s).

Associated techniques: Carinated bowls may have embellished shoulder treatment.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Like Machalilla Incised and Red Zoned, this type is characteristic of Periods B and C (fig. 89). A single example from Period A represents the rare decorative variant in which a red band alternates with a band containing a dotted line.

Machalilla Red Banded
(*Machalilla Bandas Rojas*)

PASTE: On Chorrera Plain (p. 122) or Cabuya Plain (p. 121); see those type descriptions for details.

SURFACE:

Color: Polished surfaces typically tan, buff, orange-brown or gray-brown with a leather-like tone, rather uniform on a single specimen except in areas with dark gray fire clouds. Unpolished surfaces light tan, also with little range of variation in tone.

Treatment: Decorated surfaces (exterior of jars, interior and exterior of bowls) even and striated polished, horizontal polishing striations usually remaining clearly visible. Faint vertical rippling reminiscent of Valdivia Pebble Polished sometimes occurs. Floating is not as complete as in Ayangue Incised, leaving small defects, and temper grains protruding. Uneroded surfaces may have a varnish-like sheen. Undecorated surfaces (jar interior) were scraped with a tool that left fine parallel brush-like marks that remain faintly to prominently visible. Bowl interiors and lower exteriors may be covered with a red slip, often streaky in appearance.

Hardness: 4–4.5.

FORM:

Rim: Exteriorly thickened, direct, everted or cambered, with rounded, flattened or tapered lip.

Body wall thickness: 2–8 mm., increasing to a maximum of 1.4 cm. at the shoulder of vessels of Form 1 and 4.

Base: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Bowl with flattened bottom, high angular shoulder created by pronounced body wall thickening, slight upturned rim with rounded or tapered lip. Rim diameter 10–26 cm. (fig. 85–1). Wide banded decoration restricted to upper interior and exterior.
2. Carinated bowl with rounded bottom, angular slightly thickened shoulder, insloping upper wall, exteriorly thickened rim with rounded or flattened lip. Rim diameter 12–18 cm. (fig. 85–2). Narrow banded decoration on interior and exterior.
3. Carinated bowl with rounded bottom, angular unthickened shoulder, insloping upper wall, exteriorly thickened or slightly everted rim, rounded lip. Rim diameter 18–22 cm. (fig. 85–3). Wide or narrow banded decoration on interior and upper exterior.
4. Large shallow bowl with rounded bottom, high angular shoulder, tapering rim, rounded lip. Insloping rim creates an approximate 90 degree angle at the shoulder. Rim diameter 14–28 cm. (fig. 85–4). Wide banded decoration on upper exterior.
5. Carinated bowl with rounded bottom, angular unthickened or slightly thickened shoulder, concave insloping upper wall, direct rim with rounded lip. Rim

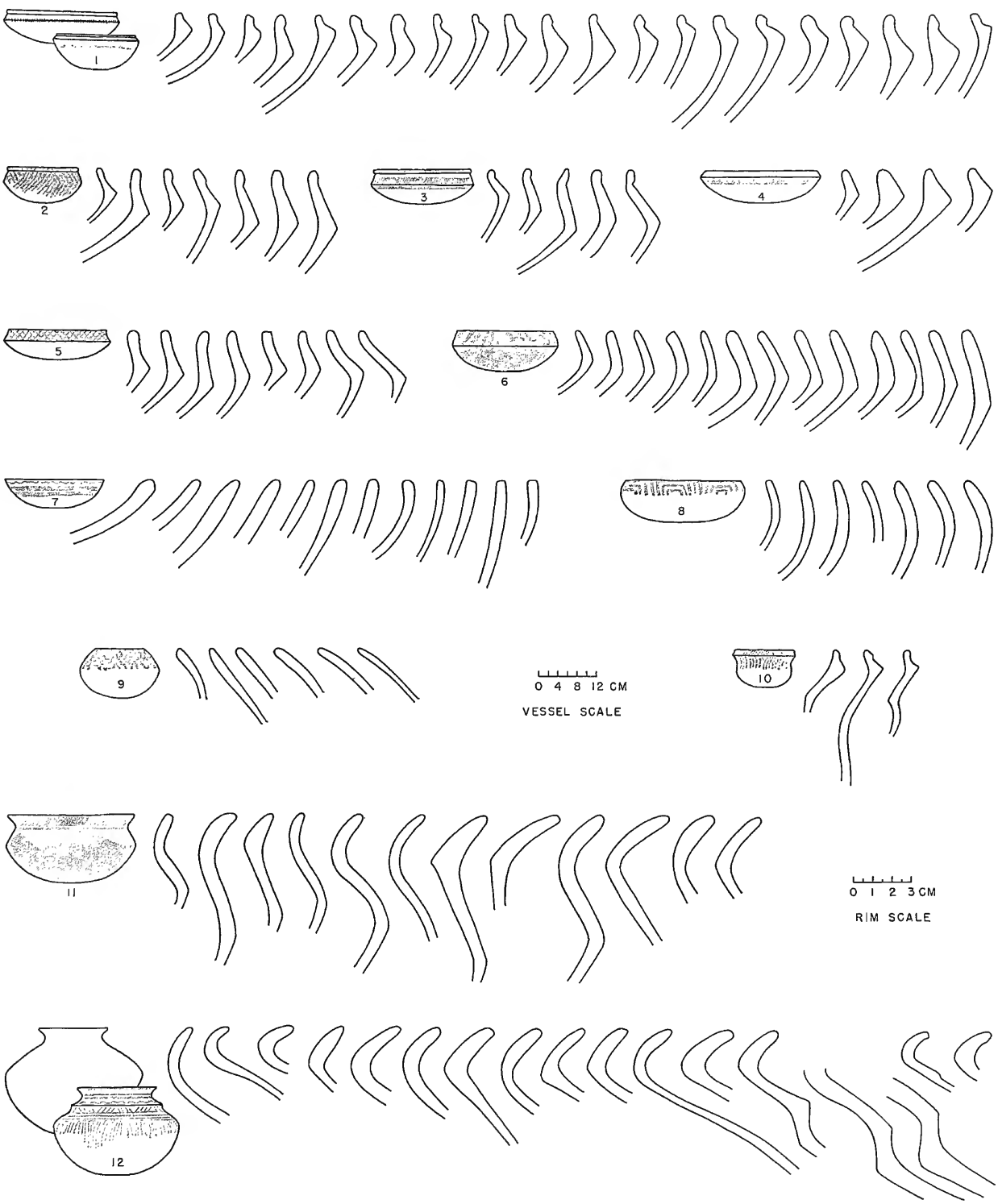

FIGURE 85.—Rim profiles and reconstructed vessel shapes of Machalilla Red Banded.

diameter 18–22 cm. (fig. 85–5). Decoration on upper exterior.

6. Mildly carinated bowl with rounded bottom, slightly angular shoulder, insloping upper wall convex on exterior, direct or slightly expanded rim with rounded, flattened or tapered lip. Rim diameter 10–20 cm. (fig. 85–6). Decoration restricted to upper exterior.
7. Open bowl with flattened bottom, walls curving outward and upward to direct rim with flattened or rounded lip. Rim diameter 12–28 cm. (fig. 85–7). Decoration on exterior and interior.
8. Rounded bowl with rounded bottom, curved shoulder and slightly constricted direct rim with rounded or tapered lip. Rim diameter 14–24 cm. (fig. 85–8). Decoration restricted to exterior.
9. Globular jar with rounded body, constricted, direct or slightly expanded rim, rounded or tapered lip. Rim diameter 7–14 cm. (fig. 85–9). Decoration on upper exterior.
10. Cambered jar with rounded body, joining outflaring neck at a slight constriction frequently angular on the interior, cambered rim produced by wall thickening, rounded lip created by constriction and reexpansion of the wall. Rim diameter 12–16 cm. (fig. 85–10). Decoration restricted to exterior.
11. Wide mouthed jar with flattened bottom, rounded shoulder, constricted neck, strongly everted rim with rounded lip. Rim diameter 18–26 cm. (fig. 85–11). Wide banded decoration on upper exterior.
12. Narrow mouthed jar with rounded bottom, rounded shoulder, constricted neck, everted rim with flattened or rounded lip. A variant has a steplike projection about half way between the base of the neck and the shoulder. Rim diameter 8–22 cm. (fig. 85–12). Decoration on exterior and upper rim interior.

DECORATION (pls. 149–153):

Technique: Thick rich dark red slip applied in sufficient thickness to produce a ridge readily visible and easily felt in the majority of cases, measuring up to 1 mm. thick in some cases. Polishing subsequent to application of red bands typically causes streaking of the pigment blurring the edges of the bands when they are not parallel to the direction of polish, which is horizontal. This polishing after decoration leaves the surface beneath the pigment unpolished with the result that sherds in which the paint has flaked off may present a zoned polished appearance. Bands occur in two general classes: 1) Narrow bands, 1–3 mm. wide, rarely reaching 4 mm. and 2) wide bands, 0.5–1.2 cm. wide, rarely reaching 2 cm. About 10 percent of the sherds are intermediate in band width, and occasional designs incorporate wide and narrow bands. Some bowls have wide bands on the interior and narrow bands on the exterior. Either wide or narrow bands may occur on jar exterior, jar rim interior, bowl interior or bowl exterior.

Execution ranges from lines of approximately even width, parallel and relatively evenly spaced to those of variable width (2–5 mm.), crooked and unevenly spaced. Blobs may occur where a full brush was applied to the surface. Broad bands have markedly irregular margins, caused partly by the painting technique, which involved repeated application of the brush, and partly by subsequent polishing.

Motif: Narrow bands (pls. 149–151, 153 a–m, o–p) are applied in groups of straight parallel lines often slanting in alternate directions with a blank zone between (pl. 149 a, d–e, i), horizontal parallel lines with an undulating line between (pls. 150 a–b, d–f, h, 151c), crosshatch (pl. 149k), diamond (pl. 150 k, t), or zoned parallel line arrangements (pls. 149j, 150s). Parallel lines are 2–8 mm. apart. Except for an occasional wavy line, curvilinear elements are rare (pls. 149f, 150 c, m, 151 a–b).

Wide bands (pls. 152, 153 n, q) typically run parallel horizontally, 0.5–1.0 cm. apart on the interior of everted jar rims (pl. 152a) or on the neck exterior (pl. 152 f–g, i, m–o), or vertically on the body exterior (pl. 152q). Wide bands are applied to the lip and carination of bowls (pls. 152 b, d, j, 153 n, q). Occasionally bands expand into zones of solid red (pl. 152f). Two sherds show ovoid spots of type produced by finger painting (pl. 152p).

Associated techniques: Carinated bowls may have embellished shoulder treatment.

TEMPORAL DIFFERENCES WITHIN THE TYPE: No clear temporal distinction can be discerned between the frequency of wide and narrow banding, the latter being approximately twice as common as the former throughout the duration of the seriated sequence during the Machalilla Phase (fig. 89).

CHRONOLOGICAL POSITION OF THE TYPE: The most common decorated type throughout the duration of the Machalilla Phase (fig. 89).

Machalilla Red Incised
(*Machalilla Rojo Inciso*)

PASTE: On Machalilla Polished Red (p. 130), see that type description for details.

SURFACE:

Color:

Unslipped surface: Brown, light tan or orange.

Slipped surface: Rich red.

Treatment:

Unslipped surface (interior of jars): Even but unpolished.

Slipped surface: Smooth and even to touch but streaky in appearance because of polishing striations. Slip of variable thickness but not leaving bare spots.

Hardness: 4–4.5.

FORM:

Rim: Exteriorly thickened, direct or slightly expanded with rounded, flattened or tapered lip.

Body wall thickness: 4–10 mm.

Base: Probably rounded or slightly flattened.

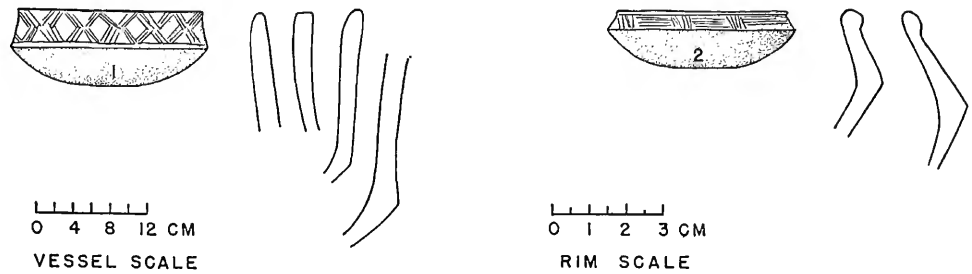

FIGURE 86.—Rim profiles and reconstructed vessel shapes of Machalilla Red Incised.

Principal vessel shapes reconstructed from sherds:

1. Carinated bowl with flattened bottom, angular shoulder, slightly thickened to produce curved interior wall, slightly concave upper wall, direct or expanded rim with flattened or rounded lip. Rim diameter 14–20 cm. (fig. 86–1). Decoration on exterior above shoulder.
2. Carinated bowl with flattened bottom, high angular shoulder slightly thickened to produce curved interior wall, insloping upper wall, exteriorly thickened rim with rounded lip. Rim diameter 18–20 cm. (fig. 86–2). Decoration on exterior above shoulder.
3. A few small thick (8–10 mm.) walled sherds may be from jars; no rims could be identified.

DECORATION (pl. 147 j–r):

Technique: Sharply defined incisions cutting through the red slip to reveal the lighter tan to orange paste. Incisions less than 0.5 mm. wide, applied when the surface was dry enough to produce a "scratched" effect with dragged edges. Strokes are crooked, not equally spaced or evenly parallel. Longer lines may be drawn with several strokes, the ends of which do not abut. Overshot junctions are typical.

Motif: Rectilinear patterns of straight parallel lines spaced 1–8 mm. apart, with variation of several millimeters typical on a single design. Diamonds produced by crossing or intersection of several parallel lines are most frequent (pl. 147 n–p, r); other motifs include zoned parallel lines (pl. 147 j, k, q), single erratic zigzag lines (pl. 147l), and cross hatch (pl. 147m).

Associated techniques: Bowls may have wide red banded decoration on the interior or embellished shoulder treatment.

TEMPORAL DIFFERENCES WITHIN THE TYPE: None discernible.

CHRONOLOGICAL POSITION OF THE TYPE: Present with minor frequency throughout the Machalilla Phase (fig. 89).

Machalilla Striated Polished Plain
(Machalilla Pulido en Líneas)

PASTE:

Method of manufacture: Coiling.

Temper: Fine to coarse sand, typically white. Most characteristic is abundant fine white sand less than 0.5 mm. in diameter standing out prominently in dark paste. Large inclusions may reach 5 mm. and occasionally extend through the cross section; usually, however, they occur in thicker walled sherds. A minority of sherds have no visible temper.

Texture: Typically sandy, with pinpoint or thin fissure-like air pockets. Not friable or easily broken even when heavily tempered. Temper is not evenly distributed and larger particles tend to cluster adjacent to the surface. Untempered sherds are compact and fine grained.

Color: Orange or medium to dark gray through cross section, or orange adjacent to both surfaces leaving a gray core. Rarely, gray along one surface and orange along the other. Core width is less uniform than in Machalilla Polished Plain and may be discontinuous.

Firing: Incompletely to completely oxidized.

SURFACE:

Color: Tan, light orange, light brown, red-brown, gray-brown, medium to dark gray, with considerable variation on most sherds. Uneven firing conditions and differential absorption by polished and unpolished areas result in a typically streaky or variegated effect. Frequent fire clouds.

Treatment (pl. 154): Polished leaving well defined parallel striations running parallel to the rim. Coverage varies from complete, with tracks abutting or overlapping, to incomplete leaving narrow unpolished intervals between adjacent tracks. Polishing typically covers more than 75 percent of the surface. Less completely polished examples tend to be uneven, with scars and visible temper grains, although even these generally feel smooth. Most surfaces have a low luster. Striated polish is applied to exterior of jars and both surfaces of bowls (if one surface was completely polished, the sherd was classified as Machalilla Polished Plain).

Hardness: 4–4.5.

FORM:

Rim: Exteriorly thickened, direct or everted with rounded, tapered or flattened lip. Rims are markedly unlevel and frequently noncircular.

Body wall thickness: Typically 2.5–7.0 mm., increasing to 10 mm. at thickened carinations.

Based: Probably rounded or slightly flattened.

Principal vessel shapes reconstructed from sherds:

1. Carinated bowl with rounded bottom, high angular

thickened shoulder, short slightly thickened rim with rounded lip. Rim diameter 14–18 cm. (fig. 87–1).

2. Large bowl with flattened bottom, high angular thickened shoulder, tapering rim, rounded lip. Rim diameter 22–30 cm. (fig. 87–2).
3. Carinated bowl with rounded bottom, angular slightly thickened shoulder, slightly concave insloping rim, rounded or tapered lip. Rim diameter 16–30 cm. (fig. 87–3).
4. Carinated bowl with flattened bottom, angular unthickened shoulder, convex insloping upper wall, exteriorly thickened rim with rounded or tapered lip. Rim diameter 16–36 cm. (fig. 87–4).
5. Carinated bowl with flattened bottom, angular thickened shoulder, insloping upper wall, slightly everted or exteriorly thickened rim with rounded lip. Rim diameter 16–24 cm. (fig. 87–5).
6. Globular jar with slightly constricted direct rim,

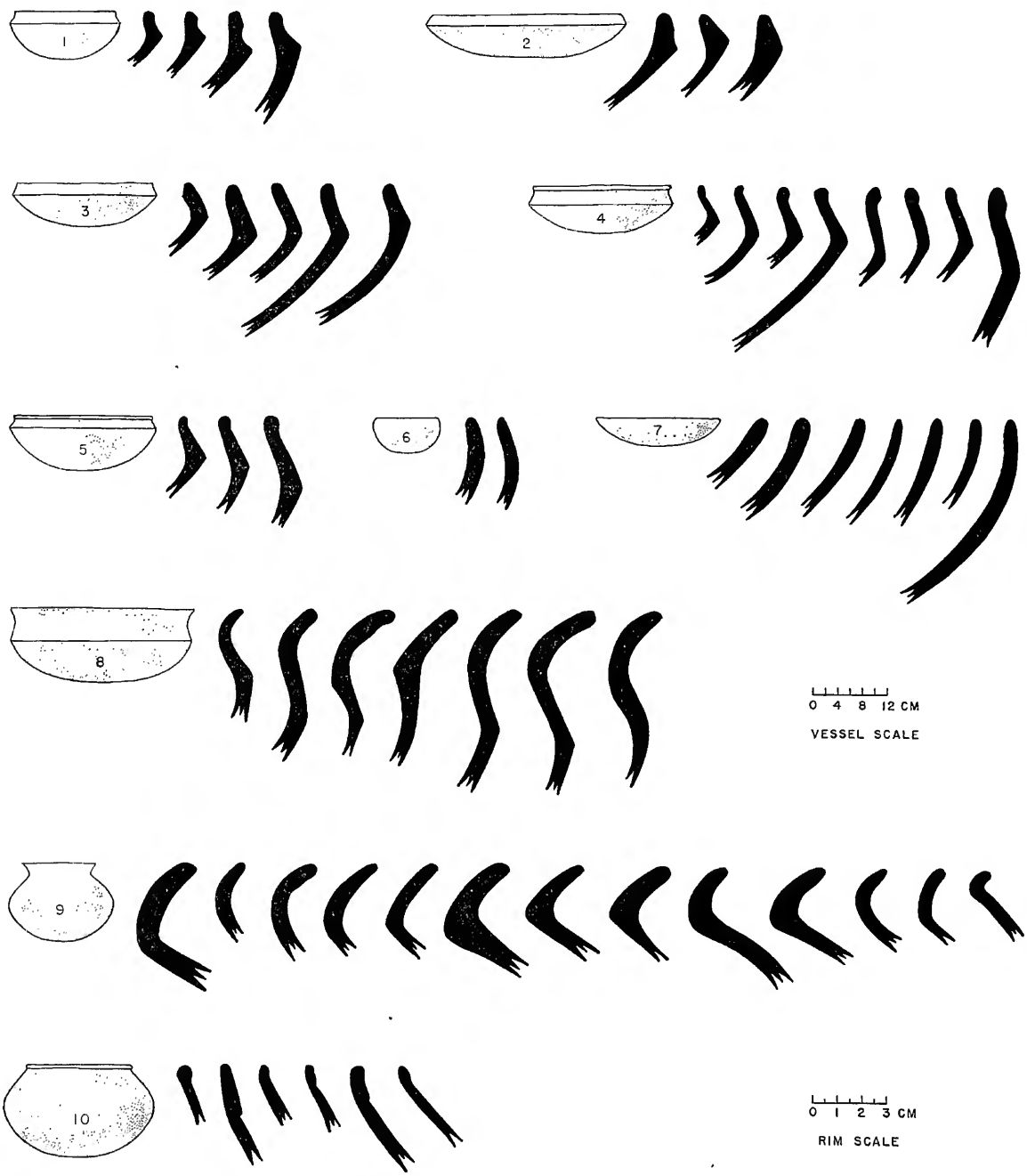

FIGURE 87.—Rim profiles and reconstructed vessel shapes of Machalilla Striated Polished Plain Forms 1–10.

rounded or tapered lip. Mouth diameter 10–26 cm. (fig. 87–6).

7. Open bowl with outcurving to upcurving wall, direct rim, rounded or tapered lip. Rim diameter 14–26 cm. (fig. 87–7).
8. Wide mouthed jar with rounded bottom, rounded to angular shoulder, slightly constricted mouth, everted rim with rounded or tapered lip. Junction of rim and neck on interior may be angular. Rim diameter 22–42 cm. (fig. 87–8).
9. Jar with rounded body, constricted neck and everted rim with rounded or tapered lip. Junction of neck and body on interior varies from rounded to angular. Rim diameter 6–18 cm. (fig. 87–9).
10. Globular jar with constricted mouth, exteriorly thickened or slightly everted rim with rounded or tapered lip. Mouth diameter 4–20 cm. (fig. 87–10).

Rare vessel shapes reconstructed from sherds:

11. Jar with cylindrical spout slightly expanding toward everted rim (pl. 156 o–q). Spout diameter 2.3–2.9 cm., rim diameter 3.3–3.6 cm. Maximum existing length 4.5 cm.; apparently broken above junction with body (fig. 88–11).
12. Stirrup spout jar with rounded body (pls. 155, 156 a–n, r–s). Spout expands laterally from minimum diameter adjacent to mouth toward junction with body giving a bulbous appearance from above. Profile is squatty and slightly angular (fig. 88–12).

TEMPORAL DIFFERENCES WITHIN THE TYPE: Buff or orange surface color becomes rare after the early part of the Machalilla Phase.

CHRONOLOGICAL POSITION OF THE TYPE: The principal plain type during the Machalilla Phase (fig. 89).

Chorrera Phase Types

ROCKER STAMPED.—One jar rim sherd from G–110, Surface, has a row of punctations on the body just below the junction with the rim, and below this a row of rocker stamping. The interior of the everted rim has red banded decoration. Rim diameter is 12 cm. (pl. 157a).

ZONED RED.—Two sherds from G–110, one from the surface and one from Cut 2, Level 0–20 cm., have decoration of red zones separated from zones of the natural buff surface color by incised lines (pl. 157 b–c).

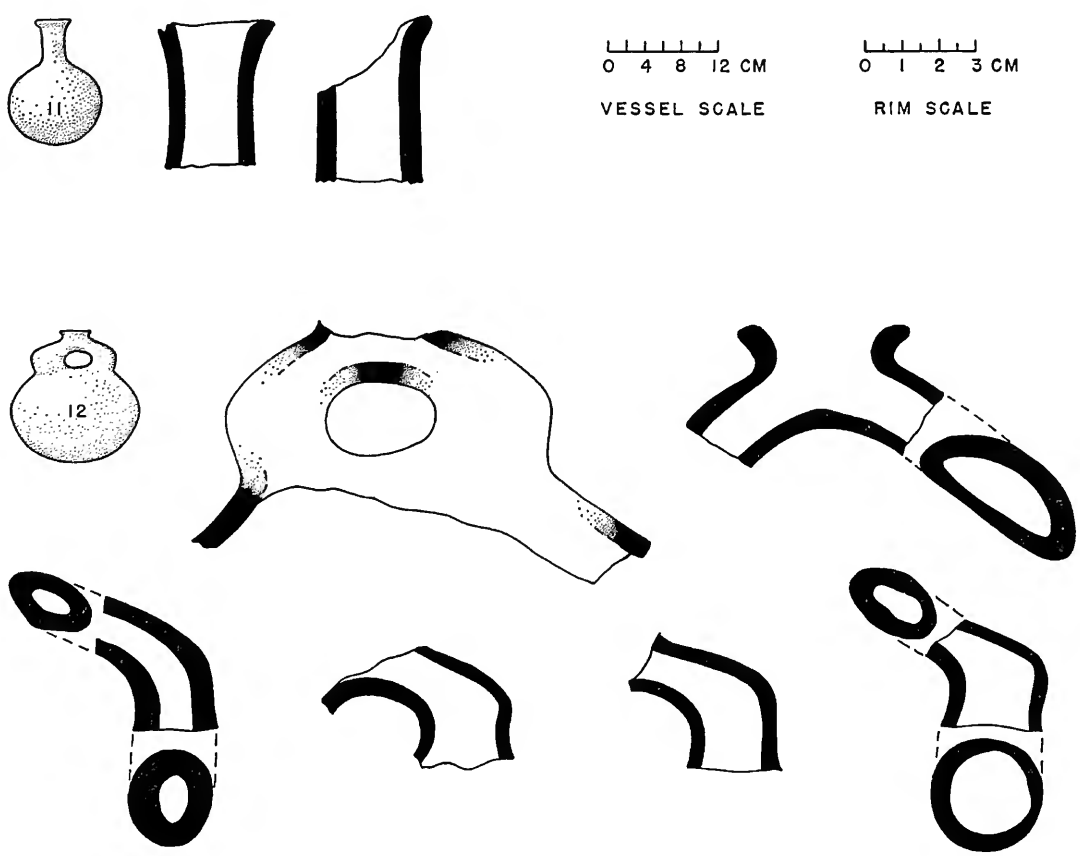

FIGURE 88.—Rim profiles and reconstructed vessel shapes of Machalilla Striated Polished Plain, spouted jar Forms 11 and 12.

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ZONED RED AND BLACK.—One sherd from G–110, Surface, representing the shoulder of a carinated bowl, has a diagonal black band 6 mm. wide separated by narrow incisions from the adjacent red slipped surface. The shoulder has poorly defined ovoid raised embellishments (pl. 159d).

ZONED PUNCTATE.—One rim sherd of unclassified form from G–110, Cut 2, Level 20–40 cm., shows an unpolished zone filled with irregularly shaped, widely (4–6 mm.) spaced punctates separated from the adjacent polished red surface by a broad curved (1–2 mm.) incision (pl. 157e).

Unclassified Decorated

Aside from a few sherds that probably represent eroded examples of Machalilla Red Banded, unclassified sherds represent a great variety of decorative techniques. The majority are small body sherds. Descriptions are arranged in alphabetical order.

DENTATE STAMPING.—One sherd from the intraspout section of a stirrup spout or spout-and-handle jar shows parts of two apparently ovoid zones filled with closely spaced rows of fine dentate stamping (pl. 157i), widely variable in shape, size and direction of inclination. Surface is smooth, even, and striated polished. G–110, Surface.

FINGER GROOVING.—Six sherds show clearly defined finger grooves on the interior (pl. 157 g–h), reflected in a slight bulging on the exterior (pl. 157f). Polishing striations on body sherds and orientation on one rim sherd indicate the grooves run vertically, 1.4–1.5 cm. apart. Length is not complete on any examples. Two are from M–28, Cut 1, Level 0–20 cm.; one from G–110, Surface; one from G–110, Cut 2, Level 20–40 cm. and two from G–110, Trench 1.

HORIZONTAL RIDGING.—A fine sharp ridge runs parallel to the lip about 1.5 cm. down on the rim exterior, apparently formed by working the soft clay of the surface (pl. 157 j–l). One is ornamented with poorly defined nicks or gashes 6–7 mm. apart (pl. 157k). Three rims from two vessels, all from G–110, Trench 1.

INCISION ON POLISHED SURFACE.—Fine scratchlike incisions on a polished or striated polished surface, too poorly finished or too thick walled to be classified as Chorrera Incised. Sherds are too small to show more than one or two incisions. None are rims. One each from G–110, Cut 1, Level 30–50 cm., Level 50–70 cm.; Cut 2, Level 0–20 cm., Level 20–40 cm.; two from G–110, Trench 1.

INCISION ON UNPOLISHED SURFACE.—Sherd from rounded shoulder with two scratchlike incisions of variable width, from M–28, Cut 1, Level 20–40 cm.

NUBBINS ON UNPOLISHED SURFACE.—Small (diameter 6–8 mm.), low (1–2 mm.) circular nubbins blending onto the adjacent surface, or applied so as to leave the junction visible as a crack. Of the three sherds, only one has multiple nubbins, and these are in a row 5 mm. apart. One from G–110, Cut 2, Level 0–20 cm., two from Level 20–40 cm.

PATTERN BURNISHING.—Five sherds from G–110 are decorated on the exterior by contrasting burnished and unburnished surface texture in bands (4 sherds, pl. 157m) or a dentate pattern (1 sherd, pl. 157n). In the banded variety, burnishing may overlap a band of red slip and extend about 5 mm. beyond the margin of the slip. Three sherds from G–110, Cut 1, Level 50–70 cm.; one sherd from Cut 2, Level 0–20 cm.; one sherd from Cut 2, Level 20–40 cm.

POLISHED GROOVE.—One small polished black sherd shows polished grooves about 4 mm. wide possibly delimiting bosses or similar protrusions. G–110, Trench 1.

RED GROOVE.—One body sherd has broad (4 mm.) shallow grooves running parallel, 6–7 mm. apart on the exterior. Grooves are red slipped, the red overlapping slightly onto the adjacent surface. Both surface and grooves are polished. M–28, Cut 1, Level 0–20 cm.

RED AND BLACK PAINTED.—Large body sherd with zone of narrow red bands bordered by two black bands and a single undulating band. Band width 2–5 mm. Polished after painting but not blurring painted edges. One sherd from G–110, Cut 2, Level 20–40 cm.

STRIATED POLISHED BANDING.—Several sherds have horizontal polishing striations that segregate into bands, an effect that may not be intentional. One example each from G–110, Cut 1, Level 30–50 cm., Level 50–70 cm., and G–110, Trench 1.

ZONED RINGS.—One sherd has a narrow band of deeply incised crosshatch at the upper end, corresponding to the base of the neck of the vessel, and zones of probable trianguloid form drawn with fine incisions and filled with irregularly circular rings 2.5–4.0 mm. in diameter (pl. 157o). The surface is superficially polished, leaving flaws. One example from G–110, Cut 2, Level 0–20 cm.

Trade Pottery of Valdivia Phase Origin

Sherds of Valdivia Phase types, both plain and decorated, occur in small numbers in all of the Machalilla Phase sites. Plain sherds show the typical irregular fracture of Valdivia Phase pottery. A diagnostic body sherd is a concave base (pl. 116q). The following types are represented (see Valdivia Phase type descriptions for details):

FIGURE 89.—Seriation of Machalilla Pha
representing the early Chorrera Phase

ZONED RED AND BLACK.—One sherd from G–110, Surface, representing the shoulder of a carinated bowl, has a diagonal black band 6 mm. wide separated by narrow incisions from the adjacent red slipped surface. The shoulder has poorly defined ovoid raised embellishments (pl. 159d).

ZONED PUNCTATE.—One rim sherd of unclassified form from G–110, Cut 2, Level 20–40 cm., shows an unpolished zone filled with irregularly shaped, widely (4–6 mm.) spaced punctates separated from the adjacent polished red surface by a broad curved (1–2 mm.) incision (pl. 157e).

Unclassified Decorated

Aside from a few sherds that probably represent eroded examples of Machalilla Red Banded, unclassified sherds represent a great variety of decorative techniques. The majority are small body sherds. Descriptions are arranged in alphabetical order.

DENTATE STAMPING.—One sherd from the intraspout section of a stirrup spout or spout-and-handle jar shows parts of two apparently ovoid zones filled with closely spaced rows of fine dentate stamping (pl. 157i), widely variable in shape, size and direction of inclination. Surface is smooth, even, and striated polished. G–110, Surface.

FINGER GROOVING.—Six sherds show clearly defined finger grooves on the interior (pl. 157 g–h), reflected in a slight bulging on the exterior (pl. 157f). Polishing striations on body sherds and orientation on one rim sherd indicate the grooves run vertically, 1.4–1.5 cm. apart. Length is not complete on any examples. Two are from M–28, Cut 1, Level 0–20 cm.; one from G–110, Surface; one from G–110, Cut 2, Level 20–40 cm. and two from G–110, Trench 1.

HORIZONTAL RIDGING.—A fine sharp ridge runs parallel to the lip about 1.5 cm. down on the rim exterior, apparently formed by working the soft clay of the surface (pl. 157 j–l). One is ornamented with poorly defined nicks or gashes 6–7 mm. apart (pl. 157k). Three rims from two vessels, all from G–110, Trench 1.

INCISION ON POLISHED SURFACE.—Fine scratchlike incisions on a polished or striated polished surface, too poorly finished or too thick walled to be classified as Chorrera Incised. Sherds are too small to show more than one or two incisions. None are rims. One each from G–110, Cut 1, Level 30–50 cm., Level 50–70 cm.; Cut 2, Level 0–20 cm., Level 20–40 cm.; two from G–110, Trench 1.

INCISION ON UNPOLISHED SURFACE.—Sherd from rounded shoulder with two scratchlike incisions of variable width, from M–28, Cut 1, Level 20–40 cm.

NUBBINS ON UNPOLISHED SURFACE.—Small (diameter 6–8 mm.), low (1–2 mm.) circular nubbins blending onto the adjacent surface, or applied so as to leave the junction visible as a crack. Of the three sherds, only one has multiple nubbins, and these are in a row 5 mm. apart. One from G–110, Cut 2, Level 0–20 cm., two from Level 20–40 cm.

PATTERN BURNISHING.—Five sherds from G–110 are decorated on the exterior by contrasting burnished and unburnished surface texture in bands (4 sherds, pl. 157m) or a dentate pattern (1 sherd, pl. 157n). In the banded variety, burnishing may overlap a band of red slip and extend about 5 mm. beyond the margin of the slip. Three sherds from G–110, Cut 1, Level 50–70 cm.; one sherd from Cut 2, Level 0–20 cm.; one sherd from Cut 2, Level 20–40 cm.

POLISHED GROOVE.—One small polished black sherd shows polished grooves about 4 mm. wide possibly delimiting bosses or similar protrusions. G–110, Trench 1.

RED GROOVE.—One body sherd has broad (4 mm.) shallow grooves running parallel, 6–7 mm. apart on the exterior. Grooves are red slipped, the red overlapping slightly onto the adjacent surface. Both surface and grooves are polished. M–28, Cut 1, Level 0–20 cm.

RED AND BLACK PAINTED.—Large body sherd with zone of narrow red bands bordered by two black bands and a single undulating band. Band width 2–5 mm. Polished after painting but not blurring painted edges. One sherd from G–110, Cut 2, Level 20–40 cm.

STRIATED POLISHED BANDING.—Several sherds have horizontal polishing striations that segregate into bands, an effect that may not be intentional. One example each from G–110, Cut 1, Level 30–50 cm., Level 50–70 cm., and G–110, Trench 1.

ZONED RINGS.—One sherd has a narrow band of deeply incised crosshatch at the upper end, corresponding to the base of the neck of the vessel, and zones of probable trianguloid form drawn with fine incisions and filled with irregularly circular rings 2.5–4.0 mm. in diameter (pl. 157o). The surface is superficially polished, leaving flaws. One example from G–110, Cut 2, Level 0–20 cm.

Trade Pottery of Valdivia Phase Origin

Sherds of Valdivia Phase types, both plain and decorated, occur in small numbers in all of the Machalilla Phase sites. Plain sherds show the typical irregular fracture of Valdivia Phase pottery. A diagnostic body sherd is a concave base (pl. 116q). The following types are represented (see Valdivia Phase type descriptions for details):

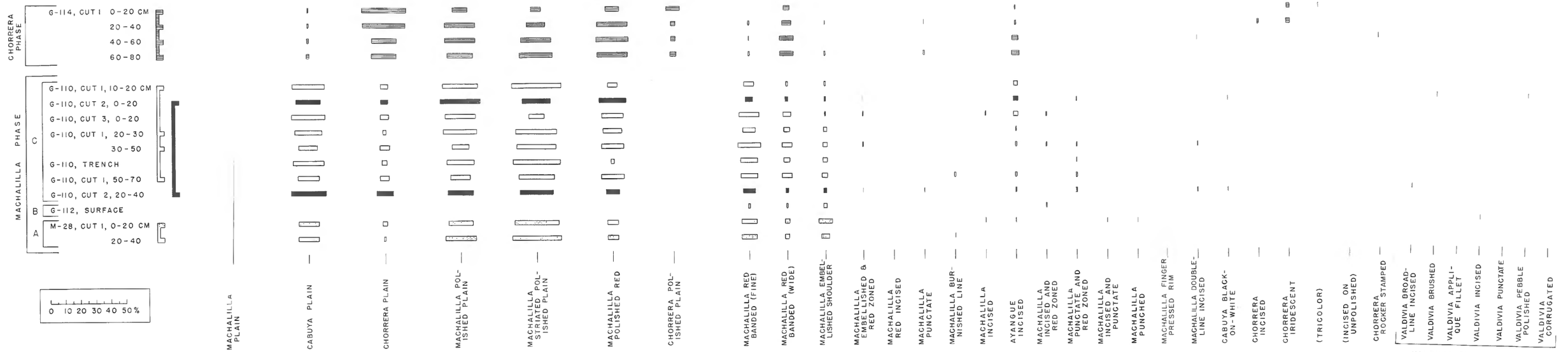

FIGURE 89.—Seriation of Machalilla Phase sites on the basis of changes in pottery type frequency (Appendix 1, table 16). G–114, Cut 1, representing the early Chorrera Phase, is added to show persistence of Machalilla Phase pottery types.

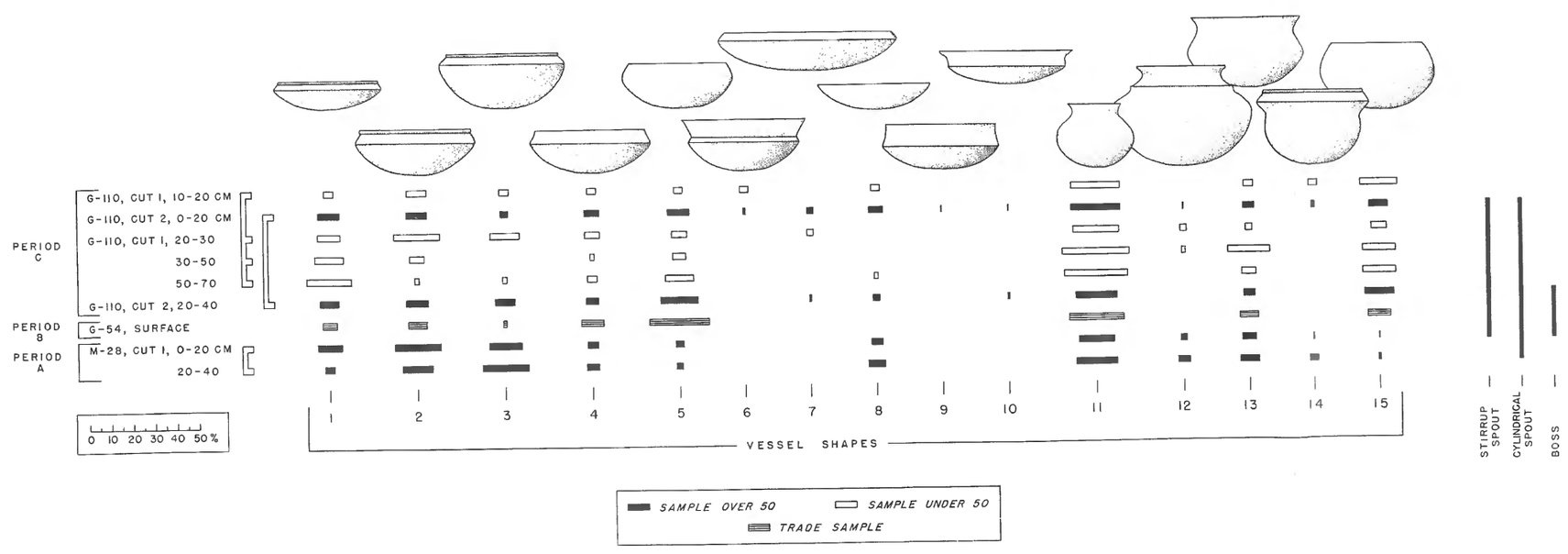

FIGURE 90.—Temporal distribution of vessel shapes of Machalilla Phase pottery types. Sites and levels are arranged in the seriated order indicated by changes in pottery type frequency. Shapes represent grouping of similar rim profiles in the various pottery types (Table F and Appendix 1, Table 15). Vertical bars connect earliest and latest occurrence of unusual appendages. The sample of Machalilla Phase trade pottery from the Valdivia Phase site of G–54 replaces G–112 to represent Period B, since no rim analysis was available for the small sample from G–112.

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Valdivia Applique Fillet (pl. 116a).
Valdivia Brushed (both varieties) (pl. 116 b–c).
Valdivia Broad-line Incised (pl. 116 d–e, h).
Valdivia Corrugated (pl. 116 f–g).
Valdivia Incised (pl. 116 i, m–n).
Valdivia Pebble Polished (pl. 116 j–k).
Valdivia Pseudo-Corrugated (pl. 116o).
Valdivia Punctate (pl. 116p).

Pottery of Probable Trade Origin

Four sherds are ornamented with deep circular punctates in zones bounded by bold incised lines. Punctates are 2–3 mm. in diameter, about 2 mm. deep, with a flat bottom, and spaced randomly 2–3 mm. apart, 3–6 mm. apart, or 6–9 mm. apart on different examples. Incisions are 1–2 mm. wide, about 1 mm. deep, U-shaped in cross section, boldly drawn with a single stroke or series of short strokes. Designs are composed of curvilinear zones outlined with incision and filled with punctations on the exterior of open bowls (pl. 158 g–h) or rounded jars (pl. 158i), both of forms unrepresented in other pottery of the Machalilla Phase. Surface is brown to black, with frequent fire clouding. Finish is uneven although polished or striated polished, with striations running vertically on the exterior of the bowls. Body wall thickness is 7–9 mm. Bowl rims are outsloping, direct, tapering slightly toward the rounded lip. Diameter is 10–14 cm. Two bowl sherds from M–28, Cut 1, Level 0–20 cm., one bowl sherd from G–110, Cut 2, Level 20–40 cm., one jar body sherd from G–110, Surface.

The Seriated Ceramic Sequence and Its Implications

The seriated sequence of the Machalilla Phase is based on pottery type frequencies from levels of M–28, Cut 1; G–110, Cuts 1 and 2, and three samples not of stratigraphic origin. G–110, Cut 3 is represented only by Level 0–20 cm., because a preliminary classification of this cut in Ecuador drew slightly different boundaries between plain types than were finally adopted, making the existing data unusable in the seriated sequence. The material collected from G–110, Trench, although not segregated by artificial levels, has been interdigitated to provide a basis for evaluating the general chronological position of shell, bone and stone artifacts from this provenience. The surface collection from G–112, although badly eroded, provides an indication of a transitional period between early and late parts of the sequence.

In assembling the seriation chart, the levels of the various cuts were first arranged in stratigraphic order within each cut. Since the cuts at G–110 showed similar frequencies, they were interdigitated. Next, the samples from G–112 and G–110, Trench were placed where they seemed best to fit the trends. When M–28, Cut 1 was added, it clearly belonged at the bottom of the sequence. The resulting graph (fig. 89) shows relatively little change in the plain types, with the exception of Machalilla Plain, which is most abundant at the beginning of the sequence. In decoration, Machalilla Red Banded, both narrow and wide varieties, and Machalilla Embellished Shoulder are the most common types throughout the sequence, although Machalilla Embellished Shoulder declines slightly from a maximum popularity in the earliest levels. Ayangue Incised shows a small but steady growth from early to late. Of the minor decorated types, several appear to be absent in the earliest levels, although in some cases this may be the result of small size of the sample. However, the failure of Machalilla Double-line Incised, Ayangue Incised, Machalilla Incised and Red Zoned, and Machalilla Punctate and Red Zoned to be represented (except for a single aberrant sherd of each of the latter three types, to be discussed later) at M–28 is probably indicative of the true situation, since these four decorated types are also absent from a much larger sample from surface collections and other tests.

The abrupt beginning of Machalilla Double-line Incised and Ayangue Incised in the earliest seriated level at G–110 suggests a gap in the existing sequence. Absence of the former type at G–112 might be explained by the small size of the sample, which lacks several other minor types present both earlier and later (such as Machalilla Incised, Machalilla Finger Punched and Machalilla Burnished Line, identified with question marks on fig. 91). On the other hand, the abundance of Machalilla Double-line Incised among sherds of Machalilla Phase origin from the Valdivia Phase site of G–54 suggests that it was a popular decorated type at the time of contact. Since the levels included in the seriation show a declining trend, the only place where greater frequency would fit the chart is prior to the occupation of G–110, or precisely in the region where the existing sample is most inadequate. Since Machalilla Red Incised, which combines single-line incision with a red-slipped surface, is present from the beginning of the Phase, Machalilla Double-line Incised can be postulated as a local innovation principally characterized by the substitution of a double for a single incised line.

The origin of Ayangue Incised may reflect outside influence. It is not represented among trade sherds at G–54, suggesting that it was either not present or not important at that time. By the occupation of G–110, it has become one of the principal decorated types. A single sherd of aberrant execution from M–28 could be interpreted as a crude early form, but the absence of intervening examples makes its insig-

nificance difficult to evaluate. The close similarity of Ayangue Incised technique, motif and vessel shape to incised styles of Mesoamerica (see p. 173) and absence of the type from the early part of the Machalilla Phase, seem to favor attributing its appearance to foreign contact. Absence of antecedents in the form either of white slip or black painting argue for a similar explanation for the appearance of Cabuya Black-on-White at about the same time. Whether Chorrera Incised and Cabuya Finger Pressed Rim are local developments or not is arguable but not demonstrable at the present time.

TABLE F.—*Correlation between vessel shapes of Machalilla Phase pottery types and generalized forms recognized for the Machalilla Phase*

Generalized Form	Constituent Forms
1: Carinated Bowl, High Thickened Shoulder	Ayangue Incised, Form 1 Machalilla Embellished Shoulder, Form 1 Machalilla Red Banded, Form 1 Machalilla Polished Red, Form 1 Machalilla Striated Polished Plain, Form 1
2: Carinated Bowl, Thickened Shoulder	Ayangue Incised, Form 2 Machalilla Double-line Incised, Form 1 Machalilla Embellished Shoulder, Form 2 Machalilla Incised, Form 3 Machalilla Red Banded, Form 2 Machalilla Red Incised, Form 2 Machalilla Polished Plain, Form 3 Machalilla Striated Polished Plain, Form 5
3: Carinated Bowl, Unthickened Shoulder	Machalilla Double-line Incised, Form 2 Machalilla Embellished Shoulder, Form 3 Machalilla Red Banded, Form 3 Machalilla Striated Polished Plain, Form 4
4: Carinated Bowl, Concave Upper Wall	Ayangue Incised, Form 3 Cabuya Plain, Form 2 Machalilla Double-line Incised, Form 3 Machalilla Embellished Shoulder, Form 4 Machalilla Incised and Red Zoned, Form 1 Machalilla Punctate and Red Zoned, Form 1 Machalilla Red Banded, Form 5 Machalilla Polished Plain, Form 1 Machalilla Polished Red, Form 4 Machalilla Striated Polished Plain, Form 3
5: Carinated Bowl, Convex Upper Wall	Cabuya Plain, Form 1 Chorrera Plain, Form 2 Machalilla Double-line Incised, Form 4 Machalilla Embellished Shoulder, Form 5 Machalilla Red Banded, Form 6 Machalilla Polished Plain, Form 2 Machalilla Polshed Red, Form 3
6: Angular Bowl	Ayangue Incised, Form 5
7: Carinated Bowl, Triangular Rim Cross Section	Machalilla Red Banded, Form 4 Machalilla Polished Red, Form 2 Machalilla Striated Polished Plain, Form 2
8: Open Bowl Direct Rim	Cabuya Black-on-White, Form 1 Machalilla Finger Punched, Form 1 Machalilla Red Banded, Form 7 Machalilla Plain, Form 2 Machalilla Striated Polished Plain, Form 7
9: Carinated Bowl, Low Shoulder	Ayangue Incised, Form 4 Machalilla Incised, Form 2 Machalilla Red Incised, Form 1
10: Everted Rim Bowl	Ayangue Incised, Form 6 Cabuya Finger Pressed Rim, Form 2
11: Narrow-mouthed, Everted Rim Jar	Cabuya Plain, Form 5 Chorrera Plain, Form 5 Machalilla Double-line Incised, Form 7 Machalilla Red Banded, Form 12 Machalilla Polished Plain, Form 5 Machalilla Polished Red, Form 6 Machalilla Striated Polished Plain, Form 9
12: Shouldered-neck Jar	Machalilla Embellished Shoulder, Form 8 Machalilla Red Banded, Form 12
13: Wide-mouthed, Everted Rim Jar	Ayangue Incised, Form 7 (?) Cabuya Plain, Form 4 Chorrera Plain, Form 4 Machalilla Embellished Shoulder, Form 7 Machalilla Incised and Red Zoned, Form 3 Machalilla Punctate and Red Zoned, Form 3 Machalilla Red Banded, Form 11 Machalilla Plain, Form 1 Machalilla Polished Red, Form 7 Machalilla Striated Polished Plain, Form 8
14: Cambered Rim Jar	Ayangue Incised, Form 8 Machalilla Embellished Shoulder, Form 6 Machalilla Red Banded, Form 10
15: Constricted Rim Jar	Ayangue Incised, Form 9 (?) Cabuya Plain, Form 3 Chorrera Plain, Form 3 Machalilla Double-line Incised, Form 5 Machalilla Incised and Red Zoned, Form 2 Machalilla Punctate and Red Zoned, Form 2 Machalilla Red Banded, Forms 8 and 9 Machalilla Polished Red, Form 5 Machalilla Striated Polished Plain, Form 6
Unclassified	Cabuya Finger Pressed Rim, Forms 1 and 3 Chorrera Plain, Form 1 Machalilla Double-line Incised, Form 6 Machalilla Incised, Form 1 Machalilla Polished Plain, Form 4 Machalilla Striated Polished Plain, Form 10

Period Divisions	Decorated Types																Plain Types					
	Machalilla Incised and Punctate	Machalilla Punctate	Machalilla Embellished Shoulder	Machalilla Embellished and Red Zoned	Machalilla Incised	Machalilla Red Banded	Machalilla Finger Punched	Machalilla Red Incised	Machalilla Burnished Line	Machalilla Incised and Red Zoned	Machalilla Punctate and Red Zoned	Ayangue Incised	Machalilla Double-line Incised	Chorrera Incised	Cabuya Black-on-White	Cabuya Finger Pressed Rim	Machalilla Plain	Machalilla Striated Polished Plain	Machalilla Polished Plain	Cabuya Plain	Chorrera Plain	Machalilla Polished Red
C		☐	☐	☒	☒	☒	☐	☐	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒
B		☐	☐	☐	(?)	☒	(?)	☐	(?)	☐	☐	(?)	(?)				☐	☒	☒	☐	☐	☐
A	☒	☐	☒	☐	☐	☒	☐	☐	☐								☒	☒	☒	☐	☐	☐

FIGURE 91.—Chronological distribution and period of maximum frequency of Machalilla Phase pottery types.

Machalilla Incised and Red Zoned and Machalilla Punctate and Red Zoned seem explicable as local evolution. Both the technique of red banding or zoning and the techniques of incision and punctation occur earlier in the seriated sequence. Rare sherds from M–28 represent the aberrant later variety, in which a single incision or row of punctates or both alternates with a red band. This is a logical ancestor for both types, which are distinguished principally by the fact that one employs punctation and the other incision. Decorative motifs and vessel shapes are essentially the same, and resemble those of Machalilla Red Banded.

In order to observe whether any important changes took place in vessel shape, totals of the principal forms represented in the various pottery types were compiled (table F) and the relative frequency per level calculated. When the levels were arranged in the order indicated by the pottery type seriation, a few significant differences became apparent (fig. 90; Appendix 1, table 15), in spite of the small size of the rim sample from many levels. Carinated bowls of Forms 2 and 3 are most popular during Period A, as is jar Form 12. Unfortunately, no rim analysis is available for the sample from Period B. Bowls of Forms 6, 7, 9 and 10 are restricted to Period C, and can be viewed as diagnostic of the late Machalilla Period. Bowls of Forms 5 and 15, although present throughout, are more popular in Period C than in Period A. Stirrup and cylindrical spouted jars are also present during the entire duration of the Machalilla Phase.

Calculation of the relative frequency of decorated sherds during Periods A and C shows a slight difference, but one that may not be culturally significant. In Period A levels of M–28, decorated sherds represent 21.6 percent of the total pottery, while in Period C levels at G–110 they account for 18.2 percent. The frequency of sherds of Valdivia Phase trade pottery declines from 0.7 percent in Period A to 0.2 percent in Period C.

The distribution of the various pottery types on the seriated chart, supplemented by the above inferences, makes it possible to suggest a three-fold subdivision of the Machalilla Phase sequence (fig. 91).

Period A, represented at M–28, is characterized by the presence of Machalilla Incised and Punctate, and the maximum popularity of Machalilla Embellished Shoulder. Five other decorated types present throughout the Phase have their inception at this time: Machalilla Punctate, Machalilla Embellished and Red Zoned, Machalilla Incised, Machalilla Red Banded, Machalilla Finger Punched, Machalilla Red Incised, and Machalilla Burnished Line. All plain types are present, the diagnostic one being Machalilla Plain.

Period B, represented only by the small surface collection from G–112, is transitional and not characterized at present by exclusive occurrence of any

decorated or plain type. Machalilla Incised and Punctate is absent, and two late types (Machalilla Incised and Red Zoned, Machalilla Punctate and Red Zoned) make their appearance in characteristic form. Machalilla Double-line Incised is probably present; the occurrence of Ayangue Incised is less certain. All plain types continue to be made, with little change in relative frequency, to judge by proportions at beginning of Period C.

Period C is characterized by further proliferation in decorated types. Most popular are Ayangue Incised, and Machalilla Double-line Incised, while Chorrera Incised, Cabuya Finger Pressed Rim and Cabuya Black-on-White occur sporadically. All Period B decorated and plain types continue, Chorrera Plain, Cabuya Plain and Machalilla Polished Red showing slight increases in popularity.

Figurines

Pottery figurines are rare, but distinctive in appearance. None is complete. Available fragments suggest a high degree of standardization in execution.

Machalilla

MATERIAL: Pottery containing sand temper, grains to 1 mm. diameter.

METHOD OF MANUFACTURE: Slab of clay worked into rectanguloid form, flattened at the top to produce a head that is wider in front view but thinner than the body in profile. Breaks at torso and legs do not show clean edges indicative of addition, but kneading may have been sufficiently thorough to obliterate such evidence. There is no longitudinal fracture or other indication of double-coiled construction utilized for manufacture of Valdivia Phase figurines. Eyes and nose are added as applique and may slough off cleanly.

SURFACE TREATMENT: Superficially smoothed to even but not polished. Vertical smoothing tracks sometimes remain visible. Finish is best on painted examples; others may remain uneven and sandy in texture because of protruding temper grains. Incomplete oxidation in firing leaves the surface light orange to medium gray.

ANATOMICAL FEATURES (fig. 92; pl. 158 a–d):

Head: Flattening of the upper end produces a head slightly wider than the body in front view but thinner in profile and tapering to a rounded edge. In outline, the head is rounded at the sides and rounded or flattened at the top. Maximum width ranges from 2.5–4.7 cm. Eyes are circular to ovoid pellets, 8–10 mm. in diameter and 3–4 mm. high, appliqued to the surface, but not smoothed over to obliterate the junction. A shallow to deep incision extends from one side to the other approximately through the center of each pellet. Placement of the eyes is high, leaving almost no forehead. The nose is a narrow ridge, broadest at the central base and tapering toward ends and summit. Length is 1.3 cm., maximum width 4–5 mm., height 4–5 mm. One fragment suggests a mouth similar in form to the eyes; on two other examples no mouth is indicated. A row of up to five small perforations may run along the sides of the head. One example has narrow red banded decoration on the back of the head, a broader band across the forehead, and three stripes running down from the eye (fig. 92).

Torso: The only example shows a torso greatly shortened in proportion to the head. Width is 2.2 cm., thickness (front to back) 1.8 cm.

Legs: Two legs represent figurines of larger size than the heads. Both are cylindrical, expanding slightly at the bottom to the flattened foot. Leg diameter is 2.4 by 2.7 cm. Vertical red-banded decoration occupies the sides and rear of one.

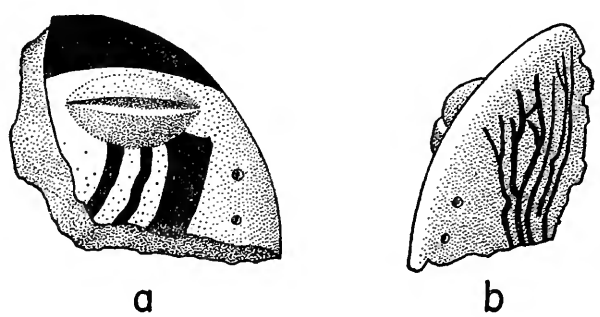

FIGURE 92.—Fragmentary head of a Machalilla type figurine from M–28 (after Estrada, 1958, fig. 34–2).

DIMENSIONS: No complete examples have been recovered. Head width ranges from 2.5–4.7 cm. Relative proportions of existing examples suggest a minimum size range of 4–15 cm.

CHRONOLOGICAL POSITION OF THE FIGURINE TYPE: Present throughout the Machalilla Phase. Although painted fragments are so far represented only at the earliest site, M–28, the sample is too small to conclude that they are confined to this part of the seriated sequence.

Figurines of Trade Origin

Two fragments of figurines recovered from G–110, Cut 2, Level 20–40 cm. are of indisputable Valdivia Phase origin. One is part of a torso showing the characteristic curve of the side from shoulder to hip and the diagnostic polished red surface associated with the San Pablo Type (pl. 158e). The other is the lower part of a figurine of the Buena Vista Type, with an unpolished gray surface and two legs tapering toward the foot (pl. 158f).

Worked Sherds

Worked sherds fall into two classes: scrapers and disks, the latter by far the most common.

Disks

PLATE 159 A–M

Seventy sherd disks were recovered from Machalilla Phase excavations. Nearly half represent Machalilla Striated Polished Plain, another 25 percent Machalilla Polished Red, with the remainder made up of Machalilla Red Banded, Machalilla Polished Plain and Cabuya Plain. Form is generally circular, but only 16 have smooth edges ground perpendicularly to the faces; the remainder vary from irregular to jagged. Size is a constant gradation from a maximum diameter of 7.2 cm. to a minimum of 2.3 cm. Sherds with slight curvature were selected so that most disks are not markedly concavo-convex. Thickness is correlated with pottery type and location on the body wall, and ranges from 5 mm. for the thinnest disks to 8 or 10 mm. for the thickest. Function of the disks is speculative, but it may be significant that the Machalilla Phase marks the first appearance of narrow mouthed jars for which sherd disks were often used as stoppers in later periods on the Ecuadorian coast.

Scrapers

PLATE 159 N–Q

Five sherds of Machalilla Polished Plain and Machalilla Striated Polished Plain have one straight slightly beveled edge produced by abrasion. The bevel slopes toward the polished exterior surface. Width of the edge is 2.5–6.5 cm. Sherds are rectanguloid in outline but not consistently shaped.

DIAGNOSTIC FEATURES AND PERIOD SUBDIVISIONS OF THE MACHALILLA PHASE

The only two sites where the Machalilla Phase has been reported in detail are M–28 and G–110. The former occupies a hill near the shore; the latter is on a high cliff overlooking the ocean. Refuse is 40–80 cm. in depth and contains large amounts of shell, fireburnt rocks, and mudstone fragments in addition to sherds, stone and shell artifacts. With the exception of one deer bone and three fragments identified as sea turtle, all the bones were from fish. Wattle and daub construction is indicated by fragments of clay with twig and cane impressions. No post holes, hearths or other features indicative of habitation structures were observed. These characteristics resemble those of Valdivia Phase refuse, and many of the inferences about perishable associated elements may be valid for the Machalilla Phase also.

Stone tools are unshaped except for a working surface or edge, and mostly take the form of cobbles and cobble fragments used as hammerstones, choppers, and blades. A few types, such as "Jaketown perforators", gravers and abraders may have been used for bone and woodworking, and other types, such as reamers and saws, have been equated with shell fishhook manufacture. None of the tools show pressure flaking to improve the working edge. Sinkers are not represented in the stone artifact inventory, but since they are exceedingly rare in Valdivia Phase refuse in spite of the large amount of digging, this cannot be interpreted as reliable evidence of their absence in the culture. One large grinding stone suggests processing of some kind of seed or grain.

The most distinctive shell artifact is a large circular fishhook, 4.0–6.5 cm. in maximum diameter, cut and shaped from pearl oyster. Smaller hooks resembling those of the Valdivia Phase occur, but are less common. Shell was rarely used for personal ornament, the only objects in this category being a single disk-shaped bead and a fragment identified as part of a narrow bracelet. The only bone or tooth object is the curved end of a canine of some carnivore cut and perforated for suspension. This scarcity suggests that personal adornment was principally with perishable materials, an inference that is supported by hunks of hematite and limonite that could have been used for body painting.

The outstanding category of material culture represented in the archeological remains is pottery. Both plain and decorated sherds are typically thin walled, but with high tensile strength and not easily broken. Surfaces tend to be smooth and are often polished. Decoration is by a few well defined techniques, including incision, punctation, gashing or nicking, applique nubbins, and red banding or zoning. Red banding, produced by application of bands of thick red clay (probably the same material used for red slipping of the entire surface) and subsequently polishing with horizontal strokes often causing "blurring" of the margins of the bands, is the most popular method of decoration throughout the duration of the Phase. Also common is embellishment of the shoulder of bowls and jars with a row of nicks, notches or small bumps. Red zones not bounded by incisions alternate with zones of punctation or incised lines on the shoulders of some bowls. Bowl and jar forms cluster into a small number of well defined shapes characterized by angularity of the shoulder. Both cylindrical

and stirrup-spouted jars are characteristic. Jars in general tend to have small orifices, suggesting that the large number of sherd disks may have served as stoppers in accord with the practice in later periods on the Ecuadorian coast.

Evidence of ceremonial elements in Machalilla Phase culture is minimal. Although 18–22 percent of the sherds bear decoration, there is no indication that decorated vessels were intended for any but domestic functions. Pottery figurines are rare, crude and stylized. The surface may be plain or decorated with narrow red bands. The lesser frequency of figurines here than in the Valdivia Phase may imply a difference in function, although the presence of several fragments of Valdivia Phase types in Machalilla Phase refuse might be interpreted as evidence that similar beliefs were prevalent.

Fragmentary remains of two burials from the refuse of G–110 suggest that here as in the Valdivia Phase interment in the village was one method of disposal of the dead. One skeleton had leg bones sufficiently well preserved to show a tightly flexed position. Perhaps the most interesting information provided by these burials is deformation of the skull, a practice not represented in any of the Valdivia Phase skulls (see Appendix 2, p. 229). No grave offerings were associated.

All of the Machalilla Phase sites produced sherds of Valdivia Phase pottery types, but although vessel shapes and decoration are quite different, there is no indication of any acculturation in Machalilla Phase pottery as a result of this familiarity with an alien style.

Although the duration of the Machalilla Phase is relatively short compared with that of the Valdivia Phase, there is sufficient change in pottery types to permit subdivision into three periods. The intermediate Period B is poorly defined, but differences between Period A and Period C are clearcut. Machalilla Incised and Punctate is limited to Period A, while Ayangue Incised, Machalilla Double-line Incised, Machalilla Finger Pressed Rim, Machalilla Zoned Burnished and Cabuya Black-on-White are limited to Period C. Bowl Forms 6, 7, 9, and 10 are also time markers for Period C.

The termination of the Machalilla Phase seems to have been accomplished by an influence received from Mesoamerica, bringing new traits that amalgamated with those of the Machalilla Phase to produce a new configuration, designated as the Chorrera Phase. The continuation of the earlier traditions in potterymaking is clearly evident when early Chorrera Phase levels are added to the top of the Machalilla Phase seriated sequence (fig. 89). A few Machalilla Phase decorative techniques and motifs survive even into the later Regional Developmental ceramic complexes, providing a thread of continuity in the diversity of regional styles.

Relative and Absolute Dating of the Valdivia and Machalilla Phases

Two kinds of dating can be used to estimate the beginning and end of the Valdivia and Machalilla Phase seriated sequences, and to measure the duration of their contemporary existence on the Ecuadorian coast. One is the archeological evidence from stratigraphy and pottery exchanged between the two Phases. The other is a large series of carbon-14 dates from Valdivia Phase levels, representing Periods A–C, and a smaller number from the late Machalilla Phase. These two sources of information agree very well in establishing the relative durations of the two Phases.

All the seriated sequences for the Valdivia Phase show sherds of Machalilla Phase pottery types in levels corresponding to Periods C and D (figs. 49–50, 52–53). In addition to plain sherds, including stirrup spout fragments, types identified from early Period C are Machalilla Incised and Machalilla Red Banded (both wide and narrow). During late Period C, the following additional types are represented: Machalilla Incised and Red Zoned, Machalilla Punctate and Red Zoned, Machalilla Embellished Shoulder, Machalilla Doubled-line Incised, and Ayangue Incised. Of these only Machalilla Red Banded and Machalilla Embellished Shoulder were identified in Period D refuse at G–84. Ayangue Incised is very rare, and restricted to G–31, where it can be equated with a late Period C or early Period D reoccupation of that site.

The chronological position of the above pottery types in the Machalilla Phase sequence (fig. 89) is similar. Machalilla Incised and Machalilla Red Banded are present throughout, as is Machalilla Embellished Shoulder. Machalilla Incised and Red Zoned and Machalilla Punctate and Red Zoned have their inception in Period B and increase in popularity during Period C. Machalilla Double-line Incised and Ayangue Incised are restricted to Period C in the present sample, but their relatively high frequency in the earliest level equated with this Period suggests a beginning during Period B. These correspondences suggest that Machalilla Period A can be correlated with the first half of Valdivia Period C, Machalilla Period B with the second half of Valdivia Period C, and Machalilla Period C with the end of Valdivia Period C and Period D. The absence of Ayangue Incised in the large sample of trade sherds from G–54 is inexplicable if the contact here dates from Machalilla Period C, since it is one of the most attractive and common of the decorated types at that time. On the other hand, abundance of Machalilla Double-line Incised rules out correlation of the occupation at G–54 with Machalilla Period A, where it does not occur.

The order of appearance of these pottery types in the Machalilla Phase seriated sequence differs from that in the Valdivia Phase in one principal respect: in the former, Machalilla Double-line Incised and Ayangue Incised appear to begin simultaneously with Period C, while among trade types Machalilla Double-line Incised is earlier and more abundant than Ayangue Incised. In fact, Machalilla Double-line Incised was so popular with residents at G–54 that a larger sample is available from this Valdivia Phase site than from all the Machalilla Phase sites put together. Unfortunately, Machalilla Period B is at present represented only by a small and badly eroded surface collection, in which neither of these decorated types occurs. While a final verdict must await further investigation, the evidence strongly suggests that trade relations at G–54 were with an undiscovered Machalilla Period B site, where Machalilla Double-line Incised was being made, but not Ayangue Incised.

Additional support for correlation between Machalilla Period B and late Valdivia Period C comes from analysis of the vessel shapes represented by sherds of Machalilla Phase origin at G–54. When relative frequency is plotted, the result seriates best between the upper level of Period A and the lowest level of Period C, filling the gap left by absence of

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information on vessel shape at the single Period B site (fig. 90). Although trends in some of the popular shapes are not conclusive, absence of late Forms 6, 7, 9, and 10 favors this seriated position for the G–54 trade material.

When we turn to an examination of the Valdivia Phase pottery types represented in Machalilla Phase refuse, we find that Valdivia Incised, Valdivia Broad-line Incised, Valdivia Brushed and several of the unslipped plain types occur throughout the Machalilla Phase seriated sequence. One sherd of Valdivia Punctate and several corrugated sherds of possible Valdivia Phase origin come from Machalilla Period A levels. Valdivia Applique Fillet and Valdivia Pebble Polished are restricted to levels seriating in the latter part of Period C (fig. 89). Motifs and vessel shapes include several diagnostic of the late Valdivia Phase. Nothing in this combination of pottery types is in contradiction with a Valdivia Period C dating for their origin. Valdivia Brushed, Valdivia Incised and Valdivia Broad-line Incised are the dominant decorated types at this time, while Valdivia Pebble Polished attains its maximum popularity during Period C. Valdivia Applique Fillet is most typical during late Period C and Period D. Plain corrugation, while diagnostic of Periods A and B continues during Period C, as does the type of punctation exemplified by the trade sherd. The presence of these latter two types could be used to argue that contact between the two Phases began toward the end of Valdivia Period B, and until more sites are represented in the Machalilla Phase seriated sequence this possibility cannot be excluded.

Analysis of the trade sherds suggests a correlation between the Valdivia and Machalilla Phases similar to that shown on figure 93. The beginning of the Machalilla Phase seems to equate approximately to the transition between Valdivia Periods B and C, and coexistence continues until the end of both Phases. During Valdivia Period C considerable amounts of pottery were exchanged, but there is no evidence during this time of any acculturation in either ceramic tradition as the result of exposure to strikingly different vessel shapes and decorative styles. During this period, the two Phases were in close geographical association, facilitating trade relations. With the advent of Period D, the Valdivia Phase population moved toward the south and became centered in the vicinity of the modern town of Posorja, and although the Machalilla Phase also extended its zone of occupation southward, it appears to have reached only the Santa Elena Peninsula. This geographical separation probably partly accounts for the decline in abundance and variety of trade sherds in late levels of both Phases. In the Machalilla Phase, frequency drops from 0.7 percent in Period A to 0.2 percent in Period C.

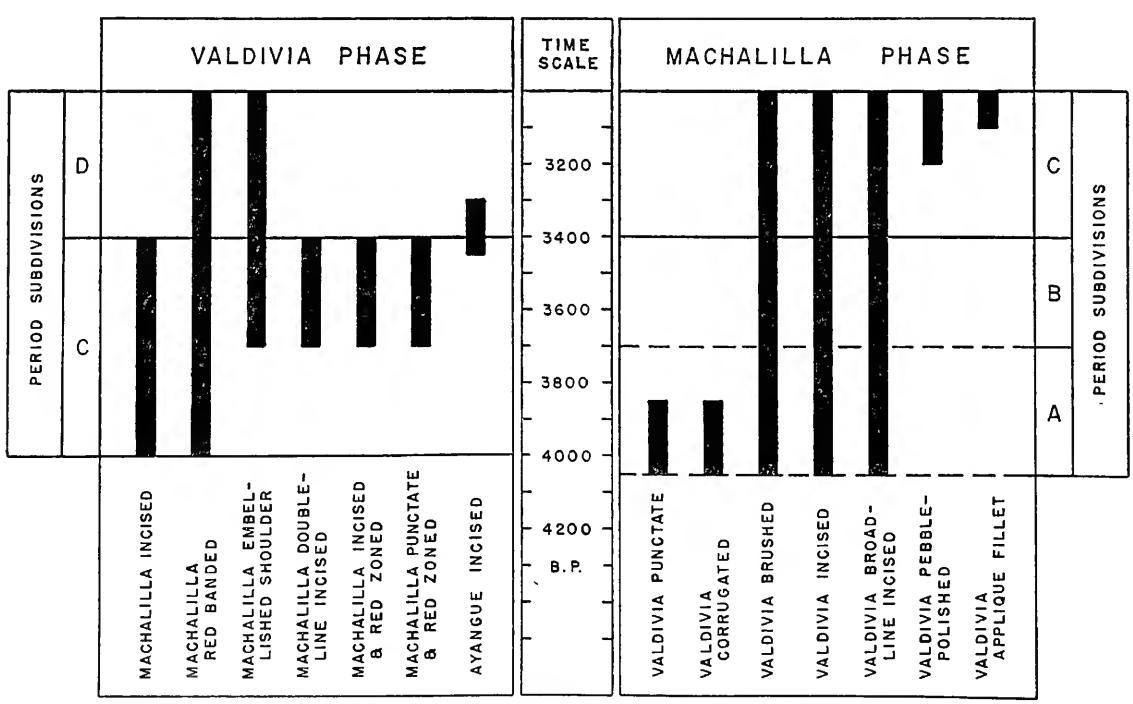


FIGURE 93.—Period distribution of pottery types of Machalilla Phase origin in Valdivia Phase sites and of Valdivia Phase origin in Machalilla Phase sites. (Distribution of sherds by levels is given on figs. 49–50, 52–53, 89.)

The seriated sequences of the two Phases and their correlation provide a chronological framework for judging the validity of the large series of carbon-14 dates (figs. 49, 50, 52). When the dates are arranged in the order indicated by seriation of pottery type frequencies (table G), the result is not consistent. Twelve dates represent Period A, five from charcoal samples and seven from shell samples. There is almost no overlap; four of the charcoal dates being older than all but one of the shell dates. Furthermore, the oldest date in each group comes from the uppermost level assigned to the Period. Of the six samples between 4100 and 4190 years, one is from Period C, two are from Period B, and the remaining three represent late, middle and early Period A. Although an increasing antiquity can be recognized if the dates for each Period are averaged (3900 years ago for Period C, 4268 for Period B, 4399 for Period A), such a solution does not take into consideration possibilities for error that may make some dates less reliable than others for determining the span of time represented by different portions of the Valdivia Phase sequence.

One means of evaluating the dates is to place them in their actual stratigraphic position with reference to one another. The dated levels represent four excavations at G–31 and one at G–54. Three of the G–31 excavations (Cut A, Cut J–D and Cut J–E) are adjacent and depths are more or less equivalent, although their exact correlation was not recorded during the fieldwork. Cut H was some distance away, and can be aligned with the other three G–31 cuts only on the basis of pottery type seriation. It in turn can be aligned with G–54, Cut 1, by the same means. When these relationships are diagrammatically expressed (fig. 94), apparent inconsistencies in the dates can be appraised.

One potential source of error is immediately suggested by the sloping contour of the period alignment of levels in the refuse of G–31, Cuts A and J. These are in the deepest part of the site, at the edge of the natural knoll that underlies the rest of the area of occupation. As the refuse rolled down the slope, it built gradually outward, an inference indicated by the pronounced disconformity between Sections D and E at the end of Period A, which decreases slightly

TABLE G.—*Carbon-14 dates for complexes of the Early Formative Period.*

Provenience (Levels in Seriated Sequence)	*Material*	*Date (B.P.)*	*Phase*	*Subperiod*
G–110 Cut 2 Level 0–20 cm.	Charcoal	3320±170 (SI–107)	Machalilla	C
Level 20–40 cm.	Shell	2830±45 (SI–67)	Machalilla	C
Level 20–40 cm.	Charcoal	2980±160 (SI–108)	Machalilla	C
G–54 Cut 1 Level 60–80 cm.	Shell	3450±50 (SI–69)	Valdivia	C
Level 100–130 cm.	Shell	4040±55 (SI–71)	Valdivia	C
G–31 Cut H Level 20–40 cm.	Shell	4140±60 (SI–80)	Valdivia	C(B)*
Level 80–100 cm.	Shell	3970±65 (SI–78)	Valdivia	C
Level 120–130 cm.	Shell	4050±200 (W–630)	Valdivia	B
Level 120–130 cm.	Shell	4170±65 (SI–85)	Valdivia	B
Level 130–140 cm.	Shell	4390±60 (SI–84) 4540±150 (re–run SI–84)	Valdivia	B (A)
G–31 Cut A Level 120–140 cm.	Shell	4190±200 (W–632)	Valdivia	B
Level 160–180 cm.	Shell	4530±55 (SI–83)	Valdivia	A
Level 180–200 cm.	Shell	4120±65 (SI–82)	Valdivia	A (B)
G–31 Cut J Section E				
Level 360–390 cm.	Charcoal	5150±150 (M–1320)	Valdivia	A
G–31 Cut A Level 200–220 cm.	Shell	4270±60 (SI–81)	Valdivia	A (B)
G–31 Cut J Section E				
Level 390–420 cm.	Shell	4220±100 (SI–16)	Valdivia	A (B)
Level 390–420 cm.	Shell	4100±140 (M–1321)	Valdivia	A (B)
Level 390–420 cm.	Shell	4230±100 (SI–18)	Valdivia	A (B)
Hearth, 400 cm.	Charcoal	4620±140 (M–1322)	Valdivia	A
G–31 Cut A Level 400–420 cm.	Shell	4450±200 (W–631)	Valdivia	A
G–31 Cut J Section D				
Level 270–300 cm.	Charcoal	4480±140 (M–1317)	Valdivia	A
Level 300–330 cm.	Charcoal	4170±140 (M–1318)	Valdivia	A (B)
Level 300–330 cm.	Charcoal	4450±90 (SI–22)	Valdivia	A

*Identifications in parentheses indicate the probable subperiod represented by the date, reflecting mixture of the shell with sherd refuse of earlier or later Period affiliation.

by the end of Period B. Section E contains fewer levels corresponding to Period A than the adjacent excavations, and more levels corresponding to Period B than Section D, based on the pottery type seriation (fig. 50). When the carbon-14 dates are equated with the level from which the sample was obtained, there is a tendency toward clustering that permits rejection of some as less reliable than others. For example, although there are three determinations for shell samples from Cut J, Section E, Level 390–420 cm., and agreement between them is excellent, all three dates are far too recent for their stratigraphic context. Instead, they are within the range of dates derived from Period B and C levels of other excavations. Since these dates are from shell samples, it can be postulated that shells rolled down or were dumped down the slope during Period B to become mixed with the shallow Period A refuse in the area of Section E. The earlier date from this level as well as the one from the next level above, both derived from charcoal, can be accepted as valid for early Period A.

Another unacceptably recent date comes from Cut J, Section D, Level 300–330 cm. Two charcoal samples from this level were processed by different laboratories, and the resulting dates disagree by 280 years. The older one (4450 ± 90) is close to a date from the next level above (4480 ± 140), and both are in the range expected from their stratigraphic position in relation to acceptable dates from the bottom of Cut J, Section E. Consequently, the younger date can be rejected as not referring to Period A. The remaining discrepancy in the Period A dates is the unusually early determination (4530 ± 55) for a shell sample from Cut A, Level 160–180 cm., which corresponds ceramically to the end of Period A. It is within the range for the Period, however, and constitutes a problem only because it is stratigraphically above two levels with more recent dates (4120 ± 65, 4270 ± 60). This reversal can be explained by supposing that mechanical mixture caused concentration of earlier shells in the level. The two recent dates seem best equated with the beginning of Period B.

An interesting situation presents itself in the dates from Cut H, Level 120–140 cm. Analysis by two laboratories of a shell sample from the upper half of this level gave closely similar results: 4050 ± 200 and 4170 ± 65. A sample from the lower half of the level produced a date of 4390 ± 60, increased on rerun to 4540 ± 150. The earlier pair of dates falls within the range accepted for Period A and can be explained by the hypothesis that during this occupation shells were scattered up the hillside where they eventually became incorporated into later refuse. The more recent pair is in close agreement with a Period B date from Cut A, Level 120–140 cm. as well as with dates from levels higher up in Cut H, and consequently may be accepted as referring to the Period B occupation.

Three of the four dates for levels representing Period C are more recent than any other of the Valdivia Phase dates, and differ by a magnitude that seems reasonable in terms of the seriated sequence. The remaining date (4140 ± 60) is only slightly older but its stratigraphic occurrence above a date of 3970 ± 65 for the lower part of Cut H, along with its similarity to the more recent pair of dates from Level 120–140 cm. of the same excavation suggests it refers to the beginning rather than the middle of Period C. The two dates from G–54 are in proper stratigraphic order, and the more recent one has been accepted as approximating the end of Period C.

Adjustment of the discrepancies and projection of the acceptable dates onto a time scale suggests the Valdivia Phase periods are approximately as follows:

Period D 3400–3000(?) years ago
Period C 4000–3400 years ago
Period B 4300–4000 years ago
Period A 5000–4300 years ago

The only three dates representing the Machalilla Phase are all from the Machalilla Period C site of G–110, one from Level 0–20 cm. and two from Level 20–40 cm. of Cut 2 (table G). Ceramically, these levels seriate in the upper and lower portions of Period C, but pottery type frequency curves suggest little difference in time. The three dates encompass about 500 years, however. The two charcoal samples, representing a charred incrustation on the interior of sherds probably belonging to the same vessel, gave determinations of 3320 ± 170 years (SI–107) and 2980 ± 160 years (SI–108). Austin Long, who produced the dates, indicates that discrepancies of this magnitude can be expected about 30 percent of the time in multiple dating of a single sample and recommends a statistical averaging resulting in 3150 ± 160 as the most reliable estimate. The shell sample is close to the charcoal date for the same level, being 2830 ± 45 years (SI–67). The shell species, *Anomalocardia subrugosa*, is the one utilized for the Valdivia Phase shell samples.

In terms of the Valdivia Phase sequence, the earliest Machalilla Phase date appears to be generally correct. Assuming that the 3450 ± 50 date corresponds approximately to the end of Valdivia Phase Period C, the date of 3320 ± 170 for the inception of occupation at G–110 coincides with the ceramic evidence represented by the pattern of trade sherds. The Valdivia Phase site of G–54, from which the

above date was obtained, produced no sherds of Ayangue Incised among the trade material of Machalilla Phase origin. Since this decorated type is common at G–110, it was postulated (pp. 147–148) that occupation here postdated abandonment of G–54, an inference that is supported by all of the carbon-14 dates.

The time span suggested by the remaining Machalilla Phase carbon-14 dates at G–110 cannot be taken at face value in view of the contradictory nature of the results for samples from the same level and the lack of agreement between antiquity and relative stratigraphic position. The results of the two charcoal samples are reversed, the oldest date coming from the upper level and the youngest from the lower level. The shell date, associated with the lower charcoal sample, is 150 years more recent than the latter. The archeological context is thus an ambiguous

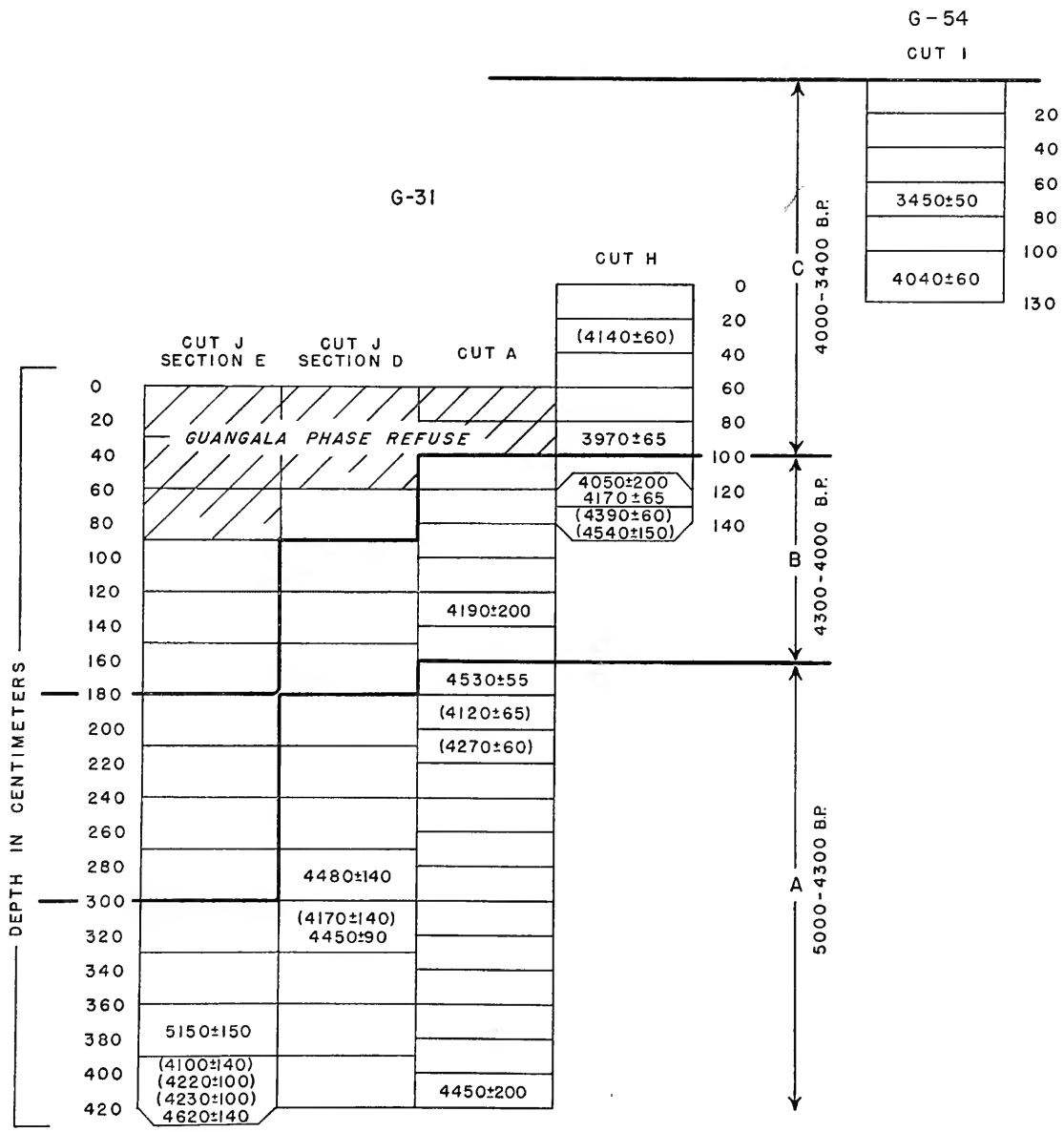


FIGURE 94.—Stratigraphic origin of carbon-14 samples from G–31 and G–54. Valdivia Phase period divisions derived from seriation of changes in pottery type frequency indicate a sloping surface during the refuse accumulation. Dates in parentheses are interpreted as not referring to the cultural period in which they stratigraphically occur. (See text pp. 149–150 for detailed explanation.).

one and evaluation of the dates depends on other evidence. Rejection of the two most recent dates seems justified because of their close approximation to a date of 2800±115 for the late Chorrera Phase from Véliz in central Manabí (table H). This coincidence might be rationalized by viewing the Machalilla Phase occupation at G–110 as an isolated local survival were it not for the presence of early Chorrera Phase sites in the immediate vicinity. G–114, representing a transition from the Machalilla to the Chorrera Phase (fig. 89), and G–48, representing the fully developed Chorrera Phase, are both within a few kilometers of G–110. A few sherds of Chorrera-like types occur at G–110, indicating that G–110 was one of the sites occupied by the Machalilla Phase at the time of the contact which produced the Chorrera Phase; and that a short interval of intercommunication preceded abandonment of the site and integration of the two populations, at sites like G–114, leading to the emergence of the Chorrera Phase along the southern Guayas coast (fig. 89). If so, either the compromise date of 3150±160 derived from averaging the two runs on the charred remains on potsherds (see p. 150), or the earlier 3320±170 more accurately date the site.

Although the series of carbon-14 dates for the Ecuadorian coastal complexes is in general agreement with the archeological sequence as it is now known, a problem arises when the attempt is made to correlate this set of dates with a set derived from obsidian. Since the use of obsidian is unknown during the Valdivia and Machalilla Phases, its appearance in refuse deposits is perhaps the most reliable single criterion for identifying the beginning of the Chorrera Phase. Extended research by Friedman and Smith has resulted in a method of using this material for age determination, producing a long series of dates for Ecuadorian coastal complexes from the beginning of the Chorrera Phase up until European contact (Friedman, Smith, Evans and Meggers, 1960, table 1, pp. 500–508). Subsequent carbon-14 determinations for sites of the Bahía, Chirije, and Manteño Phases, representing the Regional Developmental and Integration Periods coincide very well with the obsidian dates (Estrada, 1962, Cuadro 4).

Carrying obsidian dating backward into the late Formative Period leads to estimates in the range of 3400–3600 years for the elapsed time since the inception of the Chorrera Phase (Friedman, Smith, Evans and Meggers, 1960, fig. 19). Samples on which this estimate is based come from three sites, one on the Santa Elena Peninsula (G–76: Libertad), one on the Rio Daule (G–D–8: Naupe) and one on the Rio Babahoyo (R–B–1: Chorrera). These dates, which are completely consistent with the rest of the obsidian series, overlap not only with the postulated termination of the Machalilla Phase, but extend back into Valdivia Period C, a situation that is in contradiction with stratigraphic and distributional archeological evidence.

Obsidian dates result from a natural process completely different from that drawn upon by carbon-14 dating. Obsidian reacts with water resulting in a change of properties. When a new surface is exposed by fracture, hydration occurs, producing a more or less sharply defined layer easily observed microscopically in cross section. Hydration proceeds at different rates, correlated principally with differences in mean annual temperature, so that when the appropriate temperature category has been identified, hydration rim thickness measurements can be converted into elapsed time producing a series of dates superficially comparable but very different in origin from carbon-14 determinations.

A potential source of error in obsidian dating is the hydration rate selected for converting thickness measurements into elapsed time. Rates have been selected by establishing the hydration rim thickness of several specimens in contexts of different ages, dated by carbon-14 or other "absolute" methods. When several thickness-age correlations were available for a geographical area, these were connected by a straight line that represented the rate in microns squared per thousand years (Friedman, Smith, Evans and Meggers, 1960, figs. 12–17). Rates established in this way are unfortunately only as valid as the carbon-14 dates on which they are based. In the case of coastal Ecuador the rate of 11 microns squared per 1000 years was derived from "radiocarbon dating of several of the later cultures and an estimated date of 3400 years B.P. . . . for the beginning of the Chorrera Period based on the radiocarbon dating of 4000–4500 years B.P. of certain levels of the preceding occupation, the Valdivia culture" (op. cit., p. 488). The first question that must be answered in attempting to resolve the overlap between the two sequences of carbon-14 and the obsidian dates is consequently whether there is an error in the obsidian hydration rate selected for the Ecuadorian coast.

At the time the coastal Ecuadorian hydration rate (Scale B) was adopted, only three carbon-14 dates were available for the corresponding time periods. Two of these represented the Bahía Phase of the Regional Developmental Period and were of similar magnitude: 2150±240 (W–833) and 2200±240 (W–834). The third date, for a site of the early Manteño Phase at the beginning of the Integration Period, was 760±500 (W–835). All three were derived from charcoal (Rubin and Alexander, 1960, pp. 180–181). Thirteen additional dates have subsequently been

TABLE H.—*Carbon-14 dates for complexes of the Late Formative, Regional Developmental, and Integration Periods.*

Provenience	*Date B.P.*	*Phase*	*Period*
M–6: Cerro de Hojas, Corral	560±200 (M–736)	Manteño	Integration
G–22: Puerto Chanduy, Cut B, Level 50–60 cm.	760±500 (W–835)	Chirije-Manteño	Integration
M–42: Chirije, Corral A, Level 120 cm.	850±105 (1305)	Chirije	Integration
M–55: Sequita (Pepa de Huso)			
Level 280–300 cm.	1100±105 (SI–42)	Chirije	Integration
Level 260–280 cm.	2525±105 (SI–35)	Bahía-Chorrera	Late Formative
Level 300–320 cm.	2540±125 (SI–43)	Bahía Chorrera	Late Formative
M–7: Esteros, No. 1			
Cut 1, Level 40–80 cm.	2200±240 (W–834)	Bahía I	Regional Developmental
Level 280–320 cm.	2150±240 (W–833)	Bahía I	Regional Developmental
Cut A, Level 320–340 cm.	2050±120 (M–1315)	Bahía I	Regional Developmental
Level 320–340 cm.	2300±65 (SI–49)	Bahía I	Regional Developmental
Level 340–360 cm.	2350±65 (SI–52)	Bahía I	Regional Developmental
Level 380–400 cm.	2430±60 (SI–55)	Bahía I	Regional Developmental
Level 400–420 cm.	2110±120 (M–1319)	Bahía I	Regional Developmental
Level 400–420 cm.	2120±120 (M–1316)	Bahía I	Regional Developmental
M–8: Tarqui, Level 250 cm.	2170±200 (M–734)	Bahía	Regional Developmental
M–42: Véliz, Cut B, Level 40–60 cm.	2800±115 (1307)	Chorrera	Late Formative

obtained from Ecuadorian cultures using obsidian. These represent five new sites and seven more dates for the Bahía Phase site of M–7, which provided two of the original samples (table H). The results confirm the first three dates and generally substantiate the estimated time scale for the Ecuadorian coast.

Four of the dates represent the Integration Period, subdivided by Estrada (1962) into an earlier Chirije and a later Manteño Phase. Three are from single period sites: M–6, M–42, and G–22. The fourth is from M–55, which has an earlier occupation corresponding to the transition between late Chorrera and early Bahía and a later reoccupation by the Chirije Phase (Estrada, 1962, fig. 110). Since there is a large discrepancy between one of the three determinations for the site (SI–42) and the other two (SI–35, 43), and since the recent date falls within the expected range for the Chirije Phase it seems safe to attribute it to that portion of the sequence. These four dates give a span of 560–1100 years ago for the Integration Period on the coast.

Of the nine dates available for the Bahía Phase, eight are from M–7 and one from M–8 immediately adjacent and probably part of the same large site (Estrada, 1962, fig. 5). The levels from which the samples were obtained at M–7 are correlated by Estrada with Bahía I or the first half of the Bahía Phase (op. cit., Cuadro 3, figs. 107–108). Although there is some discrepancy between the results from different laboratories, the range of 2050–2430 years ago places Bahía I in the first half of the estimated duration for the Regional Developmental Period. Two dates from M–55, from levels corresponding to the transition between late Chorrera and early Bahía, agree culturally and chronologically with the M–7 dates and place the beginning of the Bahía Phase at around 2525–2540 years ago. The remaining date, from M–42 and representing levels corresponding to the late Chorrera Phase, is sufficiently older at 2800 years ago to constitute an acceptable date for the site.

One additional date, from La Tolita in Esmeraldas Province, can be equated with the Guayas-Manabí cultural sequence only tentatively because details of the local chronology have not yet been worked out. The sample was obtained from a chimney burial (Stirling and Stirling, 1963, p. 5) of the type characteristic of the Milagro Phase, which occupied the Guayas Basin during the Integration Period. Associated, however, was a figurine of La Plata type, suggesting contact with the Bahía Phase of the Manabí coast. The date of 1690±200 years ago (M–735) is within the expected range for the Regional Developmental Period but slightly earlier than the estimated beginning of the Integration Period.

This series of carbon-14 dates makes it possible to evaluate whether the overlap between obsidian dates for the early Chorrera Phase and carbon-14 dates for the latter part of the Valdivia and Machalilla Phases is the result of selection of a wrong hydration rate. For this purpose the group of dates spanning the transition from late Chorrera to early Bahía is

particularly important, since it establishes conclusively that the Regional Developmental Period began 2400–2500 years ago, or about 500 B.C. Another relatively fixed point is the upper end of the sequence, corresponding to initiation of European contact. Archeological evidence suggests that there was a rather rapid disappearance of the aboriginal cultural pattern after A.D. 1550, so that prolongation of the Integration Period much beyond this date is dubious. The earliest acceptable beginning date remains about 3450 years ago or 1500 B.C., the end of Valdivia Period C.

Scale B, the originally adopted hydration rate for coastal Ecuador, is 11 microns squared per 1000 years (Friedman, Smith, Evans and Meggers, 1960, fig. 17). By this rate 2.1 microns equate with 400 years ago (A.D. 1550), 3.9–4.0 microns with 1450 years ago (A.D. 500), 5.1–5.2 microns with 2450 years ago (500 B.C.), and 6.1–6.2 microns with 3450 years ago (1500 B.C.). This scale produces good agreement with obsidian samples from late Chorrera and Guangala, Tejar and Daule Phases (and subsequently measured samples from Bahía and Jama-Coaque Phases of north Manabí). Hydration rims on the late Chorrera Phase are typically thicker than 5.1 microns and those of the Daule Phase are typically between 4 and 5 microns. The range covered by samples from the early Guangala Phase site of G–34 and the late Guangala Phase site of G–39 is shown on figure 95. (Distributions for other Regional Developmental Phases are diagrammed in the original article; op. cit., fig. 19). Scale B presents two principal difficulties: 1) many of the obsidian chips from Integration Period sites (illustrated by G–D–2 on fig. 95) have rims thicker than 3.9 microns, making it necessary to attribute them to re-use of material recovered from earlier sites rather than primary manufacture; and 2) a number of samples with rim thicknesses between

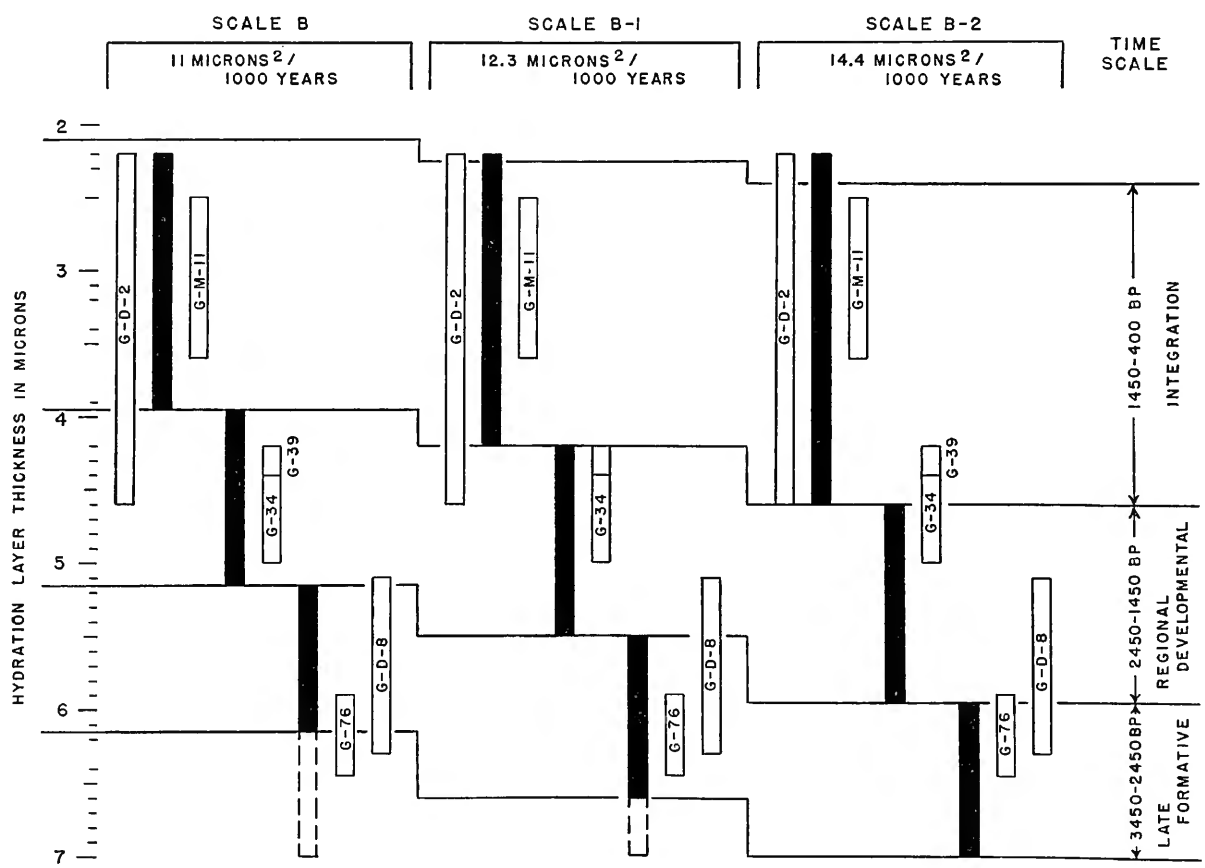


FIGURE 95.—Differences in agreement between period identification of selected sites and obsidian dates derived by three different scales for conversion of hydration layer thickness into elapsed time. The black bars indicate the thickness range encompassed by each scale for each time period. The white bars indicate the thickness range at sites representing the following successive cultural periods: Late Formative (Chorrera Phase): G–76, G–D–8; Regional Developmental (Guangala Phase): G–34, G–39; Integration (Milagro Phase): G–D–2, G–M–11.

6.2 and 7.0 microns (shown by dotted extension on fig. 95) had to be left as unexplainably older than expected. A third difficulty now arises in the form of an overlap with the upper end of the carbon-14 dated Valdivia and Machalilla Phase sequences.

In order to determine whether Scale B was too slow, a somewhat faster rate (Scale B–1) was empirically adopted, in which 12.3 microns squared corresponds to 1000 years. By this rate 2.2–2.3 microns equate with 400 years ago, 4.2 microns with 1450 years ago, 5.5 microns with 2450 years ago and 6.6 microns with 3450 years ago. Comparison of this rate with the range shown by obsidian samples in the same sites used to evaluate Scale B shows the two Chorrera Phase series (G–76 and G–D–8) to begin within the estimated duration of the Late Formative Period, but the late Chorrera Phase occupation at G–D–8 now projects into the Regional Developmental Period (fig. 95). Specimens with thickness between 6.6 and 7 still are unexplained. The early and late portions of the Guangala Phase sequence (G–34 and G–39) remain within the confines of the Regional Developmental Period but have been pushed into the upper part. Increase of the hydration layer thickness corresponding to the Integration Period allows a greater proportion of the samples to be accepted as of contemporary origin, but many must still be rejected as too early. In short, Scale B–1 does not eliminate all the problems associated with Scale B and creates new maladjustments at the point where the Formative Period ends and the Regional Developmental Period begins.

A third scale (Scale B–2) was constructed to equate 7 microns with 3400 years ago, in order to permit acceptance of specimens with hydration layers between 6.2 and 7 microns as contemporary with the beginning of the Chorrera Phase. By this rate, 2.4 microns equates with 400 years ago, 4.6 microns with 1450 years ago, 5.9–6 microns with 2450 years ago and 7 microns with 3400 years ago. While this scale accomplishes its purpose of placing all thick hydration layers within the Chorrera Phase time range, distortions in the remainder of the sequence are so gross as to create total disalignment with the period divisions, and consequently with the carbon-14 dates for equivalent sites and complexes (fig. 95).

In short, the attempt to bring the series of obsidian dates into alignment with the Valdivia and Machalilla Phase carbon-14 dates by increasing the rate used for equating hydration rim thickness with elapsed time destroys the excellent agreement between the obsidian dates and the more recent series of carbon-14 dates. While agreement exists in part because three of these dates were used as reference points for selecting Scale B, the validity of the time scale for the period divisions and of Scale B for conversion of hydration rim thickness into elapsed time seem confirmed by the thirteen carbon-14 dates subsequently received. About 1000 years farther back in time, however, the two systems of dating appear to have diverged by at least 300 years.

Examination of the literature brings to light the interesting evidence that carbon-14 dates tend to deviate increasingly from calendrical scales as they go backward in time. In one experiment, a group of wood samples of known age was dated by carbon-14. Agreement was within the probable error over the past 2000 years, but samples older than 2500 years showed increasing divergence, with the carbon-14 result being more recent than the known date. Damon, Long and Sigalove (1963, pp. 284–5), who conducted the experiment, interpret the deviation as follows:

> The cause of the large apparent excess of C-14 beyond 2500 B.P. does not appear to be the result of an underestimation of the half life of C-14 as indicated by the fairly close agreement for younger samples. Two remaining possible causes are (1) variation in the C-14 production rate and (2) fluctuation of the total CO_2 content of the atmospheric reservoir. Although the first possibility cannot be eliminated at this time, it would seem to the authors that fluctuation of the total content of the atmospheric reservoir is not only possible but quite probable. Much more work is necessary before this phenomenon can be properly evaluated. However, such large fluctuations of the initial C-14 content of wood call for caution in the evaluation of C-14 dates as absolute sidereal years. In particular, the fixing by C-14 dating, of floating archaeologic chronologies . . . cannot be successfully accomplished without reference to the C-14 content of samples of known age.

A similar kind of discrepancy has been noted between tree ring dates from *Sequoia gigantea* and carbon-14 dates on the same wood. As Libby (1963, p. 279) reports:

> It is clear that the carbon-14 dates are in good agreement with the tree-ring chronology curves for the period 800 to 2400 years ago. Between 3000 and 4000 years ago, however, the ages as determined from the number of three rings are higher than the ages shown by radiocarbon dating.

In the Old World, a correlation problem has emerged when historically derived estimates are compared with carbon-14 dates for the early Dynastic Period of Egypt, although the threshold of disagreement is about 1000 years earlier than in the New World. The Egyptian calendrical system extends back to 2000 B.C., and for this period of some 4000 years agreement between historical and carbon-14 dates is very good (Smith, 1964, p. 33). Between 4000 and 5000 years ago, however, carbon-14 dates are consistently more recent than historical dates, which for this period are based on various kinds of documentary evidence rather than on the calendar. Although there is potential ground for error in

compiling the historical evidence, arguments in favor of the longer estimates are impressive (ibid.). The differences increase from zero at 4000 years ago to 500 years at 5000 years ago (Libby, 1963, p. 278).

The consistent pattern of sudden deviation between carbon-14 dates and dates arrived at by tree-ring and historical methods in other parts of the world, beginning 2500–3000 years ago in the western hemisphere, suggests that the disconformity between the earliest Chorrera Phase obsidian dates and the most recent Valdivia Phase carbon-14 dates may be a product of factors operating on the dating systems rather than of misinterpretation of the archeological evidence. If so, reconciliation of the two series of dates could be accomplished by pushing back of the carbon-14 dates some 300 years at 3400 years ago, so that the most recent Valdivia Phase date of 3450 ± 50 (SI–69) would be corrected to 3750 ± 50, bringing it into better chronological alignment with the beginning of the Chorrera Phase, obsidian-dated at around 3400–3600 years ago. If the discrepancy is a cumulative one, as suggested by the experimental data quoted above, the earliest Valdivia Phase dates might have to be increased by more than 300 years.

Another cumulative error affecting carbon-14 and not obsidian is the halflife used for converting measurements into elapsed time. The Ecuadorian dates have been computed according to a halflife of 5568 years adopted by the various laboratories for standardization of results. Recent experiments have shown, however, that 5730 is a more accurate halflife. In the most recent Valdivia Period C date (3450 ± 50), this makes a difference of 100 years, and alone eliminates one-third of the overlap with the beginning of the obsidian series.

Reconciliation of the disconformity by accepting the obsidian sequence dating of 3400 years ago for the approximate inception of the Chorrera Phase, and pushing back the most recent Validvia Phase carbon-14 date of 3450 ± 50 by about 300 years creates a temporal alignment in keeping with the archeological situation. If the inference that the inland spread of the Chorrera Phase reflects substitution of intensive agriculture for gathering (perhaps supplemented by incipient cultivation) is correct, this marks the beginning of a process that became crystallized at around 2500 years ago in the "florescent" or "classic" Regional Developmental complexes. Evidence is accumulating in other parts of the world that realization of the cultural potential of agriculture is a slow process. Acceptance of a date appreciably less than 3400 years ago for the initiation of this process on the coast of Ecuador would require the assumption that cultural change was far more rapid than during comparable portions of Mesoamerican or Middle Eastern developmental sequences. Even 900 years is a short time compared to that intervening between the beginning of productive agriculture and the beginning of urbanism in other areas. However, special circumstances may have sped up the process, so that these speculations are subject to testing by carbon-14 dates from early sites of the Chorrera Phase.

Origin and Affiliations of the Valdivia and Machalilla Phases

The most interesting and at the same time most difficult task of the archeologist is to integrate his findings into the web of local sequences and horizon styles fashioned by previous investigators. Contradictions in interpretation must be resolved and nonconforming data must be evaluated and accepted or rejected, often on arbitrary grounds. The task may become easier when archeological sequences are better described and more exactly dated, but since it is the inevitable flaw of archeological evidence that it will always be subject to random preservation of only a minor proportion of what was once made and used, increased fieldwork cannot be relied upon to resolve all contradictions between data and hypothesis.

Another consideration inherent in the process of trying to generalize from a group of unique historical events is the inability of a generalization, which expresses patterning, to account for each small detail. The unrealistic nature of such an expectation has been well stated by a biologist (Grant, 1963, p. 5):

> A generalization may be likened to a map or ground plan drawn from the original landscape. A certain pattern of land and sea, or hills and valleys, is present in the unmapped area, waiting to be discovered. The earliest maps, like the earliest generalizations in science, are crude and inaccurate, but they do represent a first step even though they are destined to be replaced by more accurate versions at a later date. One of the theoretical goals of science is to formulate valid generalizations, maps that summarize the pattern in nature in an accurate way. . . .
>
> Theoretical generalizations in biology often take the form of classification systems . . . . It must be realized that no classification . . . can fully represent all the varied and diverse facts, just as no map can show every detail in the terrain. And this inherent limitation of generalizations gives rise to endless controversies in biology whenever facts turn up that do not fit into the existing set of concepts.

The attempt to reconstruct cultural development and diffusion in Latin America can also be compared to the piecing together of a tremendously complicated jigsaw puzzle, in which 80 percent of the pieces are missing. Many of the available pieces do not fit, and those that can be joined together reveal little of the overall pattern. However, since even a tentative arrangement may suggest fruitful areas for intensive archeological research and specific problems to be investigated, it is worthwhile from time to time, and particularly when new pieces have been found, to renew the effort to put the puzzle together. On this justification, and guided by theoretical considerations outlined in the Introduction (pp. 5–9), we offer a hypothetical reconstruction of the origin and spread of certain cultural traits in northwestern South America from the appearance of pottery to about 3000 years ago.

Pottery makes an abrupt appearance on the Guayas coast of Ecuador some 5000 years ago, injected into a preceramic and preagricultural, or at best, an incipient agricultural context, and transforming a group of shellfish gatherers and fishermen into what has been labeled the Valdivia Phase. The most specific and unique features of Valdivia culture, and therefore those best suited for establishing the origin of the Phase, are exhibited by the pottery complex of Period A. This early pottery contains a large number of unusual kinds of decoration, both in terms of technique and motif, as well as several distinctive rim and vessel shapes. With the passage of time, some of these die out and others become modified, so that by Period C the ceramic complex is very different from its initial content. Elements present at the inception of the Valdivia Phase on the Ecuadorian coast include the following:

Decorative Techniques

FIGURE 55

Shell stamping (Valdivia Shell Stamped)
Fine zoned hachure (Valdivia Fine-line Incised)
Shell combing (Valdivia Combed)
Cut and beveled rim (Valdivia Cut-and-Beveled Rim)
Incision on red slip (Valdivia Red Incised)

Finger punching from the interior (Valdivia Modeled)
Relief faces (Valdivia Embossed)
Pseudo-corrugation (Valdivia Pseudo-Corrugated)
Finger grooving (Valdivia Finger Grooved)
Fingernail and fingertip punctation (Valdivia Fingernail Decorated)
Corrugation (Valdivia Corrugated)
Incision on an unpolished surface (Valdivia Incised)
Shell scraping or brushing (Valdivia Brushed)
Broad-line incision (Valdivia Broad-line Incised)

Rim Shapes

FIGURE 54

Indented rim (Combined Form 1)
Broad exteriorly thickened rim (Combined Form 2)
Direct rim with flat or square lip (Combined Form 4)
Folded-over rim (Combined Form 13)
Folded-over, finger-pressed rim (Combined Form 14)
Short necked direct jar rim (Combined Form 18)
Cambered rim bowl (Combined Form 11)

In addition to technique of decoration, a number of specific motifs can be isolated as representative of Period A. Among these are the use of a row of punctation at the lower edge of the decorated area and zigzag, crosshatch and horizontal parallel lines (Motifs 1, 2, and 3) in Valdivia Incised designs; I-shaped elements (or "dog-bones") (Motif 4) and anthropomorphic faces (Motif 1) in Valdivia Excised; one or more horizontal parallel lines below the rim (Motif 1), a band of rectilinear incision (Motif 2) and zoned parallel lines (Motif 4) in Valdivia Broad-line Incised. For pottery types restricted to Periods A and B, all motifs are of course characteristic. Filling of incisions or excisions with red pigment after firing is also probably present in Period A, although noted only on sherds from Period B.

In vessel shape, undulating or lobed lips are frequent during Period A, as are small tetrapod feet. Sharply defined concave bases are also present, but the majority of both bowls and jars have slightly flattened bottoms. Surfaces may be unpolished, striated polished or well polished. Some jars and bowls are red slipped, with application of the slip varying from uneven to even, and polishing varying from striated to complete. Period A vessels tend to be thicker walled than those of later periods.

When the Valdivia Phase pottery was discovered in 1956, it was recognized by Estrada (1956) as containing a number of decorative elements characteristic of early Formative ceramics of coastal Peru, particularly Guañape and Ancon. Now that the Valdivia sequence of pottery change can be described in great detail, it is of interest to note that decorative techniques and motifs used for this analysis were those of Period D and to a lesser extent Period C, since the Phase was then known only from the site of G–25 and later levels of G–31. This comparison thus sheds no light on the origin of the Valdivia ceramic complex. When a more detailed report was published three years later (Evans, Meggers and Estrada, 1959), the situation was not much different. Tentative correlations were made with the earliest Formative complexes in Peru (Guañape), Panama (Monagrillo), Colombia (Barlovento) and Mexico (Tlatilco), but all of these except Tlatilco are characterized by pottery that is simple in form and predominantly undecorated. Tlatilco, which approaches Valdivia in artistry of the ceramic complex, was dated 1000 years more recent than the earliest Valdivia carbon-14 date available in 1959, ruling it out even then as a possible ancestor.

During extensive excavations at G–31 in December of 1960, a new door was opened in the inquiry by the finding of part of the castellated rim of a Valdivia Red Incised vessel (pl. 103 a–b) bearing a striking resemblance in both rim treatment and incised decoration to a jar of Middle Jomon date from the Japanese island of Honshu (Estrada, 1961, Lam. 5, 1–2). Examination of other characteristics of pottery from Early and Middle Jomon sites revealed a large number of additional similarities, which were summarized by Estrada (op. cit., Cuadro 1) in terms of their distribution in Asia and the New World. This analysis showed the early Valdivia Phase to share a larger number of traits with Early and Middle Jomon than with any New World area or complex. Attempts to pin down more specifically the distribution and antiquity of the relevant traits in Japan were hampered, however, by linguistic barriers and by emphasis in most publications on the florescent type of Jomon pottery characteristic of the Middle period on Honshu, particularly as illustrated by complete vessels. Several clues, such as the reportedly small frequency of cord marking and the lesser exuberance of modeled decoration, pointed to Kyushu as a more likely source for Valdivia pottery than Honshu, but the approach to pottery analysis employed by Japanese archeologists (see Kidder, 1957, pp. 1–5) and the relatively small number and obscure nature of publications on Kyushu sites frustrated further bibliographic research. Fortunately, it was possible for us to visit Japan and to examine and photograph pottery from a number of Early and Middle Jomon sites on Kyushu, with results that have supported the hypothesis of transpacific origin for Valdivia Phase pottery beyond all reasonable expectation.

Examination of Jomon collections was directed primarily toward finding early Valdivia elements of decoration and vessel shape. It became quickly

Islands	Period Divisions	Sites	Decorative Techniques																		Rim and Base Forms								
			Shell stamped	Brushed	Multiple drag-and-jab punctate	Combed	Finger grooved	Rocker stamped	Nicked rib	Broad-line incised	"Valdivia Incised"-like	Corrugated	Nicked broad-line incised	Fingertip punctate	Fingernail punctate	Excision	Pseudo-corrugated	Fine-line incised	Braid impressed	Red slip	Lobed rim	Direct rim, flat lip	Folded-over, finger-pressed rim	Curved cambered rim	Exteriorly thickened rim	Folded-over rim	Tapered rim	Tetrapod base	Concave base
Honshu	Middle	Mito								⊠	⊠							⊠											
		Natsushima	⊠	⊠						⊠	⊠							⊠				⊠			⊠		⊠		
		Oomiyama		⊠			⊠		⊠	⊠	⊠					⊠				⊠									
	Late Early	Moroiso						⊠	⊠		⊠							(?)			⊠	⊠							
		Kitashikawa						⊠																					
	Earliest	Kominatodai	⊠												⊠														
		Tatehira	⊠								⊠								⊠						⊠				
		Fukkirizawa	⊠		⊠			⊠														⊠				⊠			
		Shirahama	⊠														⊠												
Kyushu	Late Middle	Nampukuji											⊠			⊠													
		Uki								⊠						⊠								⊠					
	Middle	Mie	⊠				⊠			⊠		⊠		⊠		⊠					⊠								
		Ataka			⊠	⊠	⊠			⊠	⊠			⊠		⊠				⊠	⊠	⊠		⊠	⊠				
		Izumi	⊠		⊠		⊠		⊠	⊠	⊠				⊠	⊠					⊠		⊠		⊠	⊠		⊠	⊠
	Early	Sobata	⊠	⊠			⊠			⊠	⊠			⊠	⊠						⊠	⊠	⊠		⊠	⊠			
		Kasugacho		⊠	⊠				⊠	⊠	⊠		⊠										⊠	⊠					
		Ryuo				⊠	⊠			⊠	⊠																		
		Yoshida	⊠	⊠	⊠			⊠		⊠		⊠										⊠							
		Todoroki	⊠	⊠	⊠		⊠	⊠	⊠	⊠											⊠								
	Earliest	Nanshu Shrine	⊠			⊠																							
		Ishizaka	⊠	⊠	⊠																								

FIGURE 96.—Early Valdivia Phase ceramic features at Early and Middle Jomon sites on Kyushu and Honshu. Data based on the following collections: Archaeological Museum, Meiji Univ. (Mito, Natsushima); Kyoto Univ. Museum (Moroiso, Kitashikawa, Uki); Furuta Collection, Shimabara (Mie, Todoroki); Kumamoto Castle Museum (Ataka, Sobata); Kumamoto Univ. (Sobata, Nampukuji, Ataka, Todoroki); Gyokuryu High School, Kagoshima (Izumi, Yoshida, Ishizaka, Nanshu Shrine, Kasugacho); Dept. of Archeology, Keio Univ. (Shirahama, Fukkirizawa, Tatehira, Kominatodai, Sobata, Ryuo); Oomiyama City Hall (Oomiyama).

evident that Late Jomon materials could be eliminated from consideration. Among Middle and Early Jomon samples, those from sites on Kyushu contained the most similar features. In order to examine the most material in the short time at our disposal, visits were arranged to individuals and institutions known to possess such materials on Kyushu. Without their wholehearted cooperation in allowing unrestricted access to their collections, it would be impossible to present the detailed comparative data on which the case for transpacific contact depends.

Jomon sites from which pottery samples were examined are shown on figure 96, arranged from west to east (south to north) by islands and within each island from early to late. Geographical location is provided on the map (fig. 97). Dating by period follows the identification supplied by Japanese archeologists, and is based on a "horizon style" type of framework. Early Valdivia decorative techniques and rim shapes are listed across the top. It is immediately evident that the relevant items are clustered in sites from Kyushu, but scattered and unevenly represented at sites on Honshu. Since this analysis concerns only Valdivia-like traits, it does not take into consideration other characteristics of Jomon pottery from these areas, such as cord marking. When this is done, resemblances with Honshu become more tenuous than the chart suggests.

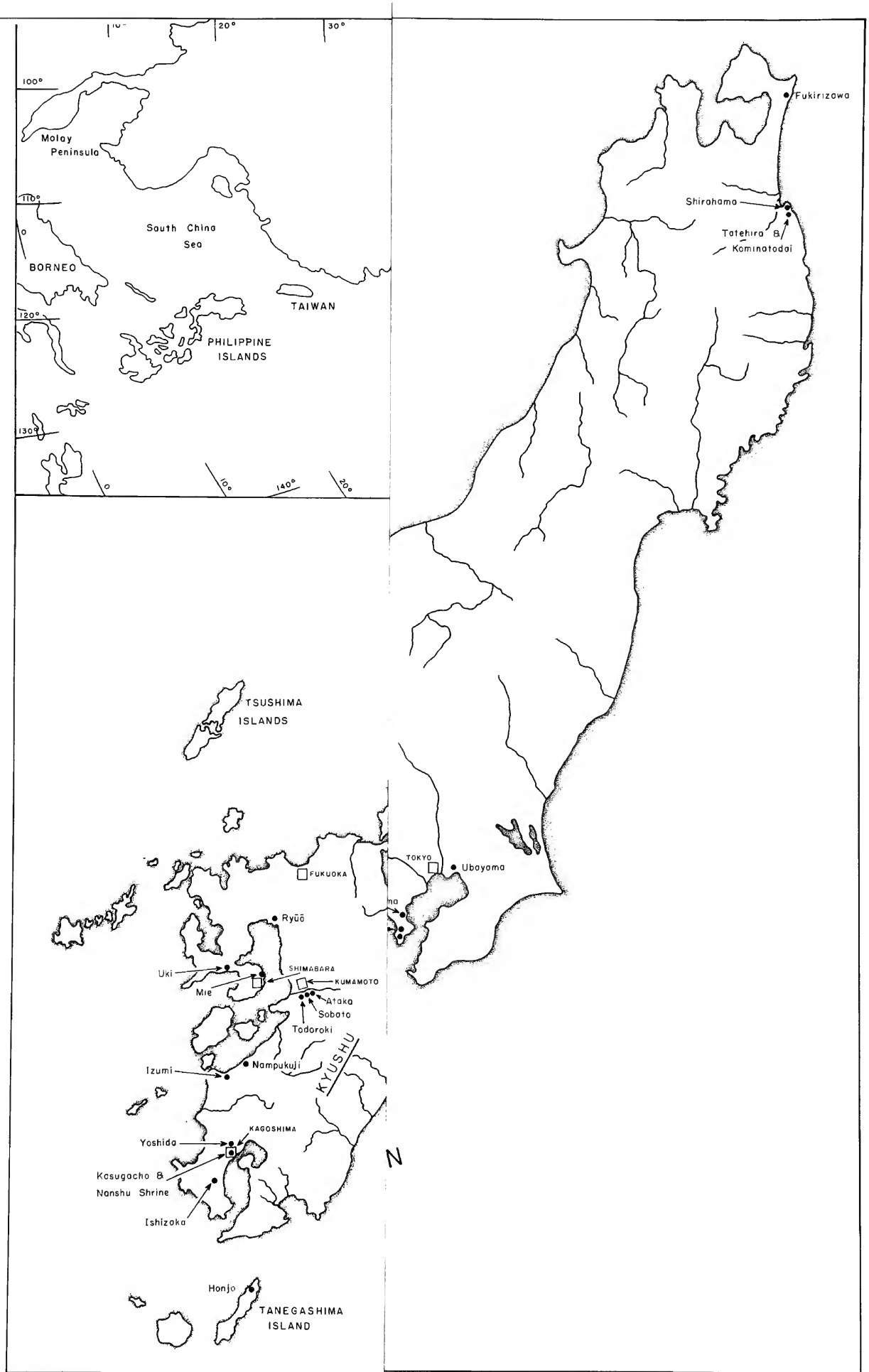
Among the Kyushu sites taken as a group, all the early Valdivia traits are represented except four: pseudo-corrugation, braid impression and fine-line incision in decoration, and tapered rim in vessel shape. Some of the traits occur throughout most of the sequence (e.g., broad-line incision, corrugation, finger grooving, shell stamping, rim lobing), while others tend to be restricted to one time period. Rocker stamping, brushing (shell scraping), and nicked ribs are Early Jomon, while fingertip and fingernail punctation, and excision correlate with Middle Jomon. A similar temporal distribution is evinced by Honshu sites where the techniques are represented. It should be emphasized that complete sherd samples were not available from any of the sites, with the result that occurrence of some elements may have been overlooked. There is no reason to believe, however, that such additions would do any more than strengthen the existing pattern.

The three sites showing the largest number of Valdivia Phase traits are Sobata, Izumi, and Ataka, dated as Late Early or Early Middle Jomon. Sobata and Ataka are located along the southern margin of what is now the Kumamoto Valley of Kyushu Island, but which several thousand years ago must have been a broad shallow bay. Numerous shell middens have been reported from the area, dating back to Early Jomon, but few have been investigated even superficially. Izumi, from southwestern Kyushu, is in a similar environmental setting. All three sites occupy the portion of the western coast protected from the open sea by Shimo Island and an irregularly shaped peninsula straggling southward. The existence of several such large nearly enclosed bays along the Kyushu coast may explain part of its attraction for Jomon fishermen (fig. 97).

Although no carbon-14 dates are yet available from Kyushu Jomon Period sites, there are several from Honshu and Hokkaido for complexes representing all major period subdivisions on those islands (fig. 98). Since the Kyushu resemblances seem to concentrate around the transition between Early and Middle Jomon, the most significant Honshu date is that from Kamo Shellmound, an Early Middle Jomon site in Chiba Prefecture, of 5102 ± 400 (M–240) years ago. This is remarkably close agreement with the earliest Valdivia carbon-14 date of 5150 ± 150 (M–1320) years ago. Middle Jomon pottery, unlike that of the early Valdivia Phase, is the product of many centuries of local evolution, in which marked changes took place in decoration and vessel shape. Although the validity of the earlier dates, in excess of 9000 years ago, has been questioned, agreement between period affiliation and carbon-14 date of more recent sites makes them appear possible.

Words do not adequately express the degree of similarity between early Valdivia and contemporary Jomon pottery, and only photographs do justice to the remarkable resemblances (pls. 160–186, 189–190). In the Valdivia Incised and Valdivia Broad-line Incised types, not only technique of incision but motifs and combinations of motifs are the same (pls. 160–167). In most categories of decorative technique, examples can be found so similar in appearance that they might almost have come from the same vessel. There are, however, certain differences in emphasis that support an inference of evolutionary relationship, particularly in finger grooved, combed, and incised kinds of decoration.

In the Valdivia Phase, it is possible to recognize two distinct kinds of incised designs; 1) broad-line incision on a polished surface (Valdivia Broad-line Incised), and 2) intermediate incision on an unpolished surface (Valdivia Incised). The former usually occurs on bowls, the latter on jars. Motifs are also dissimilar. However, among incised sherds of the Early and Middle Jomon periods there is a continuum in surface treatment and technique of incision that makes the division adopted for the Valdivia Phase inapplicable. Surfaces are less frequently polished, and Valdivia Incised motifs may be executed in Valdivia Broad-line Incised technique



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Japan, showing location of Iomen

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FIGURE 97.—Map of Japan, showing location of Jomon sites producing pottery resembling Valdivia Phase types.

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Japan, when we were shown stone figurines from the recently discovered rock shelter of Kamikuroiwa, in Ehime Prefecture, northwestern Shikoku Island. Associated pottery is of a unique type, leading to tentative identification of the site as pre-Jomon (Esaka, 1962). The unshaped, thin, flat, waterworn pebbles, 4.3–6.4 cm. long, 2.0–4.0 cm. wide and 4–5 mm. in maximum thickness, are plain on one face and decorated with fine scratchlike incisions on the other (pl. 187 a–f). On the majority, scratches run in two groups from one end toward the middle, leaving a gap between them, and the other end plain. Esaka suggests that this may be stylized hair. Two have a band of parallel incised lines at the other end bounded by a horizontal incision, which if this is the lower end might represent a fiber skirt (pl. 187 a, c). The material is micaceous schist of a pale green hue.

Reexamination of Valdivia Phase stone figurines of Palmar Plain and Palmar Notched types in the light of these features suggests the possibility that vertical scratches covering the surface of some examples may not simply reflect method of manufacture, but may instead have symbolic significance. This impression is strengthened by the fact that a few of the figurines have incisions restricted to one half of the body (pl. 187i), or have additional short diagonal strokes at the upper end (pl. 187g). One has short parallel incisions bounded by a horizontal line at one end, similar to the Japanese "fiber skirt" treatment (cf. pls. 187j and 187e). While not conclusive evidence of connection, these resemblances suggest that further search may reveal crude stone figurines in Early Jomon sites that will serve as a link between the Kamikuroiwa examples and Valdivia stone figurines of Palmar Plain and Palmar Notched types.

Turning to parallels in stone, bone and shell artifacts between early Valdivia and Early Middle Jomon introduces a factor of negligible significance in pottery and figurines, namely, functional limitation on form. While pottery is utilitarian, whether rims are direct or exteriorly thickened, whether bases are flattened or concave, whether shoulders are angular or rounded does not affect the ability of a vessel to hold liquid, nor are these differences attributable to characteristics of the raw material. However, an awl must conform to the general contour of the antler fragment from which it is carved, and a sinker must be of appropriate weight or its efficiency is reduced. Similarities must also be evaluated in terms of the antiquity of shellfish gathering and fishing as a subsistence pattern, and the possibility that survival rather than diffusion may account for common types of artifacts. Such seems to be the case with notched pebble sinkers, which occur in Early Jomon and early part of the Valdivia Phase, but also occur in preceramic sites elsewhere in the New World (e.g., Emperaire and Laming, 1961, pp. 29–30 and fig. 6). The Valdivia shell fishhook complex, including saws and reamers used for manufacture and the hooks themselves, fits into a generalized New World preceramic tradition, and the objects were apparently so well adapted to the function they served that they survived in places without major alteration until recent times (Schumacher, 1960, pp. 23–24 and fig. 5 a–j). The efficiency of these tools and techniques of manufacture for supplying subsistence requirements can be cited to account for failure of Jomon types of fishhooks and projectile points to be adopted, if the Valdivians were made aware of their characteristics.

The few Valdivia Phase shell ornaments can also be duplicated in preceramic sites on the coast of Peru (Engel, 1963a, pp. 52–53) and California shell mounds (Gifford, 1947), suggesting either that they are part of the same widely diffused ancient tradition or that they are sufficiently simple and decorative to have been independently invented a number of times.

The bulk of stone artifacts are flakes and cores chipped by percussion either accidentally during use in hammering, or intentionally to produce a cutting edge. In general character, they duplicate the complex described by Bird at Huaca Prieta, and his comment that "if only the stone artifacts had survived one would be forced to think of these people as exceedingly primitive culturally" (1948, p. 25) is equally applicable to the Valdivia Phase situation.

The principal difficulty with postulating New World antecedents for nonceramic and nonfigurine aspects of Valdivia culture is that no shell middens of unquestionable preceramic date have been identified as yet on the Ecuadorian coast. In view of the large number of such sites now known on the adjacent Peruvian coast, however, it seems probable that this is explainable on two grounds: 1) the relatively slight amount of search for such sites in Ecuador, and 2) the wet climate, which destroys all perishable materials. Shell deposits, composed principally or entirely of oyster, are numerous along margins of salitres, particularly between the Santa Elena Peninsula and Posorja, but our spot testing of these places produced no artifacts, firecracked stones or ash indicative of human origin. In view of the sparcity of cultural remains in preceramic refuse deposits in other parts of South America (e.g., Bird, 1938, p. 253), however, more excavation is required before a natural origin can be confidently assumed. A shell sample from one accumulation in El Morro Salitre was carbon-14 dated in the hope of shedding light on the problem. The resulting date of $26{,}900 \pm 900$ (I–255) years is inconclusive, since it is within the magnitude now suggested for man's occupation of North America although considerably older

than any previously obtained South American dates. Consequently, at present we can only suggest that all evidence points to the existence of a preceramic population prior to the introduction of pottery on the Ecuadorian coast, while noting that confirmation in the form of sites or artifacts does not exist so far.

One other parallel between Valdivia and Jomon is the position of burial, in which the legs are tightly flexed and the arms extended at the side. This position was represented in all the Valdivia Phase skeletons from the Period C site of G–54 that were sufficiently well preserved for observation (p. 17; pl. 12). The same position occurs in Jomon burials (Komatsu, 1962, pl. 64). However, since the only Valdivia burials found so far are from a late part of the Phase, and Jomon burials also exhibit a variety of other positions, this similarity may be coincidental. Physical anthropological analysis of the Valdivia Phase skulls showed them to differ from preceramic populations of similar or greater antiquity on the Peruvian coast, but comparative series are too few to indicate what significance may be attached to these differences.

Consolidation of evidence relevant to the origin of the Valdivia Phase leads to a reconstruction of events somewhat as follows. Some 5000 years ago, the coasts of Japan and western America were occupied by small groups of people who subsisted by fishing and shellfish gathering, supplemented by hunting of terrestrial mammals. In addition to gathering plants, they may have taken initial steps toward cultivation. Their tools and utensils, although differing in details of construction, were of similar kinds—fishhooks, awls, choppers, flakes, sinkers, hammerstones—indicating both a similar level of technological competence and a similar ecological adaptation. In Japan, sites are found not only along the coast, but up river valleys into the interior, where salmon fishing, hunting of terrestrial fauna, and an unusually rich edible flora seem to have approximated wild food conditions on the northwest coast of North America. Bones from the refuse indicate that deep sea fishing provided part of the food supply from early times, and it is probable that dugout canoes were the vehicle from which this was done. According to Ploszajski (1963, pp. 88–89):

> A large number of dug-out canoes have been found, the earliest one being found in peat at Kamo, Chiba Prefecture is estimated to be from early Jomon Period before 3000 B.C. It has a shallow rounded cross-section with width-depth ratio of approximately 4:5 and tapering bow and stern which unfortunately were seriously damaged. A comparatively well preserved paddle was also found with this boat.

If a boatload of Early Middle Jomon fisherman left the sheltering bays of Kyushu and went out into the sea off the southeastern coast in October or November, they would have entered a zone with some of the strongest currents in the northern Pacific, running northeastward at 24–32 miles per day (fig. 103). U.S. Weather Bureau records for the 40-year period between 1901–1940 tabulate 802 typhoons, of which 130 were in October and 67 in November. A canoe caught too far from shore by one of these storms might easily be swept by the combined northeasterly pressure of wind and current far out to sea before control was regained. Even if the occupants retained possession of their paddles, they might have been unable to turn back. During the month of November, westerly and northerly winds predominate in the northern hemisphere, and are steadiest and of greatest force between about the 40th and 55th parallels. In addition, the percentage of gales increases during November in high latitudes, occurring at an average frequency of one every 8–10 days over the greater part of the northern Pacific except near coasts (Hydrographic Office, 1960). A combination of these forces would have borne a canoe eastward along the great circle route, which on a flattened map curves far north of Hawaii (fig. 103). Records during the past century demonstrate the feasibility of such a drift vessel reaching land with living passengers after a voyage of as long as 11 months (Sittig, 1896, p. 530). Indeed, possibility of survival would be stronger for people accustomed to living from the sea than for land-oriented agriculturalists of more recent times.

The currents would have carried a canoe southward as it neared the Pacific coast of the Americas. Depending on the force of the wind and the direction of the currents, the dugout might have been brought in sight of land off Mexico or Central America, something that may have happened to other voyagers in later times (fig. 103). These particular Jomon fishermen were less lucky, however, and it was some weeks more before they reached the coast of Ecuador. At this point, southeastward flowing currents meet the northwestward flowing Humboldt current, and join forces to run westward across the Pacific. The Guayas coast was thus the "end of the road" as far as the New World was concerned. The junction of these opposite currents fluctuates northward or southward during the year, causing minor changes of direction in local currents off Colombia and Panama (fig. 103, upper right). It is tempting to try to suggest a time of year that would have been more propitious for arriving at Valdivia, but the complexity of current patterns and the unknown quantity represented in wind direction and force reduce any such effort to the status of pure guess. An estimate of the number of months necessary to make a trip of some 9450 miles (8230 nautical miles) also involves so many incalculables, such as days of calm, temporary devia-

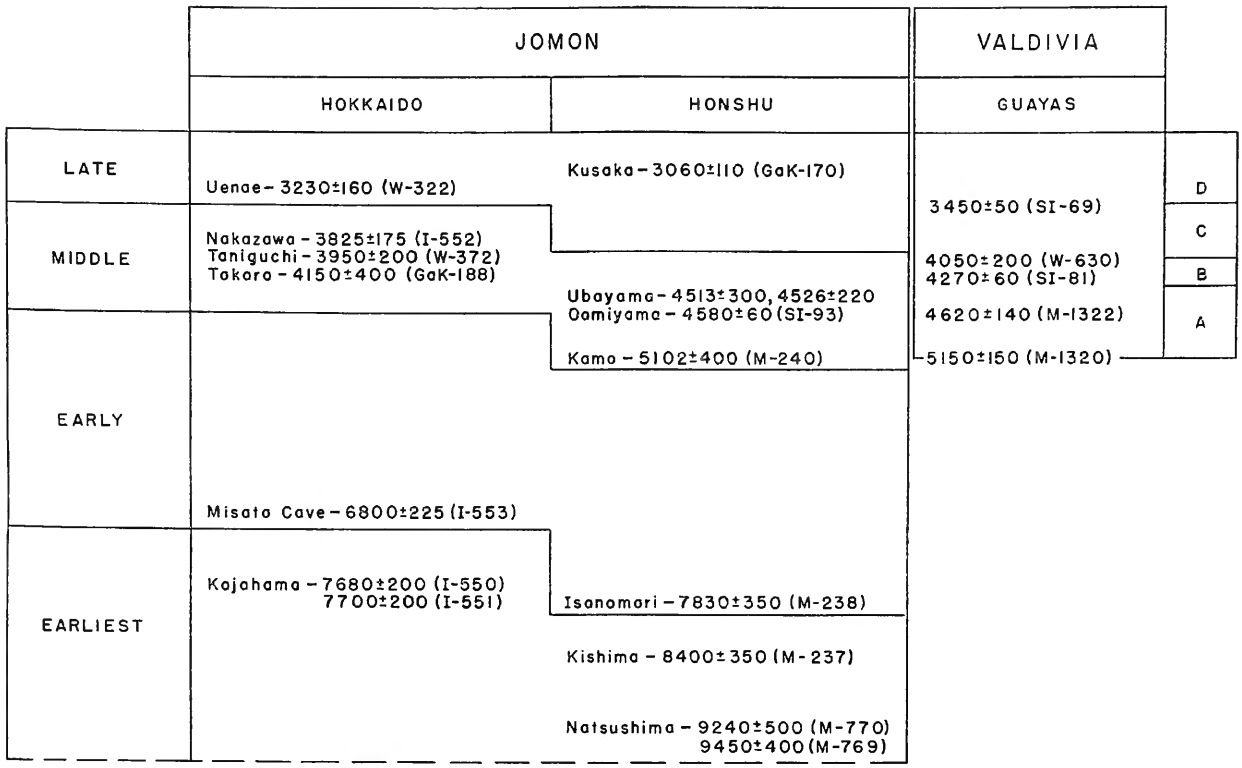

FIGURE 98.—Carbon-14 dates for Jomon sites on Hokkaido and Honshu, with selected Valdivia Phase dates for comparison.

(pl. 164 a–c, 167h). In other words, the Jomon incised style can be viewed as a common ancestor out of which the two Valdivia types have differentiated.

A similar situation exists with finger tip punctation (pl. 178 c–g) and pseudo-corrugation. These two decorative techniques are readily distinguished in the Valdivia Phase, and would not necessarily be recognized as related. However, in Jomon pottery there is a steady progression from one to the other (pl. 169), making it possible to postulate a process of evolution in which intermediate examples disappeared with the resulting emergence of two seemingly unrelated pottery types.

Multiple drag-and-jab punctate, a relatively rare technique in early Valdivia pottery, is more common in Jomon and displays a wider variation in execution. In Valdivia examples, adjacent bands are so carefully placed that the decorative technique is difficult to analyze. Although drag-and-jab by a multitoothed instrument, probably a piece of fluted shell, seemed the most probable method of execution, this was confirmed only after examination of the Jomon sherds. Here, multiple drag-and-jab occurs both in a continuous zone and in isolated bands, so that the track of a tool is clearly defined (pls. 170, 171, 183 g–i) and the technique obvious.

Combed and finger-grooved decoration are also more elaborated in Jomon. Valdivia Phase combing consists of individual vertical continuous or broken bands on a plain surface, whereas the Jomon version utilizes continuous straight or wavy lines, typically on a horizontally combed surface (pls. 172, 173). In both areas, this kind of decoration can be distinguished from brushing or shell scraping as a technique of surface texturing by its more systematic patterning, brushing being random in orientation (pls. 174, 175). Finger grooving is also more elaborated in Jomon, the surface between grooves typically ornamented with gashes or punctates. This added embellishment is rare in Valdivia (pl. 176). On the other hand, the characteristic Valdivia arrangement of vertical finger grooves on the neck of jars seems to be uncommon in Jomon.

In other instances, technique and motif of decoration are nearly identical. Excision makes use of the same crudely gouged out "hour-glass" or "dog-bone" elements (fig. 99; pl. 177). Red slipped vessels have interlocking rectilinear designs in broad-line incision alike in all details (pl. 178 a–b). Rocker stamping appears in the unusual "dragged" variant, as well as the more familiar form (pl. 179), and is applied

either as overall treatment or in isolated straight or meandering bands.

Certain combinations of techniques occur in both areas, among them shell scraping and shell stamping (pl. 180), fingertip punctation and finger grooving, excision and broad-line incision, rocker stamping and incision, incision and punctation (pl. 168), incision and nicked or finger-pressed rib (pl. 189 b, g). Others are restricted to Jomon, such as incision and shell stamping, multiple drag-and-jab punctate and shell stamping, fingernail punctation and shell stamping—all of which reflect the greater frequency of shell stamping in Jomon as opposed to Valdivia. Undulating and lobed rim embellishments in both areas are associated principally with broad-line incised and excised decoration (pl. 181). Folded-over rims are almost exclusively correlated with undecorated jars in Valdivia, whereas they often occur on incised vessels in Jomon. In both complexes, the lip may be nicked or finger pressed (pl. 182).

Three of the most popular Valdivia Period A decorated types are absent from all of the Kyushu collections examined. The principal early incised type, Valdivia Fine-line Incised, characterized by fine zoned hachure on a red-slipped surface, is represented by a few sherds from Natsushima and Mito shell mounds, on the southern coast of Honshu, both said to be of Middle Jomon date (pl. 183, a–f). Although this type has not to our knowledge been reported from Kyushu, its existence on Honshu suggests that it may be found with more careful search. No examples of the interior finger punching were observed in any of the collections, nor have we been able to discover any illustrations, in spite of the fact that several Japanese archeologists reported this kind of decoration to exist in Japan, and also on the north Asiatic mainland. Authorities and personal inspection of collections were both negative regarding a rim treatment like that characteristic of Valdivia Cut and Bevelled Rim. This could be a Valdivia Phase refinement of the lobed treatment often found on Jomon rims, in which case it would not exist in Japan; on the other hand, further search may yet turn it up.

Two rare early Valdivia techniques of decoration are also represented on Jomon pottery, but not in Kyushu collections examined. Valdivia Embossed, in which a face or stylized circular element is executed in relief on the exterior adjacent to the rim, is paralleled in the U.S. National Museum collections from the Late Jomon shell middens of Omori (pl. 184c), and Okubo (pl. 184a) in Chiba Prefecture, Honshu. A similar face on the side of a jar (pl. 184b), indicates the persistence of such treatment into the Later Jomon Period on Honshu (Esaka, 1960, p. 266). The similarity of these Valdivia faces to Jomon ones is particularly interesting in view of the total discontinuity between this form of anthropomorphic representation and that of pottery figurine faces in Valdivia Phase.

Designs incorporating impressions apparently produced by pressing a braided cord onto the surface or into an incised line occur on the pottery of both areas (pl. 185 c–d, f–g). Jomon examples come from Honshu or Hokkaido. Impression with a single cord (pl. 185 a–b, e) does not give the appearance of having been added to previously incised lines characteristic of braided cord impressions. The uniqueness of the braided cord impression and the fact that its maximum frequency is during Valdivia Period B, suggest that this decorative technique must be part of the introduced complex, and that its apparent absence from Valdivia Period A and Kyushu Early Middle Jomon must be a reflection of the small size of the pottery sample or the rarity of the technique or both.

In rim and vessel shape, the degree of similarity between Early Middle Jomon and early Valdivia is equally striking. Open or constricted bowls with direct rim and various kinds of carinated bowls are typical Jomon shapes (pls. 185 h–i, 186). Limitations

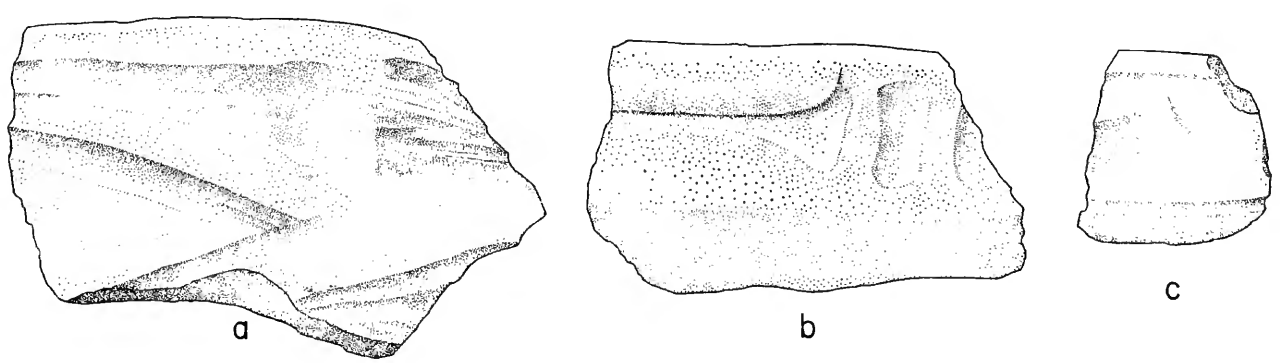

FIGURE 99.—Jomon and Valdivia Phase sherds with similar excised decoration. *a*, Mie. *b*, Nagasaki. *c*, Valdivia Phase.

of time permitted drawing rim profiles only for sherds bearing Valdivia Phase types of decoration, so that relative frequency of the shapes in the Early Middle Jomon ceramic complex is not known. However, it is interesting and probably significant that there is a similar association between rim profiles and decorative treatment in Jomon and Valdivia. When examples from the two areas are intermixed, as has been done for seven groups (fig. 100), matching extends to thickness, orientation, and lip form. Although variation exists within each group, examples from both areas occur throughout the range. The only consistent difference is a tendency toward rounding of the lip on Valdivia rims of Form A, and rounding or tapering of the lip on Form B, while Jomon rims typically have a flat lip. This distinction is not evident in the remaining forms. Parallels in Forms E and F are particularly interesting, since these are very rare rim types in early Valdivia. The existence of a Jomon prototype suggests they represent an introduction that failed to become popular. The folded-over rim, Form B, appears to occur with similar frequency in both areas, but the finger-pressed variant so abundant in early Valdivia is much rarer in Jomon, where embellishment was channeled more in the direction of lobing. Kyushu rim treatment never approached

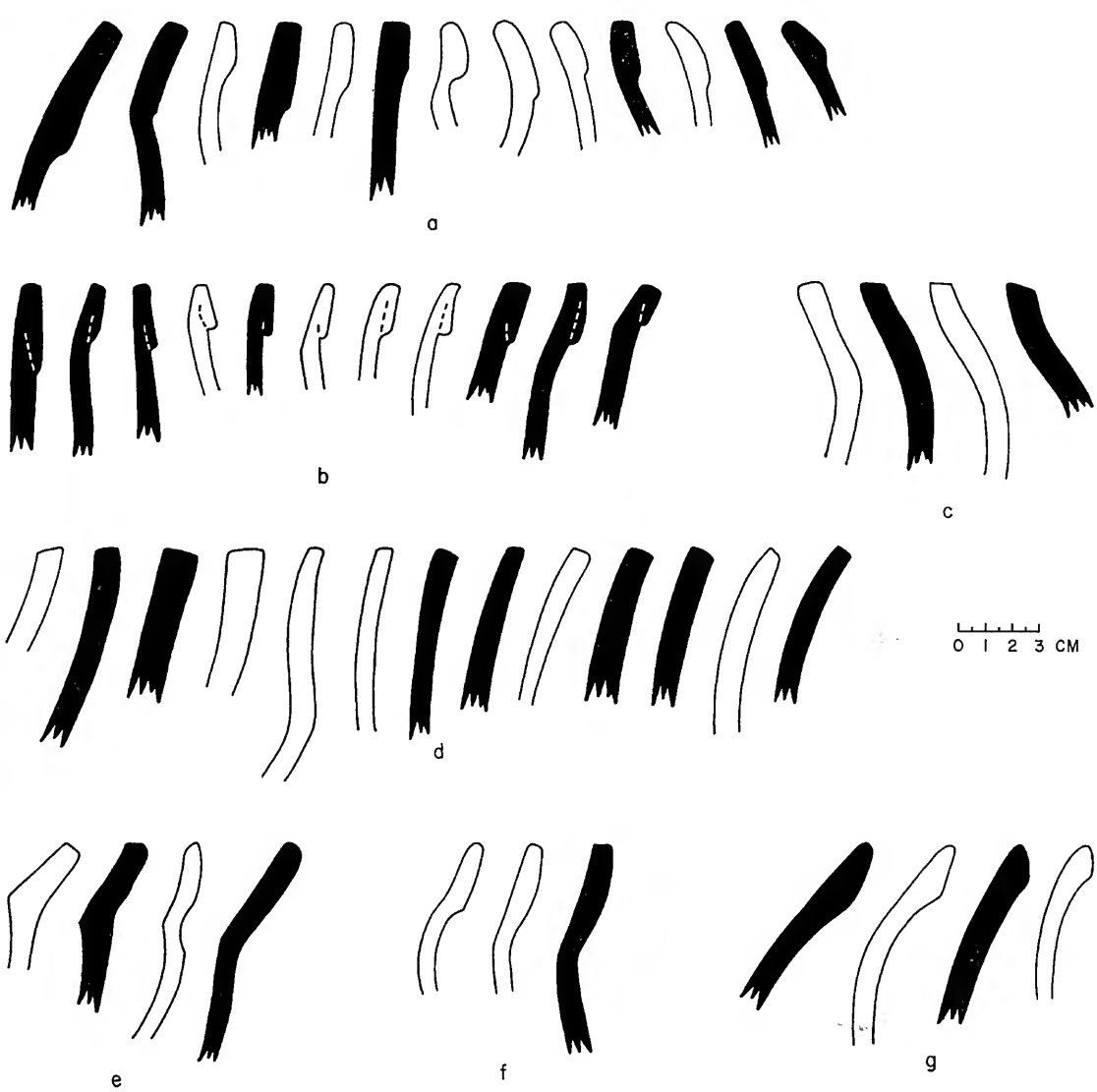

FIGURE 100.—Similarity between rim profiles of Jomon (solid) and early Valdivia (outline) pottery vessels. *a*, Exteriorly thickened. *b*, Folded-over. *c*, Direct, flat lip. *d*, Everted, flat lip. *e*, Everted and angular on interior. *f*, Curved cambered. *g*, Tapered.

the baroque elaboration typical of Honshu Middle Jomon, and is limited principally to undulating, notched or rectanguloid lobed treatment of the lip on bowls and jars, approximating the early Valdivia situation (pl. 181).

Two typical early Valdivia base forms—small tetrapod feet and a well defined circular depression—might also be expected to be represented in the Jomon material. Kidder (1957, fig. 5, no. 11) illustrates a tetrapod bowl as one of the undecorated vessel shapes in Horinouchi and Kasori types of pottery of Late Jomon date on Honshu, but we were able to find only two examples from Kyushu. One is from Izumi Shellmound, a site with numerous other Valdivia-like features (fig. 96). The other is from the site of Tanaka, for which no other information is available. Both are much cruder and somewhat larger than the Valdivia examples, but could have served as prototypes. Unfortunately, no concave bases similar to the Valdivia ones were observed, but it is possible that this was in part because of the rarity of plain sherds in collections available for examination. Support for such an assumption exists in Kidder's (1957, p. 90) statement that concave bases occur in Izumi pottery.

Castellated rim treatment, the feature that first called attention to the possibility of a transpacific origin, is very rare in the Valdivia Phase ceramic complex and apparently confined to the earliest part of Period A. Two variants are represented: 1) a slender vertical "prong," and 2) an outflaring point. Both of these extremes, and all degrees of variation between them occur on Jomon vessels (Kidder, 1957, figs. 12–27). One example of the first type, classified as Horinouchi A, shows not only the same rim treatment as the early Valdivia sherd (pl. 103 a–b), but has the rib leading to the castellation nicked horizontally in the same manner, and similar zigzag incised decoration on the upper body wall. It is somewhat later in date, if Jomon sequences are reliable, implying a convergence of vessel shape, decorative technique and motif in the two widely separated areas. A rim sherd very similar in outline and orientation to the second Valdivia type of castellation comes from Todoroki Shell Mound in southern Kyushu, dating from the Early Jomon Period (fig. 101a). Broad-line incision in horizontal parallel lines occupies the exterior adjacent to the rim, leaving the remaining surface undecorated. The Valdivia example has a similar band adjacent to the rim, with zoned punctation below and nicked lip treatment (fig. 101b). Although rim profiles are slightly different, there is no doubt that the general vessel shape is the same.

Several points of negative evidence also favor a Kyushu origin for Valdivia Phase pottery. One is the relative rarity of cordmarking. Cordmarking is almost nonexistent in Valdivia pottery, a fact that would be difficult to reconcile with a derivation from Honshu or Hokkaido, where this technique of decoration is exceedingly common from an early time. A second important consideration is the absence on Kyushu of the excessively ornate pottery, featuring fantastic castellations and high relief ornament producing a sculptural effect, associated with Middle Jomon on Honshu (Kidder, 1957, figs. 15–17). In fact, this "classic" Jomon pottery is less like contemporary material from southern Kyushu than is the pottery from across the Pacific at Valdivia (op. cit. p. 98).

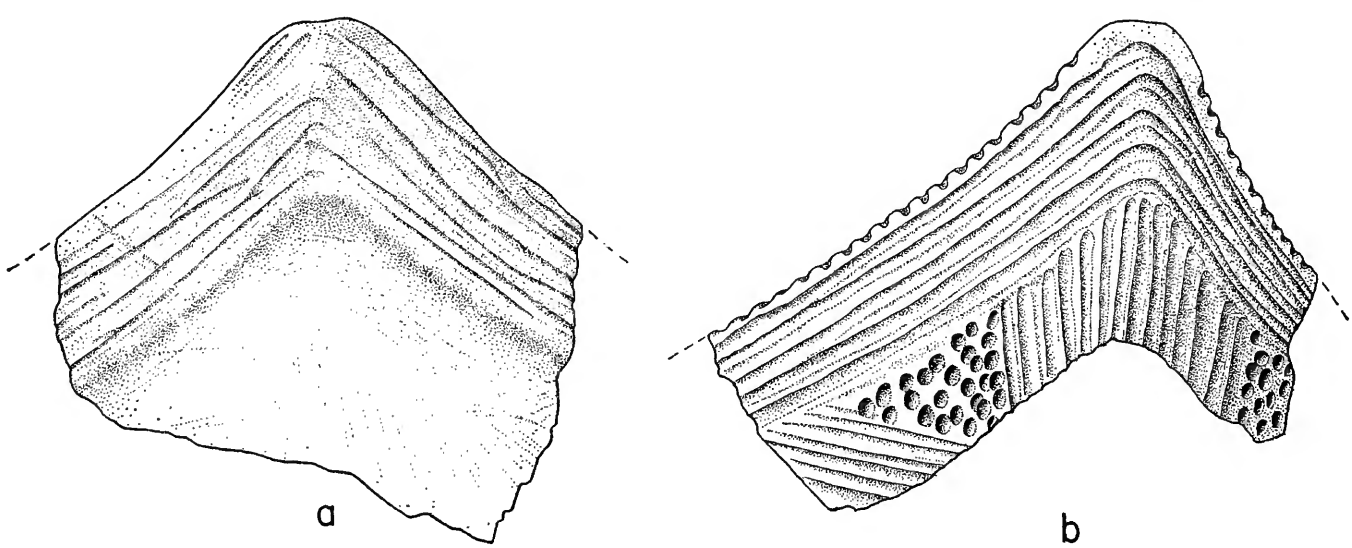

FIGURE 101.—Jomon and Valdivia Phase sherds with similar castellated rim treatment. *a*, Todoroki. *b*, Valdivia Phase.

If it can be granted that the idea of pottery making in the Valdivia Phase originated by transpacific contact from somewhere on Kyushu, it is of interest to investigate whether other elements may have been introduced at the same time, and particularly whether any Jomon antecedents can be found for the Valdivia Phase Period A stone figurines. Three types of the latter have been recognized: 1) Palmar Plain: a small, thin, elongated, plain surfaced slab (pl. 117 a–q); 2) Palmar Notched: a slightly thicker slab with a notch at one end suggesting legs (pl. 117 r–ee); and 3) Palmar Incised: a broader, thicker, larger stone with face and arms incised on one surface (pl. 118 a–j). The faces are executed in a stylized manner, often with a broad nose and thick lips.

A search for parallels in Jomon stone or pottery material is at first disappointing. The Japanese pottery figurines are not only totally dissimilar in all respects, but are generally confined to the Late Jomon period, so that their only significance from a comparative point of view is to demonstrate that use of figurines was shared by the two cultures. There are in addition, however, a number of carved stone "plaques", which although principally representing Late Middle and Late Jomon show several Valdivia-like features. The plaques are rectanguloid or ovoid in outline, with flat or slightly convex surfaces and rounded edges (Kidder, 1957, figs. 44–45). One or both surfaces are decorated, often elaborately, with a bilaterally symmetrical or asymmetrical incised design making liberal use of spirals and volutes. Some have a readily recognizable face at one end (e.g., Kidder, 1957, fig. 44, no. 18). More frequently, only two ovoid eyes with a horizontal incision across the center reveal the anthropomorphic nature of the artifact (fig. 102c). Many bear a purely geometric decoration.

Within this wide variety, several plaques show features also represented on the Valdivia Phase stone figurines of the Palmar Incised type. One is a pair of concentric semicircles extending from each side toward the center, in a manner like that employed on Valdivia figurines for stylization of the arms (fig. 102b). Another is a T-shaped junction of horizontal eyebrows and a narrow vertical nose (Kidder, 1957, fig. 44, no. 8–9, 20–21). A third similarity lies in use of an ovoid or rectanguloid outline with a horizontal incision at the center for depicting eyes (op. cit., fig. 45, no. 9–10), a treatment otherwise exhibited in the Valdivia Phase only on anthropomorphic faces incised or excised on vessel walls (pls. 41, 58 a–m). Several of the Late Jomon plaques with geometric ornamentation duplicate the interlocking motif characteristic of Valdivia Red Incised and Valdivia Excised pottery (fig. 102a–b; pls. 59a, 102 c–d) in a striking way.

Efforts to locate figurines resembling Valdivia stone Palmar Plain and Palmar Notched types in Jomon collections were unproductive at first. All scholars who saw the photographs disclaimed knowledge of anything similar until almost the end of our trip in

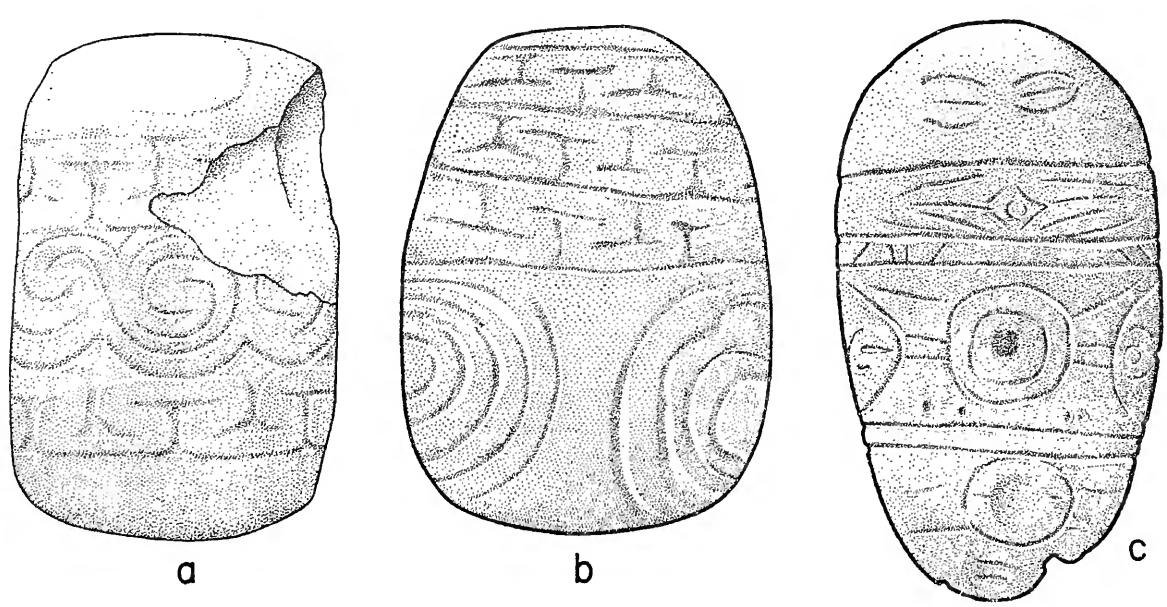

FIGURE 102.—Late Jomon stone and pottery plaques from Honshu sites with decorative motifs resembling those on Valdivia Phase pottery. *a*, Height 26.2 cm. (after Esaka, 1960, fig. 149). *b*, Height 7.5 cm. (after op. cit., fig. 119). *c*, Height 14.5 cm. (after op. cit., fig. 141).

tions from the most direct route, etc. as to be of little value. It can only be said with certainty that the trip must have taken many months, and that one or more members of the original crew must have survived, probably well tanned!

Arriving on the Ecuadorian shore, the travelers were met or soon found by the local residents, who presumably were living much the same kind of life as had been left behind on Kyushu—fishing, shellfish gathering, a little hunting and gathering of plants for food and fiber. The results make it apparent that the newcomers were welcomed and incorporated into the community. In the process, they introduced the art of pottery making, and very probably new religious practices that are reflected in the stone figurines. Other new ideas may also have been incorporated, but no tangible evidence has been recognized.

The Valdivians quickly became skillful potters, and in fact the most striking aspect of the material is its superiority in quality and artistry to pottery not only of contemporary Kyushu, but also of all other early Formative complexes in the New World. It is an ironical fact that attempts to relate Valdivia ceramics to Guañape on the coast of Peru, Monagrillo on the Pacific coast of Panama, or Puerto Hormiga on the Caribbean coast of Colombia involve more tenuous comparative evidence than can be brought to support the inference of Jomon-Valdivia connections. Undoubtedly, this situation would, if properly understood, shed light on the kind of contact that underlay diffusion of potterymaking both north and south (see pp. 6–7).

Puerto Hormiga, on the north Colombian coast (fig. 104), has produced the earliest pottery in South America aside from the earliest Valdivia date. Two carbon-14 dates are available, 4875±170 (I–445) and 4515±250 (I–1123) years ago, the former based on a shell sample and the latter on a charcoal sample from 30 cm. higher up in the deposit. The ceramic complex shows a number of striking similarities to early Valdivia (fig. 105) including decoration by multiple drag-and-jab punctate (pl. 188 c–e), finger grooving (pl. 188 a–c), broad-line incision, sometimes red-filled (Reichel-Dolmatoff, 1961b, p. 352), or nicked (pl. 188 c), and a ring with a dot at the center (Reichel-Dolmatoff, 1961b, Lam. II, 6). Several non-Valdivia Period A–B techniques and motifs of decoration are associated, including zoned dentate (pl. 188f), incisions terminating in a punctate (pl. 188b) and narrow bands of parallel hachure bounded by broad-line incision (pl. 188 l). Until publication of the detailed analysis of the Puerto Hormiga sequence it cannot be determined whether the latter are present from the beginning or introductions at some later time. Vessel shapes and rim profiles have not been described in sufficient detail for comparison with early Valdivia shapes.

Monagrillo, on the Pacific coast of Panama, with a carbon-14 date of 4090±70 years (Y–585), is approximately contemporary with the beginning of Valdivia Period C, and it is interesting to note the occurrence of nicked broad-line incision (Willey and McGimsey, 1954, fig. 47c), a decorative technique diagnostic of this part of the Valdivia Phase sequence (fig. 105). Other Monagrillo decorative techniques are excision (op. cit., figs. 12 a–d, 46 c, g, k), broad-line incision (op. cit., figs. 46f, 47b), and incisions terminating in a punctate (op. cit., figs. 12z, 46 g–i, l, 47a). Some sherds have scoring in the excised zones that may be related to the zoned hachure of other early complexes (op. cit., fig. 46 c, k–l). A Valdivia-like feature of vessel shape is the folded-over rim (op. cit., fig. 45h).

The most recent of the shell midden complexes reported on the north Colombian coast, that of Barlovento (fig. 108), incorporates a number of elements aligning it with the Valdivia-Puerto Hormiga-Monagrillo tradition (fig. 105), such as broad-line incision (Reichel-Dolmatoff, 1955, Lám. III, 6, 9), incision terminating in a punctate (op. cit., Lám. IV, 7), and post-firing application of red pigment to incisions (op. cit., p. 256). Certain examples of zoned hachure (op. cit., Lám. III, 3) can be seen as evolving from the Monagrillo practice of scoring excised areas. Circles or ovals frequently have a central punctate (op. cit., Lam IV, 3–6) reminiscent of the Puerto Hormiga dot-in-ring. Small rings stamped with a tubular instrument are relatively frequent (op. cit., Lám. III, 3, 8). Zoned punctation is the most common kind of decoration, produced with a variety of tools some of which created a circular mark (op. cit., Lám. IV, 5, 9). The abundance and variety of punctation makes it possible to interpret the presence of ring and zoned circular punctate elements in Barlovento and Valdivia Phase pottery as coincidental. On the other hand, they form part of a complex with wide temporal and spacial distribution and in this context their possible diagnostic value cannot be overlooked. With carbon-14 dates ranging between 3470±120 (W–739) and 2980±120 (W–741) years ago, Barlovento is approximately contemporary with late Period C and Period D of the Valdivia Phase, and if the analysis of its origin is correct represents the product of some 1300 years of divergent evolution.

Turning toward the south, the earliest pottery is from the Guañape complex on the north Peruvian coast (fig. 104), with a carbon-14 date of 4300±200 years (L–122D) for a shell sample from upper Early Guañape and 3100±200 years (L–122C) for a

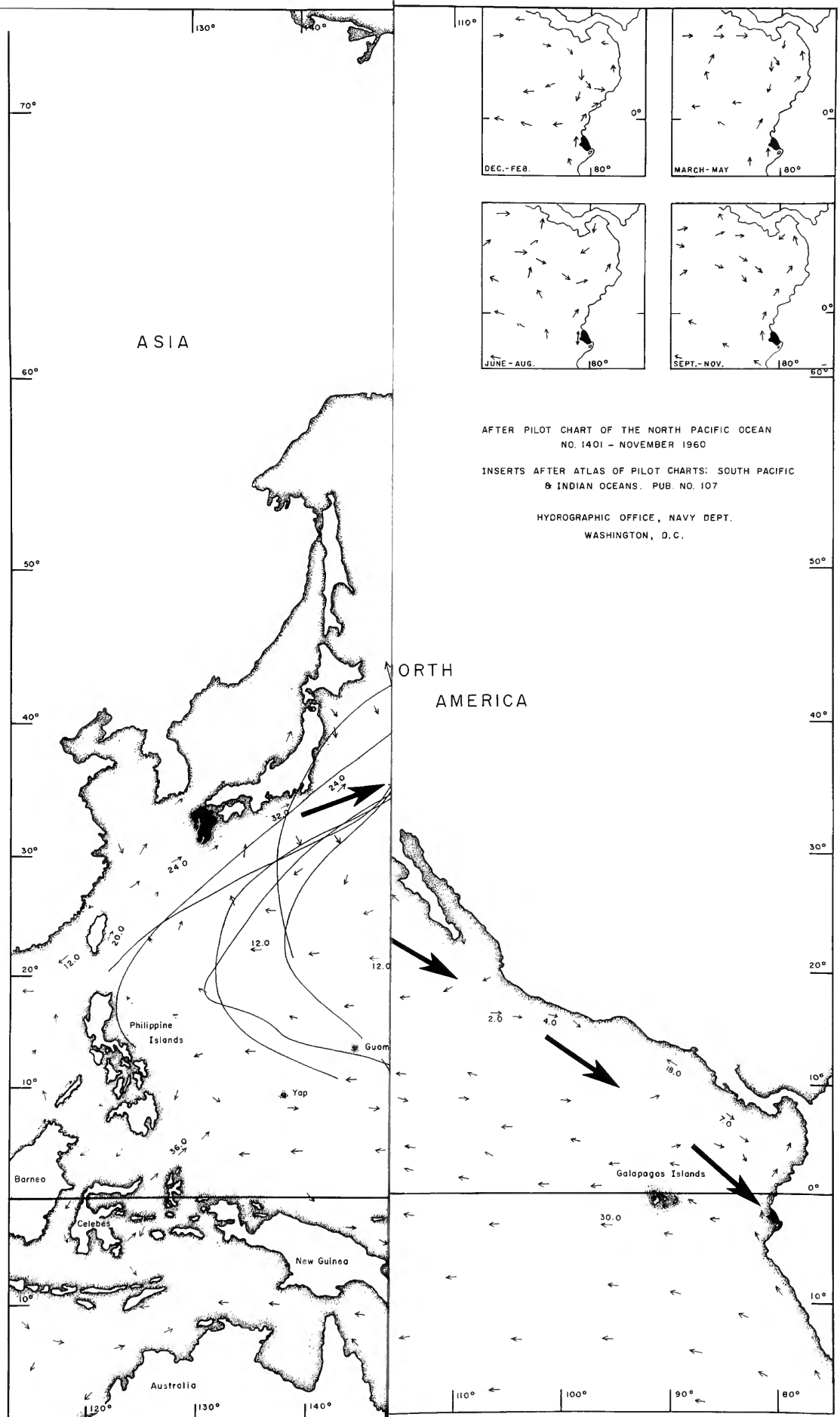

FIGURE 103.—The northern Pacific Ocean, showing
circle route between Kyushu, Japan and the Guayas

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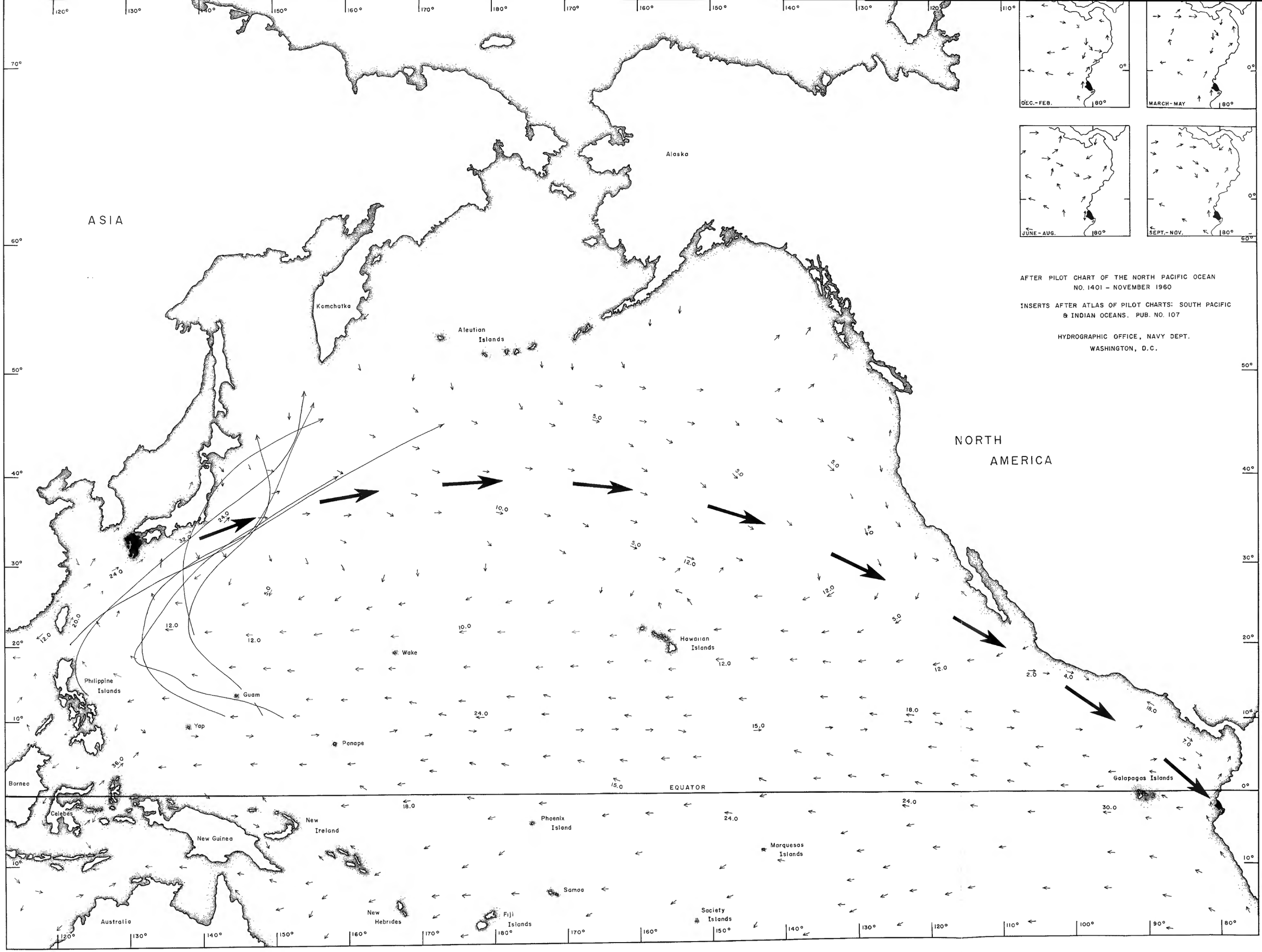

FIGURE 103.—The northern Pacific Ocean, showing direction and speed of principal currents, paths of cyclonic storms and the great circle route between Kyushu, Japan and the Guayas coast of Ecuador.

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charcoal sample from the same level. In terms of the Ecuadorian sequence, the shell date seems a more accurate reflection of the age of Early Guañape. Although this would place Early Guañape contemporary with the end of Valdivia Period A, the pottery is so simple that few similarities can be observed. Decoration is by punctation (Strong and Evans, 1952, fig. 48) or nicked and finger pressed rib (op. cit., figs. 45–46), both techniques represented in Valdivia Period A–B pottery. However, execution and motif are so different that considerable allowance must be made for readaptation and simplification during the process of diffusion if a connection is inferred. Similarities are somewhat greater in vessel shape, particularly in jar Form 18, with a rounded body and short insloping to vertical neck (Evans, Meggers and Estrada, 1959, fig. 81 top). Although these resemblances may seem to be a tenuous basis for inferring derivation of the earliest pottery of coastal Peru from Valdivia, the probability of a correlation is increased by failure to find anything earlier or more primitive in Peru in spite of a great deal of search. As Engel (translation, 1963b, p. 23) has recently noted:

> Up to the present time, we have been unsuccessful in efforts to find underneath the levels with well developed pottery, pottery of beginners. This does not of course prove that such pottery does not exist on the Peruvian coast, but the present state of knowledge finds us at the same point as Ford, Willey and other classic authors who twenty years ago reported a stage called "Cupisnique" in the Chicama Valley and "Guañape" in the Virú Valley superimposed on the preceramic remains.

An additional hint of possible Valdivia Phase influence on the Peruvian coast can be seen in similarities in face treatment between a carved gourd from preceramic levels at Huaca Prieta (Bird, 1962, figs. 7–9) and Valdivia Phase Palmar Incised stone figurines (pl. 118 a–b, g), and some incised and excised designs on pottery (pl. 58 f, h–i). Dated at about 4000 years ago, this is a little later than the Valdivia face motifs, but as an isolated find it may not represent the oldest Peruvian occurrence.

Returning to the evolving Valdivia culture, we find that Period C, estimated as beginning about 4000 years ago, is characterized by the introduction of several new and striking ceramic features, including Valdivia Nicked Broad-line Incised, Valdivia Rocker

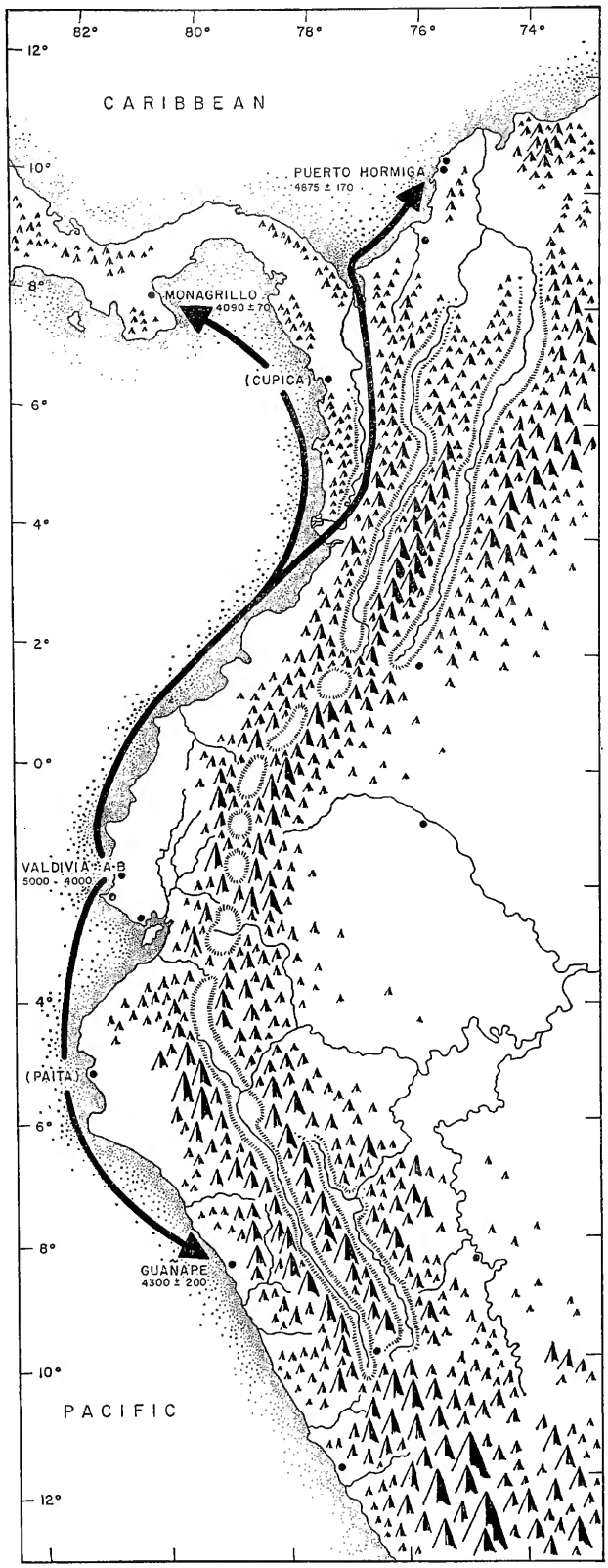

FIGURE 104.—Northwestern South America, showing location of pottery complexes carbon-14 dated between 5000–4000 years ago and their possible derivation from the early Valdivia Phase. Complexes with names in parentheses are of later date but incorporate early Valdivia decorated treatment suggesting they represent survivals. Routes are highly stylized and not intended to r eflectexact or exclusive paths of communication.

Phases and Periods	Pottery Techniques	Coastal Ecuador 5000–3000 BP	Puerto Hormiga 4800–4500 BP	Monagrillo 4000 BP	Barlovento 3500–3000 BP	Kotosh 3800–3000 BP	Momíl	Ancon 2900 BP	Tutishcainyo
Machalilla Phase 4000–3000 BP	Tiered jar neck	⊠				⊠			⊠
	Stirrup spout	⊠				⊠		⊠	
	Cylindrical spout	⊠				⊠		⊠	
	Zoned hachure (fine-line border)	⊠					⊠		
Valdivia Phase Period D: 3400–3000 BP	Zoned hachure (broad-line border)	⊠	⊠	(?)	⊠	⊠			⊠
	Concave-walled carinated bowl	⊠				⊠	⊠		⊠
Valdivia Phase Period C: 4000–3400 BP	Nicked broad-line incision	⊠	⊠	⊠					
	Zoned circular punctate	⊠			⊠	⊠	⊠		⊠
	Ring	⊠			⊠	⊠		⊠	
	Flange					⊠	⊠		⊠
Valdivia Phase Period A–B: 5000–4000 BP	Multiple drag-and-jab punctate	⊠	⊠						
	Finger grooving	⊠	⊠						
	Excision	⊠		⊠		⊠			
	Red-filled incision	⊠	⊠	(?)	⊠	⊠	⊠		
	Broad-line incision	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
	Dot-ended incision		⊠	⊠	⊠	⊠			⊠
	Zoned dentate stamping		⊠			⊠	⊠	⊠	
	Dot in ring	⊠	⊠		(?)	⊠	⊠	⊠	

FIGURE 105.—Occurence of selected Valdivia and Machalilla Phase decorative techniques and vessel form elements in other Formative complexes of Colombia and Peru. Information is derived from the following sources: Puerto Hormiga, Reichel-Dolmatoff, 1961b and pers. commun.; Monagrillo, Willey and McGimsey, 1954; Barlovento, Reichel-Dolmatoff, 1955; Kotosh, Izumi and Sono, 1963; Momíl, Reichel-Dolmatoff, G. and A., 1956; Ancon, Willey and Corbett, 1954; Tutishcainyo, Lathrap, 1962.

Stamped and Valdivia Applique Fillet in decoration (fig. 55), and the angular form of cambered rim and the spout in vessel shape (fig. 56). Attempts to explain these by evolution from previously existing types are inconclusive. Valdivia Nicked Rib or Nubbin, which has Jomon parallels (pl. 189), may be earlier than Valdivia Applique Fillet, and if so the latter could represent a modification of rib size and treatment. It is a logical step from broad-line incision to the additional embellishment of this incision by punctation or scoring, and this innovation may have been made independently by the Valdivia potters. In vessel shape, an evolutionary sequence can be made from the Period A gently curved rim to increasing angularity, resulting in the Period C cambered form (fig. 56). However, the common variety of rocker stamping, in which the instrument is dragged producing a "negative" impression in a broad groove (pls. 107–111) and the spout at the base of the neck (pl. 69p) are without apparent antecedents in the Valdivia Phase. On the other hand, they and most of the other new Period C elements have parallels in Japan.

The chronological and geographical position of these Valdivia Period C traits in Japanese material is more scattered than was the case with Valdivia Period A traits. Rocker stamping, identical in technique, occurs on Kyushu and Honshu and is dated on both islands as Early Jomon (fig. 96). An interesting detail of difference between the Jomon and Valdivia versions is that they tend to be mirror images. Jomon is more consistent than Valdivia in respect to direction of curvature, and examples of the Jomon variant appear among Valdivia examples more frequently than the Valdivia variant does in Jomon (pl. 179). Whether this decorative technique is restricted temporally to Early Jomon, or whether it survives sporadically into later times cannot be determined on the basis of existing information.

Nicked incision closely resembling several Valdivia varieties (pl. 190 a–f) occurs sporadically in Early and Middle Jomon complexes from Kyushu (fig. 96) and is represented in the Katsusaka and Atamadai types from Middle Jomon of Honshu (Groot and Sinotô, 1952, pl. IV, XV). Frequently, an elongated horizontal zone delimited by nicked incision has a

zigzag incised line running from end to end (op. cit., pls. III, 13; IV, 3, 6, 8; VIII, 2), exactly like that characterizing Valdivia Broad-line Incised, Motif 3, which is limited to Period C. One variant of Valdivia Nicked Broad-line Incised, in which the lower line is discontinuous or converges from two directions onto a low nubbin, is very similar to Honshu Middle Jomon style of execution (pl. 190a).

Vessels with short slightly upslanting spouts are present in Japan from Early Jomon times, although they become common only in Late Jomon of Honshu (Kidder, 1957). In the earliest period, the spout is just below the rim of a wide-mouthed, deep jar, while the typical Late Jomon Horinouchi or Kasori form resembles a teapot, with the spout on the rounded shoulder (ibid.). A small patch of red slip on the upper interior edge and a few incisions on the corresponding portion of the exterior identify the Valdivia spout as from just below the junction of the decorated neck with the rounded shoulder on a Valdivia Incised jar, a position that coincides better with the later than with the earliest Jomon form of spouted vessel.

In view of these Valdivia Period C innovations of Jomon-like affiliation, it is of interest to note a stone figurine head showing Buena Vista type characteristics from the Late Jomon Sakaizaki Shellmound, Kumamoto Prefecture, Kyushu (fig. 106; Esaka, 1960, p. 192). Eyes and nose are shown as depressions rather than slits, but the general treatment is much more like that of Valdivia figurines than of Jomon ones.

The fact that most Valdivia Period C innovations can be explained by local evolution in the Valdivia Phase ceramic complex makes it seem prudent to account for rocker stamping and the spouted jar form as earlier introductions only becoming sufficiently common to be represented in the refuse at this later time. Rocker stamping, which in more recent times has often been used for decorating gourds, might have been initially employed for this perishable medium. Since only one spout was identified in the entire pottery sample from all Valdivia Phase sites, it cannot be confidently concluded that the form was restricted to Period C.

About the beginning of Valdivia Period C, trade sherds of Machalilla Phase origin make their appearance in the refuse of Valdivia Phase sites, attesting to the arrival of this new complex on the central Ecuadorian coast. Strong evidence of interrelations in the form of trade sherds of the other Phase in both kinds of sites continues throughout Valdivia Period C and traces persist into Period D (fig. 93). Detailed analysis of the significance of this material for correlating the two Phases was given earlier (pp. 147–148) and need not be repeated here. It is of interest, however, to comment on the lack of evidence that this apparently intensive intercourse had any acculturative effect on the ceramics of either Phase for some 600 years. Although large quantities of Machalilla Red Banded have been recovered from G–54, and although red slipping of the entire vessel surface was a common

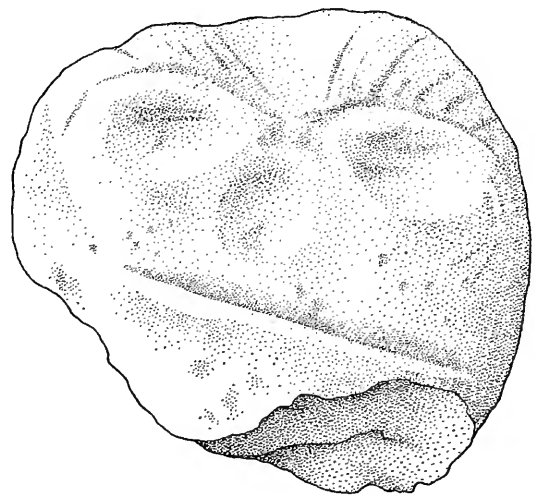

FIGURE 106.—Late Jomon stone figurine head from Sakaizaki Shell Mound, Kyushu bearing a slight resemblance to some examples of the Buena Vista type of the Valdivia Phase. (After Esaka, 1960, fig. 137.)

Valdivia Phase practice, there is no indication that Valdivia Phase potters made any effort toward duplicating Machalilla Phase wide or narrow banding. Nor does there appear to be any modification in vessel shape, although Machalilla Phase stirrup-spout jars for example were, to judge from their frequency, much appreciated by the Valdivians. The fact that a considerably larger sample of Machalilla Double-line Incised was recorded from the Valdivia Phase site of G–54 than from all of the Machalilla Phase sites combined suggests that this may have been a type made principally for "the market" rather than for home consumption, although the alternative possibility that it reflects developments during Machalilla Period B, not well illustrated by the present seriated sequence, has been given preferential consideration.

Some light is shed on this absence of acculturation by observations of the lack of receptivity on the part of modern Papago potters to potentially acculturative influences. Several women were shown films of pottery making by New Mexico Pueblo Indians, as well as a variety of archeological materials in the museum, and although they expressed great interest and asked numerous questions, they made no effort

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to incorporate any of the techniques or motifs of decoration into their own work. The investigators (Fontana, Robinson, Cormack and Leavitt 1962, pp. 82–83) concluded:

> What is most interesting is that Papago potters who have been "trained" in traditional Papago pottery techniques adhere to those techniques even when shown others . . . Papago pottery changes, to be sure, and there is an extensive allowable range in forms, clays, tempers, firing fuels, and so on. But the changes, like the range in techniques and materials, all occur within a framework that is distinctively Papago and beyond whose bounds no true Papago pottery will go.

That this kind of attitude is characteristic of small groups in general is suggested by the frequency with which situations paralleling the Valdivia-Machalilla exchange without acculturation have been reported by archeologists. If this is the normal attitude, the question is raised as to what factors bring about acculturation on the part of one or both groups between which trade relations exist.

About the end of Valdivia Period C, the seemingly harmonious lives of the people of the Valdivia and Machalilla Phases were disrupted. A geographical dislocation apparently occurred, in which the Machalilla Phase expanded southward to the Santa Elena Peninsula, and the Valdivia Phase retreated or was pushed southeastward into the Posorja area (fig. 2). That some of the Valdivians may have continued down the coast is suggested by Lanning's report (1963, pp. 153 and 207) of sherds with Valdivia Applique Fillet decoration (not illustrated by Lanning) from the coast of Peru near the mouth of the Chira River. On the other hand, illustrated sherds said to be associated are not similar to other Valdivia Period D pottery types, so that if his identification is correct it seems most likely to reflect trade relations. No evidence of the Valdivia Phase was encountered during survey of the coast of El Oro Province in southern Ecuador (Estrada, Meggers and Evans, 1964), but in adjacent Peru Izumi and Terada (1965) report a few sherds similar to Valdivia Zoned Incised, a Period D decorated type.

Whether the shift in geographical distribution of Machalilla and Valdivia Phase sites took place before or as a result of the arrival of immigrants from Mesoamerica will not be known until the transition between the Machalilla and Chorrera Phases is worked out in sufficient detail to make it clear where the earliest contact took place. In any case, the pottery of Valdivia Period D is strikingly different from that of Period C in spite of the continuation of several decorative types (fig. 55). Body wall thickness is markedly less, typically from 3–7 mm. in contrast to 6–12 mm. during Periods A–C. Several distinctive decorated types become popular, such as Punta Arenas Incised, Valdivia Carved and Valdivia Zoned Incised, while Valdivia Applique Fillet reaches maximum frequency. Vessels tend to be smaller and simpler in form, although most Period C shapes continue to be made (figs. 54, 56).

When the attempt is made to account for this seemingly rapid transformation, most clues point toward the Machalilla Phase. Punta Arenas Incised is similar to Machalilla Incised in both motif and vessel shape (cf. figs. 21 and 80; pls. 26 and 144 a–v). The marked decline in body wall thickness brings Valdivia Period D pottery into the range characteristic of Machalilla Phase pottery, so that sherds of Machalilla Polished Plain are more difficult to distinguish from those of Valdivia Polished Plain from Period D than the latter are to separate from sherds of the same type from Period C. The near disappearance of figurines in Period D parallels more closely the slight emphasis on this form of religious expression in the Machalilla Phase than the situation during Valdivia Periods B and C.

If these changes imply acculturation, the question arises as to what brought this about after several centuries of seeming resistance. A certain amount of ceramic deculturation might be accounted for by the relatively impoverished subsistence resources of the new environment, reflected in smaller size and lesser concentration of refuse deposits. Even if such a possibility is accepted, however, it fails to explain the tendency for Valdivia Phase Period D pottery to diverge toward Machalilla Phase norms rather than to develop into a simpler version of the preceding Period C complex. The most probable explanation would seem to be intermarriage, which would permit Machalilla Phase women to introduce some of their ceramic traditions into a Valdivia Phase community. Over a period of time, this kind of situation could produce an amalgamation of the two complexes with results similar to that illustrated by Valdivia Period D ceramics. Identification of an adult female with the Machalilla Phase variety of skull deformation (see Appendix 2, p. 226) among the burials at the Valdivia Period C site of G–115 (San Pablo) suggests that intermarriage did take place between the two populations, since it is doubtful that a war victim would be buried in the village even if cultural indications existed of hostility between the two groups, which they do not.

During the time that the Valdivia Phase was undergoing transformation, the Machalilla Phase was changing in a different way, with results that laid the foundation for the whole future development of aboriginal culture on the Ecuadorian coast. Before the Machalilla Phase was discovered, a number of Mesoamerican-like features were noted in the Chor-

rera Phase and influence from that region was postulated to account for them (Evans and Meggers, 1957, pp. 243–245). Shortly thereafter, a site producing most of the relevant ceramic and nonceramic traits was described by Coe (1960) on the coast of Guatemala. Sherds of Ocós and Conchas period types of Guatemala were matched with Chorrera and Tejar Phase sherds, illustrating the near identity of decorative techniques and motifs (op. cit., figs. 2–7). The keystone in the reconstruction was set in place with recognition of the Machalilla Phase. Adding Machalilla Phase elements to those present in Ocós and Conchas made it possible to account for nearly all the characteristic features of the Chorrera Phase (Meggers and Evans, 1962, table 1).

There remains, however, the problem of the origin of the Machalilla Phase, and here we run into an almost blank wall. There is little possibility of deriving it from Peru, where work on early ceramic cultures has failed to turn up anything even remotely similar. The attempt to suggest linkages with Mesoamerica runs afoul of the relatively late date for the first pottery complexes recognized so far in that area. The arrival of the Machalilla Phase is estimated by correlation with Valdivia Phase carbon-14 dates to have taken place about 4000 years ago. Nearly all early Formative ceramic complexes so far identified in Mesoamerica are 500 or more years more recent (Meggers and Evans, 1963, figs. 4–5), and are too sophisticated in form and decoration to represent the beginning of pottery making. An earlier and much simpler ceramic complex has recently been discovered in the Tehuacan Valley by MacNeish (1962, p. 36 and fig. 9), but in spite of its crudity and early date, between 2500 and 1500 B.C., he suggests that it "may not be the first modeled in Mexico but only an imitation of still earlier pottery (as yet unfound) in some other area" (MacNeish, 1964, p. 536). By analogy with the seafood subsistence pattern associated with Machalilla Phase pottery in Ecuador, the most likely place to search for such an early complex would seem to be along the coast.

Some of the earliest Mesoamerican styles incorporate elements of decoration and vessel shape so similar to some of the Machalilla Phase pottery as to suggest a relationship. Decoration resembling Ayangue Incised in technique and motif occurs in the Escalera and Francesca Phases in the region of Frailesca, southwest of Tuxtla Gutierrez, Chiapas (Navarrete, 1960, fig. 29), correlated with Chiapa III and IV; and in the Chiapilla Phase at Santa Cruz, on the Rio Grijalva east of Tuxtla Gutierrez (Sanders, 1961, fig. 23). At La Victoria, on the Guatemalan coast, Machalilla-like elements appear in the Conchas ceramic complex, including Ayangue Incised designs (Coe, 1961, fig. 35–i) and vessel shapes (op. cit., figs. 35i, 36l), and Machalilla Embellished Shoulder bumps (op. cit., fig. 36n). An even larger number of similarities occurs in Tlatilco pottery, including Ayangue Incised-like designs (Piña Chan, 1958, vol. I, figs. 16f, 35j, 36 r, s, 47), red banding (op. cit., figs. 14, 15, 28 b–k, 29 d–f), tiered jar (op. cit., fig. 37n), angular shouldered jar (op. cit., fig. 37p), cylindrical spouted jar (op. cit., fig. 39a′), stirrup spout jar (op. cit., figs. 43m, 44n), and carinated bowl forms (op. cit., figs. 21 i–l, p, 23 n–o; lam. 20).

Unfortunately, carbon-14 dates so far obtained place all these complexes nearly 1500 years more recent than the inception of the Machalilla Phase, making it difficult to argue for a derivation from Mesoamerica. This relatively late position is supported by the stratigraphic occurrence of the Machalilla Phase-like elements, which are clearly introduced in the Chiapas and La Victoria sequences into earlier ceramic traditions of different origins (fig. 107). Farther north, the Tlatilco complex in the Valley of Mexico is not well pinned down either stratigraphically or in terms of absolute dates. Existing carbon-14 determinations place it earlier than the Chiapas complexes, and radical guess dates extend it backward to about 1400 B.C. (Piña Chán, 1963, fig. 4). This is still at least 500 years too recent, however, to account for the origin of the Machalilla Phase, and would argue for derivation of Tlatilco from the Machalilla Phase rather than the reverse. A similar interpretation might fit the occurrence of Machalilla Phase-like features in Conchas, since these survive into the Chorrera Phase on the Ecuadorian coast, for which Ocos-Conchas connections have been established. Such possibilities, while fitting existing distributional and chronological evidence, fail to account for the appearance of the Machalilla Phase on the coast of Ecuador. Since the seafood subsistence pattern implies derivation from a coastal environment, and since the coast of central and southern Mexico and of Central America is still incompletely known, it can be hoped that an ancestral complex may yet be found in Mesoamerica. Otherwise, it may be necessary to conclude that the Lord was not resting all the time on the seventh day.

As a preliminary to suggesting possible interrelations between late Valdivia and Machalilla Phase pottery and other early ceramic complexes in the Andean Area, it is necessary to backtrack a few centuries in time and to examine the earliest materials from the central Peruvian highlands, represented by the Kotosh sequence with an initial carbon-14 date of between 3420 ± 220 and 3800 ± 110 years ago (Izumi, pers. commun.). As a result of intensive excavation at this site, the University of Tokyo archeologists have produced a sequence of six periods, defined in terms

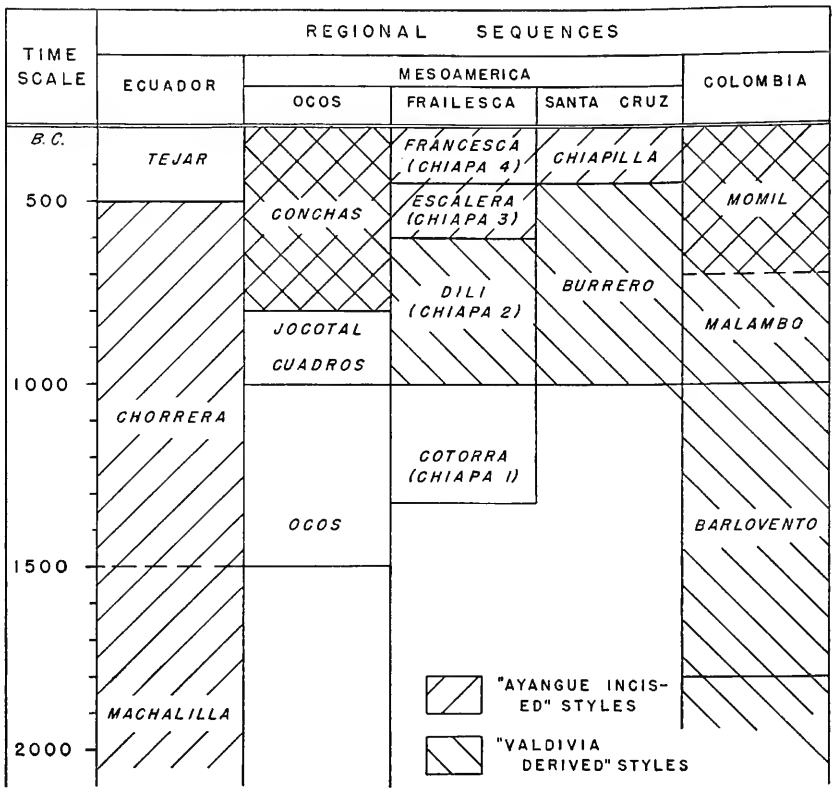

FIGURE 107.—Chronological position of certain Mesoamerican and Colombian complexes incorporating decorative techniques and motifs resembling Valdivia and Machalilla Phase (Ayangue Incised) types. Alignment is based on the following sources: Ocos, Coe, pers. commun.; Frailesca, Navarette, 1960; Santa Cruz, Sanders, 1961; Colombia, Reichel-Dolmatoff, 1955, 1956 and Angulo, 1963.

of pottery types and architectural constructions. Unfortunately, the attempt to correlate this sequence with other early South American sequences is frustrated by their unique approach to pottery classification, which groups under a single ware a number of the decorative techniques isolated by other archeologists, and by the assumption that complete vessels are the only reliable indicators of ceramic chronology, which causes rigid periodization of pottery types (Izumi and Sono, 1963, table 6). Tabulations of sherds by ware (op. cit., table 7), decorative technique (op. cit., table 9) and motif (op. cit., table 10) suggest a greater degree of continuity between periods and a longer time range for certain kinds of decoration than the complete vessels indicate. That continuity is a more accurate inference than discontinuity is also implied by the absence of significant innovations in architectural features during occupation of the site (op. cit., p. 65).

Examination of elements diagnostic of the two earliest periods, Waira-jirca and Kotosh, leads to the interesting observation that many are also represented in the "Valdivia-derived" complexes of northern Colombia (fig. 105). Similarities include traits that can be traced to Valdivia Periods A–B, a few diagnostic of Period C, and others originating in Colombia, such as dot-ended incision (pl. 191 l–m), zoned dentate, dot-in-ring (pl. 191 l–m), and zoned parallel hachure (pl. 191 n–s). Along with these are a number of traits missing in the early Valdivia complex, but diagnostic of Valdivia Period D and Machalilla Phase pottery, including tiered (pl. 191 a–b) and stirrup-spout jar forms. The latter imply communication between the early Machalilla Phase and a Kotosh-like ceramic complex, an implication further supported by the presence of three sherds at Machalilla Phase sites (pl. 158 g–i) reminiscent of zoned punctated pottery from Kotosh in vessel shape and decorative motif (pl. 191 f–k).

Association in the central Peruvian highlands of these two groups of elements clearly separated chronologically on the Ecuadorian coast can be accounted for by postulating convergence of two movements, one southward along the intermontane valleys from the Caribbean coast of Colombia and the other inland from the coast of Ecuador (fig. 108). Although pottery complexes of sufficient antiquity to serve as "stepping stones" have so far not been reported in the intervening highland area (an area literally untouched from the standpoint of modern archeological research), certain theoretical considerations tend to support such a reconstruction.

Among the most significant contributions of the Tehuacán Archaeological-Botanical Project has been

clear definition of the steps from plant gathering to plant cultivation and increasingly settled life, and the establishment of a preceramic context for this transition in Mesoamerica. Pottery making was added to the material culture inventory only after agriculture became the principal subsistence resource (MacNeish, 1962, fig. 9), and since Tehuacán ceramics are the earliest yet reported in Mesoamerica, it seems probable that pottery postdates rather well developed agriculture in other inland regions. Whether the same is true along the Mesoamerican coast cannot be determined on the basis of existing evidence. While all known coastal complexes are more recent, the relatively sedentary community pattern permitted by seafood subsistence appears to be a more congenial context for adoption of pottery than the wandering life of incipient agriculturalists or food gatherers.

In South America, present evidence indicates that pottery making appeared first among seafood exploiters on the coast of Ecuador, and was transmitted in the beginning to groups in similar circumstances along the coasts of Panama, Colombia, and possibly Peru (cf. Willey, 1958, p. 372). By analogy with Tehuacán evidence, inland diffusion of pottery making was dependent on prior acquisition of a staple crop permitting sedentary life. This being the case, it follows that the appearance of pottery in a highland situation implies previous (or simultaneous) acquisition of domesticated plants of sufficient productivity to constitute a dependable food resource. The existence of a preceramic building stage at Kotosh would fit such a theoretical model in two ways: 1) by attesting to the existence of sedentary populations in the central Peruvian highlands before the introduction of pottery; 2) by permitting projection of a similar situation of "subsistence readiness" toward the north, until a source for certain elements of the ceramic complex is reached.

The feasibility of the intermontane route for communication is well attested from Inca times to the present. Within Colombia, the Magdalena-Cauca river system, navigable for 900 miles, has been the major route of transportation for centuries (Herring, 1964, p. 8), taking second place only in the last few years to road and railroad, which follow most of its course. The Pan American Highway continues southward through the intermontane valleys of Ecuador

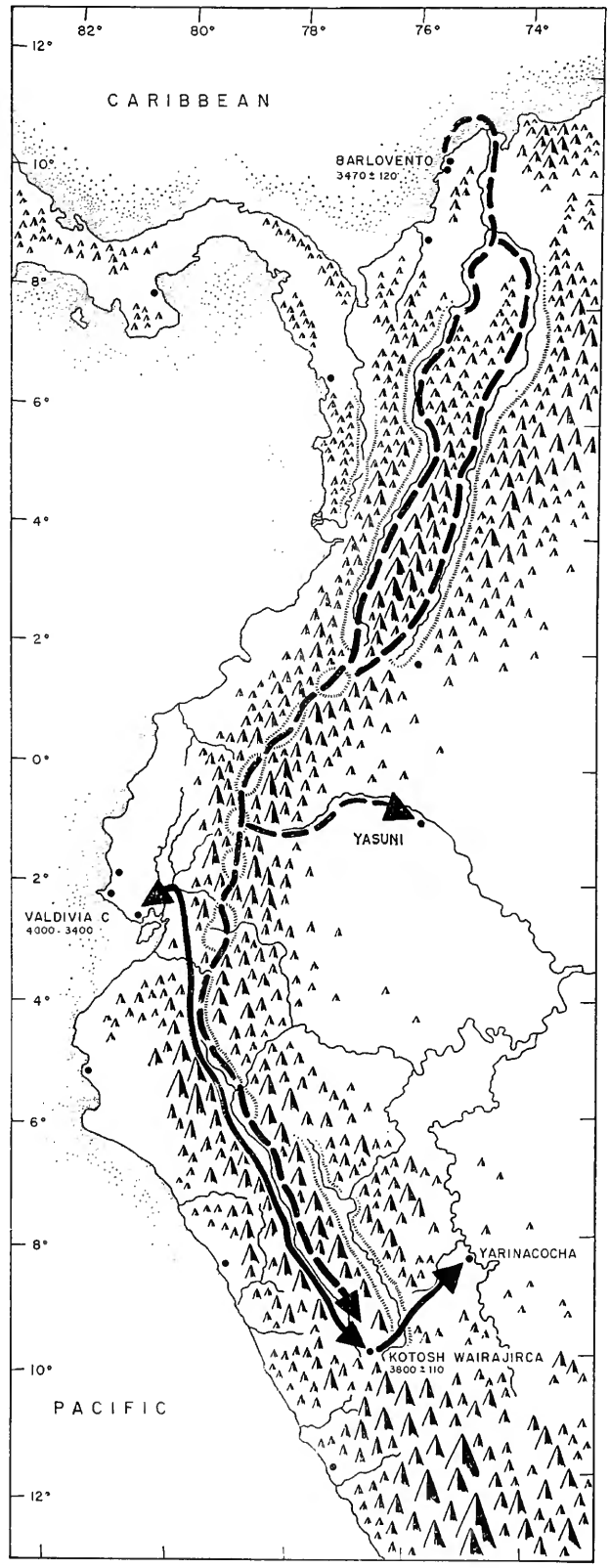

FIGURE 108.—Northwestern South America, showing location of pottery complexes carbon-14 dated between 4000–3400 years ago and possible routes by which they were spread. Dotted line passes through highland zones where no complexes of sufficient antiquity have been reported to provide corroboration for the hypothesis of cultural exchange. Routes are highly stylized and not intended to reflect exact or exclusive paths of communication.

and Peru, which have served as the principal route of communications since Colonial times (Morales y Eloy, 1942, pp. 34–5). Not only does this zone present no major geographical obstacles, but it is characterized by botanical continuity in the form of tropical montane forest (Eyre, 1963, map 6). Lack of pronounced regional diversity in soil or climate, reflected in the similarity of wild vegetation, would have facilitated dispersal of cultivated plants, and perhaps also ideas or experimental methods of incipient cultivation, from one part of this zone to another, in much the same manner as in Mesoamerica.

The suggestion that Colombia may have played a major role in New World plant domestication comes not only from its environmental similarity to the region definable as the Mesoamerican hearth (Meggers and Evans, 1963, fig. 18), but also from evidence (admittedly meager) that manioc utilization decreases in antiquity the farther one moves from this center toward the east, southeast or south. Neither of the principal South American staples—manioc and potato—have been found in early archeological sites in Mesoamerica, suggesting that they are of South American origin. Sweet manioc appears on the coast of Peru only after 1000 B.C., with pottery associations that can be traced to a highland ancestor resembling Kotosh Chavín, the third subdivision in the Kotosh sequence (figs. 105, 109).

A further kind of information bearing on this hypothesis is the variety of plants cultivated in the Colombian highland valleys at the time of the Conquest. According to Reichel-Dolmatoff (1961a, p. 85):

> In practically all regions maize was the most important food plant. Next in importance followed the root crops such as sweet manioc, racacha, sweet-potato, and yam. The highland dwellers grew at least two local types of potato and, besides, quinoa, ulluco, oca, topinambur, and cubios, a tuberous nasturtium. Other root crops were achira, yautia, and groundnuts; kidney and lima beans were widely cultivatad. A large number of more or less cultivated fruits included avocado pears, papaya, guava, custard apple, pineapple, soursop and others. The peach palm provided an important and very common source of food, and squashes, pepino, tomato, caimito, hogplums, and peppers were widely used. The greatest number of species was grown on the fertile temperate slopes of the Cordilleras.

While a number of these plants undoubtedly reached Colombia after being domesticated elsewhere, others are highland or temperate varieties for which an Andean origin seems probable.

In view of the argument presented by Lathrap (1963) for derivation of the Machalilla Phase from Tutishcainyo, the earliest phase at Yarinacocha in eastern Peru, examination of the possibility of an Amazonian origin is necessary. Unfortunately, such an hypothesis can be sustained only by ignoring the chronological position of Machalilla-like traits in the Yarinacocha sequence, and by attributing missing Machalilla Phase elements to local invention on the Ecuadorian coast. Two important elements shared by Early Tutishcainyo and Kotosh Waira-jirca—broad zoned parallel hachure and dot-ended incision—are unknown in the Machalilla Phase, while the early Machalilla Phase diagnostics—red banded decoration and stirrup spout jar form—have never been reported in Tutishcainyo ceramics. A further clue to relative chronological position of the two complexes comes from the appearance in Late Tutishcainyo of the tiered jar form introduced into the Kotosh sequence during the Kotosh period along with stirrup spouts, both characteristic of the beginning of the Machalilla Phase on the Ecuadorian coast. Numerous illustrations of decoration and vessel shape characteristic of Early and Late Tutishcainyo provided by Lathrap (1962, figs. 20–52) show no similarities in either category that might suggest any direct connection with the Machalilla Phase, but instead numerous features indicating derivation from a complex like that represented at Kotosh (figs. 105, 108).

Several other bits of evidence can be fitted into this hypothetical reconstruction of the spread of pottery making in northwestern South America. One is the appearance in Cupica Phase I on the north Pacific coast of Colombia (fig. 104) of several early Formative Ecuadorian ceramic features, such as jars with Valdivia Modeled decoration around the shoulder (Reichel-Dolmatoff, G. and A., 1961, Lám. IV, 1–2), and Machalilla Embellished Shoulder gashes (op. cit., Lám. IV, 5). The context suggests a considerably later date for the Cupica I complex, but the geographical location of the site along the route by which an early movement could have passed permits interpretation of these resemblances as survivals. A similar explanation may apply to jars with Valdivia Modeled decoration from Paita Phases C and D of the north Peruvian coast (Lanning, 1963, figs. 3 and 8), correlated by Lanning with Machalilla and Chorrera Phases (op. cit., table 22), both subsequent to disappearance of this type of decoration in the Valdivia Phase.

On the eastern side of the Andes, pottery from the Yasuní site on the Rio Napo shares broad zoned hachure and the flanged bowl form with Kotosh and Tutishcainyo, suggesting that it may represent an offshoot from a member of this tradition located in highland Ecuador, along the postulated route of movement from north to south (fig. 108). In the highlands of Colombia, the presence of dentate stamping on San Agustín pottery can be interpreted as another survival that may serve as a clue to the past.

If this general picture is valid, the complex of ceramic features presented by Momíl on the north coast of Colombia (fig. 105) is of considerable interest. Unfortunately, no carbon-14 dates have been obtained for the Momíl site, but dates from earlier complexes such as Malambo in the nearby area suggest that an estimate of 1000 B.C. for its inception may be too early. In addition to elements that align it with the earlier north Colombian complexes like Puerto Hormiga, Barlovento, and Malambo (Angulo, 1963, p. 58), Momíl includes a style of incision closely resembling Ayangue Incised (Reichel-Dolmatoff, G. and A., 1956, Lám. XVIII, 2, 4, 10) and duplicating the motif noted earlier as shared by the Machalilla Phase, Conchas of coastal Guatemala, and Escalera-Francesca and Chiapilla of southern Mexico. Typical Machalilla Phase bowl rim shapes occur in Momíl I, where they are associated with incised decoration (op. cit., p. 146 and fig. 8 LL, MM, NN) or embellished shoulder treatment (op. cit., Lám. VI–8). However, in Momíl I, these traits are associated with polypod and annular bases, polychrome painting, negative painting, and other elements suggesting a later chronological placement for the entire complex. Momíl II marks the first reported occurrence in northern Colombia of the so-called "basal flange" (op. cit., fig. 6), also represented at Kotosh and Yarinacocha. To complete the confusion, small tetrapod feet similar to the Valdivia form occur in Momíl I (op. cit., p. 225 and fig. 12–7), along with zoned dentate, in which zones may or may not be outlined by incision (op. cit., Lám. VIII–IX).

Such a combination of traits might be expected if Momíl is the consequence of developments of the kind postulated to have occurred in northern Colombia. Although too late to account for the origin of the Kotosh assemblage, it suggests that several earlier traits missing in Barlovento (such as zoned dentate) may have survived elsewhere in the region. The stirrup spout vessels in the late coastal Colombian complex of Santa Marta (Bennett, 1944, p. 106 and pl. 12–1) may constitute local persistence of another early trait.

Stirrup spouts are also represented in the Playa de los Muertos complex, which in other respects

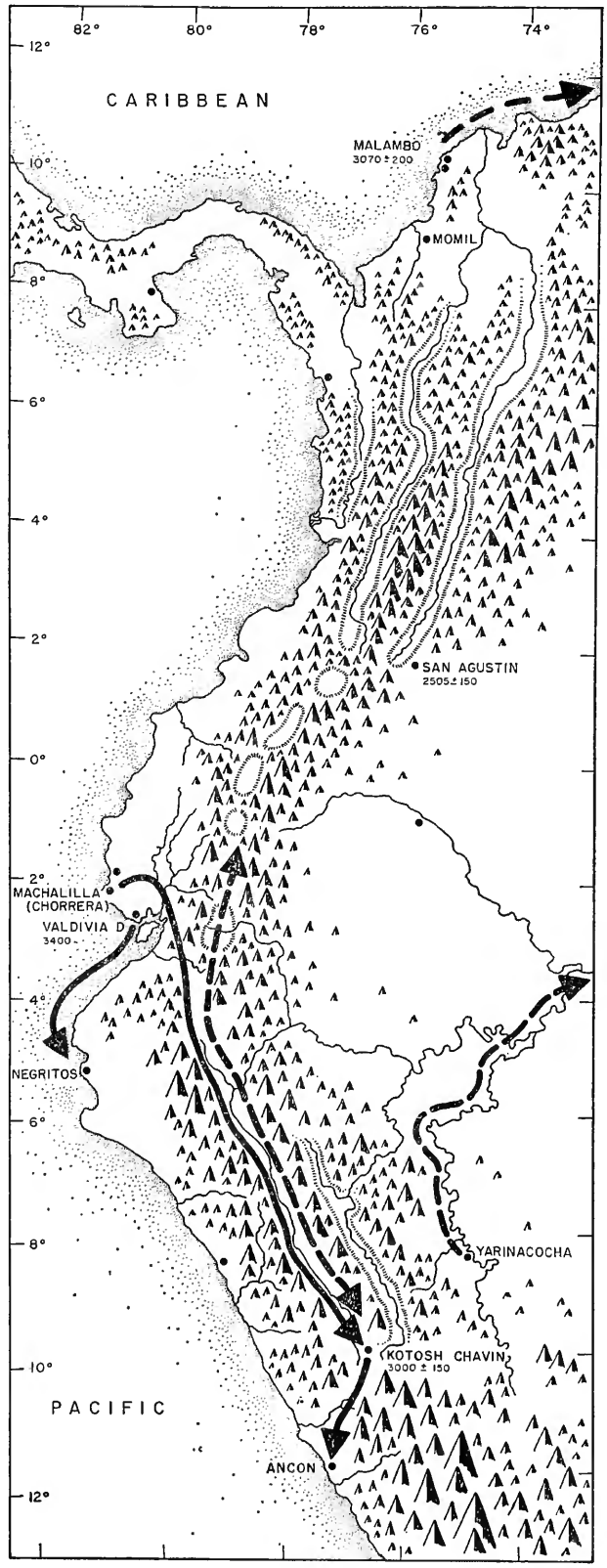

FIGURE 109.—Northwestern South America, showing location of selected pottery complexes carbon-14 dated between 3400–3000 years ago and possible routes of communication between them. San Agustín, although of more recent date, incorporates decorative techniques aligning it with earlier complexes at Momíl and Kotosh, suggesting the possibility of earlier occurrence of these traits in the Colombian highlands. Routes are highly stylized and not intended to reflect exact or exclusive paths of communication.

appears to be closely related to Tlatilco (Porter, 1953, pp. 66, 89). It is unfortunate that the Playa de los Muertos sequence is not well defined, and that chronological placement is based on tentative correlations with other early styles. However, its geographical location intermediate between central Mexico and northern South America points once again to Central America as a fruitful area for more intensive search for Machalilla Phase origins. The marginality of this region to centers of incipient agriculturism is an additional factor in its favor, in view of the probable preagricultural subsistence pattern of the Machalilla Phase.

Although most of the ceramic evidence points to a diffusion route into the highlands of southern Ecuador and Peru toward the end of the Ecuadorian early Formative Period, the introduction of fronto-vertico-occipital or tabular erecta flattening of the skull on the Peruvian coast in late preceramic times suggests that communication with that area also occurred. Munizaga (pp. 230–232) interprets the distributional and chronological contexts as reflecting differential diffusion of some of the constituent elements southward from the coast of Ecuador. This places skull deformation in a class with such other cultural traits as cotton and maize, which are apparently derived from areas where pottery was being made. If so, the failure of pottery making to be adopted on the coast of Peru at any of these successive opportunities is a situation for which no satisfactory explanation seems to exist at the present time.

The end of the early Formative Period on the coast of Ecuador is signaled by abandonment of the sea-oriented subsistence economy for a new way of life that permitted sedentary occupation along the river banks. The existence of early Chorrera Phase sites on the Rio Daule and Rio Babahoyo suggests that this inland flow was a relatively rapid one. The inference that it reflects the introduction of maize is based on several kinds of evidence. First, maize is associated with the coastal Guatemalan Ocós and Conchas Phases presenting the closest ceramic similarities to Chorrera. Second, maize becomes a major subsistence plant on the Peruvian coast about 800 B.C. in association with a ceramic complex that can be linked with the Chorrera Phase. Third, inland expansion of a sedentary community pattern depends on substitution of a reliable terrestrial staple for seafood, a role that can only have been played by agriculture. If inferences regarding the existence of early sedentary, nonceramic communities in the highland valleys are correct, failure of domesticates from this region to be adopted on the coast might be explained by their poor adaptation to lowland conditions and consequent inability to compete with seafood as the primary source of subsistence.

Reconstruction of the origin, interrelations and ramifications of the Valdivia and Machalilla Phases has moved us beyond the boundaries of available evidence into the realm of hypothesis. Although we hope that some of the interpretations will be confirmed by future work, others will undoubtedly be altered. If calling attention to the potential importance of Colombia and Central America in the origin and dissemination of certain South American cultural complexes serves to stimulate fieldwork in these areas, our efforts will have been well spent regardless of whether or not the hypotheses are upheld.

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Appendix 1

TABLES 1–17

TABLE 1.—*Frequency of species of mollusks in levels in G–31, Cuts A, F and H, of the Valdivia Phase (fig. 9)*

Periods	Levels in seriated sequence		*Anomalocardia subrugosa* Sby.		*Anomalocardia subimbricata* Sby.		*Anadara multicostata* Sby.		*Anadara tuberculosa* Sby.		*Astrae buschi* Philippi		*Arca pacifica* Sby.		*Aequipecten circularis* Sby.		*Bulla aspera* A. Adams	
	Cut	Level (cm.)	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
C	H	0–20	248	43.8	1	0.2	–	–	10	1.7	8	1.4	–	–	6	1.0	–	–
		20–40	521	47.3	14	1.2	–	–	15	1.3	16	1.4	–	–	2	0.2	1	0.1
		40–60	1,101	51.3	20	0.9	1	0.1	29	1.3	24	1.1	4	0.2	2	0.1	1	0.1
		60–80	776	49.3	10	0.6	1	0.1	36	2.2	24	1.5	1	0.1	1	0.1	–	–
		80–100	1,196	57.5	15	0.7	3	0.1	40	2.0	14	0.6	1	0.1	1	0.1	2	0.1
B		100–120	1,286	65.0	7	0.3	6	0.3	72	3.6	7	0.3	1	0.1	4	0.2	1	0.1
	F	0–20	59	67.9	–	–	1	1.1	1	1.1	1	1.1	–	–	–	–	–	–
		20–40	203	61.8	1	0.3	1	0.3	2	0.6	–	–	1	0.3	–	–	–	–
	H	120–130	1,176	64.7	4	0.2	5	0.3	64	3.5	15	0.8	–	–	5	0.3	–	–
	F	40–60	126	77.0	1	0.6	–	–	2	1.2	–	–	–	–	–	–	–	–
	H	130–140	1,307	50.8	7	0.3	9	0.4	116	4.5	22	0.9	1	0.1	12	0.5	–	–
A	A	160–180	405	62.2	1	0.2	–	–	76	11.6	6	0.9	–	–	39	6.0	–	–
		180–200	484	64.7	4	0.5	2	0.3	77	10.4	5	0.7	–	–	42	5.6	–	–
		200–220	214	53.8	5	1.2	3	0.8	37	9.3	1	0.2	–	–	1	0.2	–	–
		220–240	62	51.7	2	1.7	–	–	9	7.6	1	0.8	–	–	2	1.7	–	–

TABLE 1.—*Frequency of species of mollusks in levels in G–31, Cuts A, F and H, of the Valdivia Phase (fig. 9)*—Continued

Periods	Levels in seriated sequence		*Cerithidea valida* C.B. Adams		*Columbella major* Sby.		*Conus purpurascens* Brod.		*Cypraea robertsi* Hidalgo *C. arabicula* Lamarck		*Chama echinata* Brod.		*Cerithium adjustum* Kiener		*Dosinia dunkeri* Philippi		*Fissurella oirescens* Sby.	
	Cut	Level (cm.)	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
C	H	0–20	95	16.8	11	1.9	7	1.2	2	0.4	–	–	1	0.2	38	6.7	4	0.7
		20–40	160	14.5	23	2.1	4	0.4	8	0.7	–	–	–	–	62	5.6	9	0.8
		40–60	344	16.1	28	1.3	6	0.3	3	0.1	15	0.7	–	–	98	4.5	9	0.4
		60–80	308	19.7	26	1.6	3	0.2	2	0.1	6	0.4	–	–	55	3.5	8	0.5
		80–100	336	16.6	30	1.5	8	0.4	3	0.1	5	0.2	–	–	64	3.2	7	0.3
B		100–120	249	12.6	21	1.1	2	0.1	7	0.3	1	0.1	2	0.1	40	2.0	3	0.1
	F	0–20	2	2.3	3	3.5	1	1.1	–	–	–	–	–	–	2	2.3	1	1.1
		20–40	20	6.1	15	4.5	12	3.7	7	2.1	–	–	2	0.6	10	3.0	–	–
	H	120–130	300	16.5	15	0.8	1	0.1	6	0.3	1	0.1	–	–	33	1.8	1	0.1
	F	40–60	2	1.2	6	3.7	11	6.7	1	0.6	–	–	–	–	–	–	–	–
	H	130–140	748	29.1	18	0.7	5	0.2	4	0.2	–	–	2	0.1	57	2.2	4	0.2
A	A	160–180	34	5.2	1	0.2	–	–	–	–	–	–	–	–	42	6.4	–	–
		180–200	37	4.9	2	0.3	–	–	2	0.3	–	–	–	–	54	7.2	–	–
		200–220	59	14.8	–	–	1	0.2	–	–	–	–	–	–	28	7.0	2	0.5
		220–240	22	18.3	6	5.0	–	–	–	–	–	–	–	–	3	2.5	–	–

Periods	Levels in seriated sequence		*Glycymeris inaequalis* Sby.		*Mactra velata* Philippi		*Natica chemnitzii unifasciata* Lamarck		*Nodipecten subnodosus* Sby.		*Oliva peruviana* Lamarck		*Ostrea iridescens* Cpr.		*Ostrea fischeri* Dall		*Panamicorbula inflata* C. B. Adams		*Phyllonotus regius* Swainson, *P. radix* Gemlin	
	Cut	Level (cm.)	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
C	H	0–20	–	–	–	–	–	–	–	–	–	–	17	3.0	8	1.4	–	–	2	0.4
		20–40	–	–	2	0.2	9	0.8	1	0.1	–	–	49	4.4	12	1.1	5	0.5	6	0.5
		40–60	1	0.1	–	–	3	0.1	3	0.1	2	0.1	94	4.3	4	0.2	3	0.1	16	0.7
		60–80	3	0.2	–	–	4	0.3	1	0.1	5	0.3	59	3.7	2	0.1	3	0.2	3	0.2
		80–100	1	0.1	1	0.1	–	–	1	0.1	6	0.2	48	2.3	2	0.1	4	0.2	3	0.1
B		100–120	1	0.1	3	0.1	5	0.2	2	0.1	–	–	29	1.4	1	0.1	1	0.1	4	0.2
	F	0–20	–	–	–	–	–	–	–	–	–	–	2	2.3	–	–	–	–	–	–
		20–40	2	0.6	–	–	3	0.9	–	–	–	–	11	3.4	–	–	–	–	1	0.3
	H	120–130	–	–	2	0.1	2	0.1	3	0.2	2	0.1	31	1.7	1	0.1	4	0.2	2	0.1
	F	40–60	–	–	–	–	–	–	–	–	–	–	1	0.6	2	1.2	1	0.6	–	–
	H	130–140	–	–	–	–	8	0.3	–	–	3	0.1	40	1.5	4	0.2	–	–	3	0.1
A	A	160–180	–	–	–	–	–	–	–	–	–	–	12	1.8	–	–	–	–	2	0.3
		180–200	–	–	–	–	–	–	5	0.7	–	–	16	2.1	–	–	–	–	–	–
		200–220	–	–	–	–	–	–	–	–	–	–	16	4.0	2	0.5	–	–	2	0.5
		220–240	–	–	–	–	–	–	–	–	–	–	1	0.8	–	–	–	–	–	–

TABLE 1.—*Frequency of species of mollusks in levels in G–31, Cuts A, F and H, of the Valdivia Phase (fig. 9)*—Continued

Periods	Levels in seriated sequence		*Pinctada mazatlanica* Hanley		*Pitar (Lamelliconcha) concinnus* Sby.		*Porphyrobaphe isolama* Sby.		*Protothaca grata* Sby.		*Spondylus princeps* Brod.		*Strombus granulatus* Wood, *S. galeatus* Swainson		*Tegula reticulata* Wood		*Tagelus rufus* Bosc.	
	Cut	Level (cm.)	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
C	H	0–20	2	0.4	–	–	15	2.7	26	4.5	17	3.0	6	1.0	1	0.2	6	1.0
		20–40	4	0.4	2	0.2	28	2.5	47	4.2	26	2.3	11	1.0	3	0.3	14	1.2
		40–60	9	0.4	11	0.5	28	1.3	76	3.5	74	3.4	5	0.2	6	0.3	61	2.8
		60–80	4	0.3	2	0.1	10	0.6	62	3.9	39	2.4	6	0.4	5	0.3	39	2.6
		80–100	11	0.5	2	0.1	19	0.9	53	2.6	79	3.9	15	0.7	3	0.1	48	2.3
B		100–120	7	0.3	1	0.1	3	0.1	48	2.4	50	2.5	31	1.5	5	0.2	51	2.5
	F	0–20	2	2.3	–	–	2	2.3	3	3.5	5	5.8	–	–	–	–	–	–
		20–40	2	0.6	–	–	4	1.2	10	3.0	16	4.9	2	0.6	–	–	3	0.9
	H	120–130	13	0.7	2	0.1	6	0.3	35	1.9	7	0.4	31	1.7	–	–	27	1.4
	F	40–60	2	1.2	–	–	–	–	6	3.6	3	1.8	–	–	–	–	–	–
	H	130–140	3	0.1	–	–	7	0.3	66	2.5	16	0.6	4	0.2	8	0.3	34	1.3
A	A	160–180	1	0.2	–	–	1	0.2	3	0.5	7	1.0	6	0.9	–	–	11	1.7
		180–200	1	0.1	–	–	–	–	3	0.4	1	0.1	–	–	–	–	4	0.5
		200–220	4	1.0	1	0.2	–	–	6	1.5	–	–	3	0.8	–	–	5	1.2
		220–240	–	–	–	–	–	–	7	5.8	–	–	1	0.8	2	1.7	–	–

Periods	Levels in seriated sequence		*Thais crassa* Blainu		*Trivia radians* Lamarck		*Turbo squamiger* Reeve		*Triumphis distorta* Wood		*Trachycardium senticosum* Sby.		*Vasum muricatum caestum* Brod.		Unclassified		Totals	
	Cut	Level (cm.)	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
C	H	0–20	13	2.3	1	0.2	–	–	13	2.3	–	–	7	1.2	2	0.4	567	100.0
		20–40	21	1.9	1	0.1	5	0.5	15	1.3	1	0.1	4	0.4	4	0.4	1,105	100.0
		40–60	25	1.1	–	–	12	0.5	18	0.8	3	0.1	1	0.1	17	0.8	2,157	100.0
		60–80	23	1.5	–	–	8	0.5	26	1.6	2	0.1	5	0.3	7	0.4	1,575	100.0
		80–100	16	0.7	2	0.1	12	0.5	12	0.5	1	0.1	–	–	6	0.3	2,070	100.0
B		100–120	14	0.7	–	–	1	0.1	4	0.2	4	0.2	–	–	6	0.3	1,980	100.0
	F	0–20	2	2.3	–	–	–	–	–	–	–	–	–	–	–	–	87	100.0
		20–40	–	–	–	–	–	–	1	0.3	–	–	–	–	–	–	329	100.0
	H	120–130	10	0.6	–	–	–	–	5	0.3	2	0.1	–	–	8	0.4	1,819	100.0
	F	40–60	–	–	–	–	–	–	–	–	–	–	–	–	–	–	164	100.0
	H	130–140	16	0.6	–	–	11	0.4	15	0.6	6	0.2	3	0.1	11	0.4	2,570	100.0
A	A	160–180	1	0.2	–	–	–	–	–	–	–	–	–	–	3	0.5	651	100.0
		180–200	2	0.3	–	–	–	–	–	–	–	–	4	0.5	3	0.4	748	100.0
		200–220	–	–	–	–	3	0.8	2	0.5	1	0.2	–	–	3	0.8	399	100.0
		220–240	–	–	–	–	–	–	–	–	–	–	–	–	2	1.7	120	100.0

TABLE 2.—*Shell artifacts from the Valdivia Phase (fig. 20)*

Some levels not found in the seriated pottery sequences are interdigitated into this sequence based on their approximate position in time from all the evidence available. No samples were available from Period D Levels.

Periods	Levels in seriated sequence			Abraders & Polishers	Beads	Bowl or Cup	Disks	Fishhook Blanks	Fishhooks Small–Medium	Drilled Clam Shell Pendants	Drilled & Shaped Pendants	Drilled Pecten Pendant	Scoops, Spoons or Spatulas	Miscellaneous Worked Shell
	Site	Cut: Section	Level (cm.)											
	G–54	1	20–40	–	–	–	–	–	–	–	–	–	–	–
			40–60	–	–	–	1	–	–	–	–	–	–	–
			60–80	–	1	–	2	1	3	2	1	–	–	–
C			80–100	–	1	–	1	2	–	–	2	–	–	–
			100–120	–	1	–	2	4	2	1	–	1	–	–
			120–130	–	–	–	–	–	–	–	–	–	–	–
	G–31	A	20–40	1	–	–	–	–	–	–	–	–	–	–
		H	0–20	–	–	–	–	–	–	–	–	–	–	–
			20–40	–	–	–	–	–	1	–	–	–	–	–
			40–60	3	–	–	–	–	–	–	–	–	–	–
			60–80	–	–	–	–	–	–	–	–	–	–	–
			80–100	–	–	–	–	–	–	–	–	–	–	–
			100–120	1	–	–	–	–	–	4	–	–	–	–
		A	40–60	–	–	–	–	–	–	–	–	–	–	–
		F	0–20	–	–	–	–	–	–	–	–	–	–	–
			20–40	–	–	–	–	–	–	–	–	–	–	–
	G–31	A	60–80	1	–	–	–	–	–	–	–	–	–	–
			80–100	–	–	1	–	–	–	–	–	–	–	–
	G–88	2	0–30	–	–	–	–	6	1	–	–	–	–	–
			30–60	–	–	–	–	4	1	–	–	–	–	–
B	G–31	H	120–130	–	–	–	1	1	–	2	–	–	2	–
		F	40–60	–	–	–	–	–	–	–	–	–	–	–
		H	130–140	–	–	–	–	–	–	–	–	–	1	–
	G–88	2	60–90	–	–	–	–	4	–	–	–	–	–	–
	G–31	A	100–120	–	–	–	–	–	–	–	–	–	–	–
			120–140	–	–	–	–	–	–	–	–	–	–	–
			140–160	1	–	–	–	–	–	–	–	–	–	–
		J:E	90–120	–	3	–	–	–	–	–	2	–	–	–
		J:E	120–150	–	–	–	–	–	–	–	–	–	–	–
		J:E	150–180	1	1	–	–	–	–	–	1	–	–	–
		J:E	180–210	–	–	–	–	–	–	–	1	–	–	–

TABLE 2.—*Shell artifacts from the Valdivia Phase (fig. 20)*—Continued

Periods	Levels in seriated sequence			Abraders & Polishers	Beads	Bowl or Cup	Disks	Fishhook Blanks	Fishhooks Small–Medium	Drilled Clam Shell Pendants	Drilled & Shaped Pendants	Drilled Pecten Pendant	Scoops, Spoons or Spatulas	Miscellaneous Worked Shell
	Site	Cut: Section:	Level (cm.)											
		A	160–180	–	–	–	–	–	–	–	–	–	–	–
		B	180–200	–	–	–	–	1	1	–	–	–	3	1
		A	180–200	–	–	–	–	–	–	–	–	–	–	–
		B	200–220	–	–	–	–	–	–	1	–	–	1	–
			220–240	–	–	–	–	–	–	–	–	–	–	–
		A	200–220	1	–	–	–	–	–	–	–	–	–	–
		B	240–260	–	–	–	–	1	–	–	–	–	1	–
			260–280	–	–	–	–	–	–	–	–	–	–	–
		J:E	240–270	1	–	–	1	1	2	–	–	–	–	–
		J:D	150–180	–	–	–	–	–	–	–	–	–	–	–
		J:E	270–300	–	–	–	–	–	–	–	–	–	–	2
		B	280–300	–	–	–	–	–	–	–	–	–	–	–
			300–320	1	–	–	–	–	–	–	–	–	–	–
			320–340	–	–	–	–	–	–	–	–	–	–	
			340–360	1	–	–	–	–	–	–	–	–	1	–
A			360–380	–	–	–	–	–	–	–	–	–	–	–
		A	220–240	–	–	–	–	–	–	–	–	–	–	–
		J:E	300–330	–	1	–	1	2	1	–	1	–	–	–
		A	240–260	–	–	–	–	1	–	–	–	–	–	–
			260–280	–	–	–	–	–	–	–	–	–	–	–
			280–300	–	–	–	–	–	–	–	–	–	–	–
		J:E	360–390	–	1	–	–	1	1	–	1	–	–	1
		J:E	390–420	–	–	–	–	1	–	–	–	–	–	–
	G–88	3	0–20	–	–	–	–	–	1	–	–	–	–	–
	G–31	A	320–340	–	–	–	–	–	–	–	–	–	–	–
		J:D	240–270	–	–	–	–	1	–	–	–	–	–	–
			270–300	–	–	–	–	–	–	–	–	–	–	–
			300–330	–	2	–	–	1	2	–	2	–	–	–
		A	340–360	–	–	–	–	–	–	–	–	–	–	–
			360–380	–	–	–	–	–	–	–	–	–	–	–
			380–400	–	–	–	–	–	–	–	–	–	–	–
			400–420	–	–	–	–	–	1	–	–	–	–	–
	TOTALS:			12	11	1	9	32	17	10	11	1	9	4

TABLE 3.—*Stone artifacts and natural stone from Valdivia Phase (fig. 18)*

Some levels not found in the seriated pottery sequences are interdigitated into this sequence based on their approximate position in time from all the evidence available. No samples were available from Period D levels.

Periods	Levels in seriated sequence			Abraders	Blades	Choppers	Cores	Gravers	Grinding Stones	Hammerstones	"Jaketown" Perforators	Paint Stones	Pebble Polishers	Reamers	Saws	Scrapers	Sinkers	Burnt Sandstone Fragments	Coquina Fragments	Mudstone Fragments	Flakes	Natural Waterworn Pebbles
	Site	Cut	Level (cm.)																			
	G–54	1	20–40	–	2	3	1	–	4	–	–	–	–	–	–	–	–	204	–	226	51	2
			40–60	–	4	1	5	1	–	5	1	–	–	–	–	3	–	130	–	245	70	9
			60–80	–	6	1	3	1	–	4	–	–	–	–	–	2	–	87	–	180	60	12
			80–100	–	3	2	2	–	–	2	2	–	3	1	–	5	–	72	–	284	39	19
			100–120	–	–	–	3	–	–	1	–	–	8	–	–	3	–	74	–	268	61	19
C			120–130	1	2	–	2	–	–	–	–	–	5	–	–	3	1	53	–	71	21	6
	G–31	A	20–40	–	–	–	–	–	1	10	1	–	3	–	–	–	1	28	–	59	34	15
		H	0–20	1	–	–	5	–	1	3	2	–	–	–	–	–	–	190	16	380	55	26
			20–40	1	–	–	4	–	–	2	–	–	3	–	–	2	–	365	21	220	87	21
			40–60	–	–	3	7	–	1	3	2	–	–	–	3	1	–	363	28	276	118	34
			60–80	–	–	1	1	–	–	6	–	–	–	–	–	1	–	318	21	186	62	27
			80–100	–	–	–	1	–	–	5	1	–	1	–	1	1	–	509	26	250	58	43
			100–120	1	–	–	–	–	–	3	–	–	–	–	1	–	–	626	18	157	36	22
		A	40–60	–	–	–	4	–	2	9	–	–	2	–	–	–	1	162	7	128	20	12
		F	0–20	–	–	–	3	–	1	–	–	–	–	–	1	–	–	196	–	131	15	8
			20–40	–	–	–	–	–	–	4	–	–	–	–	–	–	–	239	–	266	21	17
		A	60–80	–	–	–	7	1	–	4	–	–	–	–	–	–	–	210	11	163	27	19
			80–100	–	–	–	1	–	1	2	–	–	2	–	–	–	–	55	2	50	11	2
	G–88	2	0–30	3	9	2	4	–	–	2	–	2	–	–	1	4	–	28	12	21	36	2
B			30–60	–	–	–	–	–	–	1	–	–	1	–	–	3	–	9	–	23	13	4
	G–31	H	120–130	–	–	–	–	–	–	3	–	–	–	–	–	–	–	108	1	687	23	12
		F	40–60	–	–	–	–	–	–	2	–	–	1	–	–	–	–	54	–	44	6	1
		H	130–140	–	–	–	–	1	–	6	1	–	1	–	1	–	–	77	5	1, 136	26	12
	G–88	2	60–90	–	3	–	3	1	–	1	–	3	2	–	–	2	–	1	–	31	16	4
	G–31	A	100–120	1	–	–	2	–	–	3	–	–	1	–	–	–	–	58	3	32	1	4
			120–140	–	–	–	–	–	–	3	–	–	–	–	–	–	–	37	1	23	2	–
			140–160	–	–	–	–	–	3	1	–	–	–	–	–	–	–	126	8	48	8	3
			160–180	–	–	–	–	–	1	3	–	–	1	–	–	–	1	104	6	44	2	6
		B	180–200	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	2	–
		A	180–200	–	–	–	–	–	–	2	–	–	1	–	–	–	–	60	–	24	3	6
		B	200–220	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	3	–
			220–240	–	1	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–
		A	200–220	1	–	–	1	–	–	–	–	–	1	1	–	–	–	143	5	63	2	6
		B	240–260	–	1	–	–	2	–	–	3	–	–	–	–	3	–	–	–	–	–	–
			260–280	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
			280–300	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			300–320	–	1	–	–	2	–	–	4	–	–	–	–	1	–	–	–	–	–	–
A			320–340	–	5	–	1	1	–	1	2	–	3	–	–	3	–	–	–	–	9	–
			340–360	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–
			360–380	–	1	–	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–
		A	220–240	–	–	–	–	–	1	–	–	–	–	–	–	–	–	69	2	45	3	2
			240–260	–	–	–	–	–	–	–	–	–	–	–	–	–	–	25	1	44	1	4
			260–280	–	–	–	–	–	–	–	–	–	–	–	–	–	–	29	2	28	1	–
			280–300	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	–	14	2	2
	G–88	3	0–20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	G–31	A	320–340	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	1	7	–	2
			340–360	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	6	–	1
			360–380	–	–	–	–	–	–	–	–	–	–	–	–	–	–	19	–	22	4	12
			380–400	–	–	–	–	–	–	–	–	–	1	–	–	–	–	23	5	16	5	8
			400–420	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	8	–	–
	TOTALS:			9	38	13	60	12	16	91	23	5	41	3	8	40	4	4, 869	202	5, 906	1, 015	404

TABLE 4.—*Chronological distribution of faunal remains from Valdivia Phase excavations*

Periods	Levels in seriated sequence: Site	Cut	Level (cm.)	Fish	Crab	Bird	Sea Turtle	Deer	Small Land Mammal	Reptile	Cameloid	Dog
	G–54	1	20–40	45	(a)	–	4	22	4	–	–	–
			40–60	52	(a)	–	3	21	3	1	–	–
			60–80	110	(a)	–	–	49	–	–	–	–
			80–100	126	(a)	3	14	153	4	–	4	3
			100–120	109	(a)	1	4	311	2	2	9	2
C			120–130	13	(a)	6	1	80	3	2	2	–
	G–31	A	20–40	9	(a)	–	–	–	–	–	–	–
	G–31	H	0–20	7	2	–	–	3	–	–	–	–
			20–40	16	10	–	–	5	–	–	–	–
			40–60	27	19	–	–	–	–	–	–	–
			60–80	25	22	–	3	2	–	–	–	–
			80–100	72	74	–	4	–	–	–	–	–
			100–120	62	84	–	4	–	–	–	–	–
	G–31	A	40–60	16	2	–	–	–	–	–	–	–
	G–31	F	10–20	1	–	–	–	1	–	–	–	–
			20–40	6	–	–	–	–	–	–	–	–
	G–31	A	60–80	19	1	–	–	1	–	–	–	–
			80–100	4	1	–	–	–	–	–	–	–
B	G–88	2	0–30	20	–	–	1	14	–	1	–	–
			30–60	17	–	–	1	9	–	–	–	–
	G–31	H	120–130	47	50	–	3	–	–	–	–	–
	G–31	F	40–60	–	1	–	–	–	–	–	–	–
	G–31	H	130–140	22	39	–	3	1	–	–	–	–
	G–88	2	60–90	9	–	–	2	11	–	1	–	–
	G–31	A	140–160	5	7	–	–	–	–	–	–	–
			160–180	3	8	–	–	–	–	–	–	–
			180–200	4	1	–	–	–	–	–	–	–
			200–220	4	–	–	–	–	–	–	–	–
A			220–240	10	1	–	–	–	–	–	–	–
			240–260	–	–	–	–	–	–	–	–	–
			260–280	–	–	–	–	–	–	–	–	–
			280–300	–	–	–	–	–	–	–	–	–

[a] Count unavailable for these levels.

TABLE 5.—*Bone and teeth artifacts from Valdivia Phase.*

Only those portions of the sequence having specimens are shown; hence, levels from Period D, the lower part of Period B and all of Period A are omitted.

Periods	Levels in seriated sequence: Site	Cut	Level (cm.)	Worked Fish Vertebrae	Fish Bone Awl	Deer Antler Awl	Saw Fish Teeth Awl	Bone Point
	G–54	1	20–40	–	–	–	1	–
		1	40–60	–	–	–	–	–
		1	60–80	–	1	1	1	–
		Bank Excavation		–	–	5	–	–
		Test Trench on Hill		–	–	1	–	–
		1	80–100	–	–	1	2	–
C		1 (N.E. ext.)	85–100	–	–	–	–	1
		1	100–120	–	2	1	1	–
		1	120–130	–	–	–	–	–
	G–31	A	20–40	–	–	–	–	–
		H	0–20	1	–	–	–	–
		H	20–40	–	–	–	–	–
		H	40–60	–	–	–	–	–
		H	60–80	–	–	–	–	–
		H	80–100	–	–	–	–	–
		H	100–120	–	–	–	–	–
		A	40–60	–	–	–	–	–
		F	0–20	–	–	–	–	–
		F	20–40	–	–	–	–	–
B		A	60–80	–	–	–	–	–
		A	80–100	–	–	–	–	–
	G–88	2	0–30	–	–	–	–	–
		2	30–60	–	–	–	–	–
	G–31	H	120–130	–	2	–	–	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*

	Pottery types	G–25: Punta Arenas de Posorja Tests		G–31: Valdivia									
				Cut A									
				20–40 cm.		40–60 cm.		60–80 cm.		80–100 cm.		100–120 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Polished Plain	422[a]	79.5	2	2.3	6	1.3	–	–	4	1.0	7	1.5
	San Pablo Plain			1	1.1	17	3.8	13	3.6	18	4.5	11	2.4
	Valdivia Plain			18	20.4	128	28.6	117	32.6	117	29.8	141	30.4
	Valdivia Polished Plain			16	18.2	86	19.2	76	21.1	82	20.8	84	18.1
	Valdivia Polished Red			7	8.0	66	14.7	90	25.0	74	18.8	114	24.6
	Valdivia Striated Polished Plain			5	5.7	49	10.9	23	6.4	32	8.1	34	7.3
DECORATED	Validiva Applique Fillet	4	0.7	3	3.4	8	1.8	2	0.5	2	0.5	–	–
	Valdivia Broad-line Incised	44	8.3	8	9.1	25	5.6	10	2.8	22	5.6	13	2.8
	Valdivia Brushed	3	0.6	24	27.3	32	7.1	3	0.8	16	4.1	18	3.9
	Valdivia Carved	11	2.1	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	–	–	3	0.7	1	0.3	3	0.7	4	0.8
	Valdivia Fine-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fingernail Decorated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	25	4.7	4	4.5	21	4.7	16	4.4	17	4.3	29	6.3
	Valdivia Modeled	–	–	–	–	4	0.9	9	2.5	5	1.3	6	1.3
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	9	1.7	–	–	3	0.7	–	–	2	0.5	2	0.4
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	–	–	–	–	–	–	–	–	–	–	1	0.2
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	4	0.7	–	–	–	–	–	–	–	–	–	–
	Unclassified	9	1.7	–	–	–	–	–	–	–	–	–	–
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	531	100.0	88	100.0	448	100.0	360	100.0	394	100.0	464	100.0
	SUBTOTALS:												
	Plain types	422	–	49	–	352	–	319	–	327	–	391	–
	Decorated types	109	–	39	–	96	–	41	–	47	–	73	–
	Trade pottery	0	–	0	–	0	–	0	–	0	–	0	–

[a] Eroded surfaces prevented typing. All plain types lumped into a total count.

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–31: Valdivia—Continued											
		Cut A—Continued											
		120–140 cm.		140–160 cm.		160–180 cm.		180–200 cm.		200–220 cm.		220–240 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Polished Plain	2	0.8	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain	13	5.5	26	2.3	16	2.4	15	2.4	21	6.3	37	8.4
	Valdivia Plain	60	25.2	377	33.6	178	26.5	190	30.8	119	35.8	130	29.7
	Valdivia Polished Plain	36	15.1	267	23.9	189	28.1	155	25.1	54	16.2	75	17.1
	Valdivia Polished Red	54	22.8	179	16.0	174	25.8	184	29.8	96	28.8	126	28.8
	Valdivia Striated Polished Plain	32	13.5	98	8.7	57	8.5	36	5.8	9	2.7	18	4.1
DECORATED	Valdivia Applique Fillet	2	0.8	3	0.2	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	12	5.1	40	3.6	21	3.1	17	2.8	12	3.6	6	1.4
	Valdivia Brushed	2	0.8	4	0.4	–	–	–	–	3	0.9	–	–
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	13	1.2	12	1.8	6	1.0	2	0.6	3	0.7
	Valdivia Fine-line Incised	–	–	–	–	1	0.1	–	–	–	–	–	–
	Valdivia Fingernail Decorated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	20	8.4	106	9.5	23	3.4	11	1.8	6	1.8	2	0.5
	Valdivia Modeled	2	0.8	2	0.2	1	0.1	–	–	11	3.3	40	9.1
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	1	0.1	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	1	0.4	2	0.2	–	–	1	0.2	–	–	–	–
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	2	0.8	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	1	0.1	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	–	–	–	–	2	0.3	–	–	1	0.2
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	238	100.0	1,119	100.0	674	100.0	617	100.0	333	100.0	438	100.0
	SUBTOTALS:												
	Plain types	197	–	947	–	614	–	580	–	299	–	386	–
	Decorated types	41	–	172	–	60	–	37	–	34	–	52	–
	Trade pottery	0	–	0	–	0	–	0	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–31: Valdivia—Continued											
		Cut A—Continued											
		240–260 cm.		260–280 cm.		280–300 cm.		300–340 cm.		340–360 cm.		360–380 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Polished Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain	41	10.6	23	10.0	10	8.6	14	9.3	10	9.3	10	8.8
	Valdivia Plain	110	28.7	81	35.2	34	29.1	59	39.1	50	46.4	72	64.2
	Valdivia Polished Plain	38	9.9	16	6.9	14	11.9	13	8.6	11	10.2	4	3.6
	Valdivia Polished Red	136	35.4	85	37.1	47	40.3	28	18.6	26	24.1	14	12.4
	Valdivia Striated Polished Plain	21	5.5	4	1.7	8	6.8	–	–	–	–	–	–
DECORATED	Valdivia Applique Fillet	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	1	0.3	–	–	–	–	3	2.0	–	–	1	0.7
	Valdivia Brushed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	1	0.3	–	–	–	–	–	–	–	–	–	–
	Valdivia Fine-line Incised	2	0.5	1	0.4	1	0.8	21	13.9	1	0.9	–	–
	Valdivia Fingernail Decorated	–	–	2	0.9	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	1	0.7
	Valdivia Incised	2	0.5	2	0.9	–	–	–	–	1	0.9	–	–
	Valdivia Modeled	31	8.0	16	6.9	1	0.8	11	7.3	7	6.4	11	9.6
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	–	–	–	–	–	–	1	0.6	–	–	–	–
	Valdivia Red Incised	1	0.3	–	–	2	1.7	1	0.6	2	1.8	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	–	–	–	–	–	–	–	–	–	–
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	384	100.0	230	100.0	117	100.0	151	100.0	108	100.0	113	100.0
	SUBTOTALS:												
	Plain types	346	–	209	–	113	–	114	–	97	–	100	–
	Decorated types	38	–	21	–	4	–	37	–	11	–	13	–
	Trade pottery	0	–	0	–	0	–	0	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–31: Valdivia—Continued											
		Cut A—Continued						Cut F					
		380–400 cm.		400–420 cm.		420–440 cm.		0–20 cm.		20–40 cm.		40–60 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain	10	8.8	23	9.2	11	8.9	103	4.8	49	3.9	10	4.1
	Valdivia Plain	73	64.2	170	68.4	92	74.2	747	34.5	273	21.6	40	16.4
	Valdivia Polished Plain	9	7.9	13	5.2	4	3.2	372	17.3	276	21.8	72	29.4
	Valdivia Polished Red	11	9.7	22	8.8	7	5.7	181	8.4	157	12.4	33	13.5
	Valdivia Striated Polished Plain	–	–	–	–	–	–	91	4.2	138	10.9	43	17.6
DECORATED	Valdivia Applique Fillet	–	–	–	–	–	–	9	0.4	2	0.2	–	–
	Valdivia Broad-line Incised	–	–	1	0.4	2	1.6	49	2.3	26	2.1	6	2.4
	Valdivia Brushed	–	–	–	–	–	–	50	2.3	32	2.6	3	1.2
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	1	0.8	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	–	–	–	–	9	0.4	7	0.5	1	0.4
	Valdivia Fine-line Incised	1	0.8	1	0.4	–	–	–	–	–	–	–	–
	Valdivia Fingernail Decorated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	1	0.8	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	1	0.8	–	–	–	–	501	23.3	286	22.6	28	11.4
	Valdivia Modeled	8	7.0	19	7.6	5	4.0	–	–	–	–	1	0.4
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	–	–	8	0.3	5	0.3	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	1	0.1	2	0.2	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	–	–	–	–	–	–	7	0.3	2	0.2	1	0.4
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	–	–	–	–	–	–	16	0.8	6	0.6	2	0.8
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	1	0.1	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	–	–	2	1.6	12	0.5	1	0.1	5	2.0
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	114	100.0	249	100.0	124	100.0	2,157	100.0	1,262	100.0	245	100.0
	SUBTOTALS:												
	Plain types	103	–	228	–	114	–	1,494	–	893	–	198	–
	Decorated types	11	–	21	–	10	–	663	–	369	–	47	–
	Trade pottery	0	–	0	–	0	–	0	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–31: Valdivia—Continued											
		Cut H											
		0–20 cm.		20–40 cm.		40–60 cm.		60–80 cm.		80–100 cm.		100–120 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain	9	1.1	7	0.5	26	1.7	12	1.5	9	0.9	22	2.6
	Valdivia Plain	119	15.4	243	15.8	243	16.3	162	19.7	303	30.4	256	30.2
	Valdivia Polished Plain	141	18.1	224	14.6	227	15.2	137	16.7	156	15.7	165	19.5
	Valdivia Polished Red	109	14.0	208	13.6	142	9.5	105	12.8	95	9.6	109	12.9
	Valdivia Striated Polished Plain	101	13.0	161	10.5	186	12.4	82	9.9	103	10.4	72	8.5
DECORATED	Veldivia Applique Fillet	19	2.4	21	1.3	37	2.5	22	2.7	15	1.5	15	1.8
	Valdivia Broad-line Incised	42	5.3	71	4.6	65	4.3	50	6.1	42	4.2	26	3.1
	Valdivia Brushed	124	15.9	442	28.8	392	26.1	168	20.4	128	12.9	93	11.0
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	1	0.1
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	–	–	–	–	–	–	1	0.1
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	7	0.9	13	0.8	8	0.5	5	0.6	10	1.0	4	0.5
	Valdivia Fine-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fingernail Decorated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	93	11.9	117	7.6	145	9.7	64	7.8	125	12.6	74	8.7
	Valdivia Modeled	–	–	1	0.1	–	–	–	–	–	–	1	0.1
	Valdivia Multiple Drag-and-Jab Punctate	–	–	1	0.1	–	–	1	0.1	1	0.1	1	0.1
	Valdivia Nicked Broad-line Incised	–	–	6	0.4	4	0.3	–	–	1	0.1	–	–
	Valdivia Nicked Rib or Nubbin	1	0.1	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	12	1.5	19	1.2	15	1.0	5	0.6	3	0.3	1	0.1
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	3	0.4	–	–	7	0.5	6	0.7	2	0.2	4	0.5
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	1	0.1	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	–	–	–	–	1	0.1	1	0.1	2	0.2
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	1	0.1	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	1	0.1	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	780	100.0	1,535	100.0	1,497	100.0	823	100.0	994	100.0	847	100.0
	SUBTOTALS:												
	Plain types	479	–	843	–	824	–	496	–	666	–	624	–
	Decorated types	301	–	692	–	673	–	325	–	328	–	223	–
	Trade pottery	0	–	0	–	0	–	2	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–31: Valdivia—Continued											
		Cut H—Continued				Cut J: Section D							
		120–130 cm.		130–140 cm.		60–90 cm.		90–120 cm.		120–150 cm.		150–180 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain	9	1.2	26	3.5	[b] 617	31.3	1,495	33.00	3,729	30.30	5,645	46.70
	Valdivia Plain	236	33.5	211	28.2								
	Valdivia Polished Plain	147	21.0	230	30.8	500	25.3	1,238	27.35	3,559	28.94	2,201	18.30
	Valdivia Polished Red	141	20.0	127	17.0	522	26.4	1,111	24.70	3,326	27.10	3,010	25.00
	Valdivia Striated Polished Plain	49	6.9	47	6.3	68	3.4	243	5.38	681	5.55	653	5.40
DECORATED	Valdivia Applique Fillet	2	0.3	1	0.1	11	0.6	24	0.50	74	0.60	21	0.20
	Valdivia Broad-line Incised	33	4.7	36	4.8	63	3.2	70	1.50	204	1.66	108	0.90
	Valdivia Brushed	22	3.1	13	1.7	37	1.9	189	4.05	390	3.17	25	0.21
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	1	0.02	3	0.02	4	0.03
	Valdivia Cord Impressed	–	–	–	–	2	0.1	2	0.03	–	–	–	–
	Valdivia Corrugated	–	–	–	–	–	–	–	–	–	–	3	0.01
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	1	0.02	2	0.01	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	1	0.01	–	–
	Valdivia Excised	8	1.1	5	0.7	4	0.2	3	0.05	–	–	8	0.06
	Valdivia Fine-line Incised	–	–	–	–	4	0.2	7	0.15	15	0.10	25	0.20
	Valdivia Fingernail Decorated	–	–	–	–	2	0.1	–	–	1	0.01	4	0.03
	Valdivia Finger Grooved	–	–	1	0.1	–	–	–	–	–	–	4	0.03
	Valdivia Incised	55	7.8	43	5.8	83	4.2	88	1.90	103	0.80	19	0.15
	Valdivia Modeled	–	–	4	0.5	12	0.6	29	0.60	151	1.23	330	2.70
	Valdivia Multiple Drag-and-Jab Punctate	–	–	1	0.1	–	–	1	0.02	1	0.01	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	2	0.3	–	–	42	2.1	28	0.60	48	0.40	–	–
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	1	0.1	2	0.3	5	0.3	4	0.07	8	0.06	10	0.08
	Valdivia Red Incised	–	–	–	–	–	–	2	0.03	4	0.03	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	–	–	2	0.1	2	0.03	–	–	–	–
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	705	100.0	748	100.0	1,974	100.0	4,538	100.0	12,300	100.0	12,070	100.0
	SUBTOTALS:												
	Plain types	582	–	641	–	1,707	–	4,087	–	11,295	–	11,509	–
	Decorated types	123	–	107	–	267	–	451	–	1,005	–	561	–
	Trade pottery	0	–	0	–	0	–	0	–	0	–	0	–

[b] In Cut J, Sections D and E, unpolished plain sherds were not separated into two types (see text p. 42).

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–31: Valdivia—Continued											
		Cut J: Section D—Continued											
		180–210 cm.		210–240 cm.		240–270 cm.		270–300 cm.		300–330 cm.		330–360 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain / Valdivia Plain	3, 080	55. 20	2, 084	51. 80	3, 122	60. 69	5, 197	65. 90	3, 577	65. 60	1, 268	67. 7
	Valdivia Polished Plain	918	16. 40	887	22. 00	796	15. 50	1, 512	19. 21	905	16. 54	275	14. 7
	Valdivia Polished Red	942	16. 85	638	15. 80	689	13. 40	604	7. 66	636	11. 64	146	7. 8
	Valdivia Striated Polished Plain	170	3. 03	118	2. 93	162	3. 16	117	1. 48	33	0. 61	8	0. 4
DECORATED	Valdivia Applique Fillet	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	72	1. 29	28	0. 68	36	0. 70	29	0. 36	5	0. 09	15	0. 8
	Valdivia Brushed	4	0. 07	3	0. 07	5	0. 09	10	0. 12	–	–	–	–
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	4	0. 07	23	0. 56	25	0. 48	41	0. 52	50	0. 92	16	0. 9
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	3	0. 05	4	0. 10	3	0. 05	8	0. 10	3	0. 05	2	0. 1
	Valdivia Cut-and-Beveled Rim	–	–	1	0. 03	–	–	2	0. 02	–	–	–	–
	Valdivia Embossed	–	–	1	0. 03	–	–	–	–	1	0. 02	–	–
	Valdivia Excised	3	0. 05	3	0. 07	6	0. 11	4	0. 05	–	–	–	–
	Valdivia Fine-line Incised	47	0. 84	42	1. 04	54	1. 05	75	0. 95	24	0. 44	53	2. 9
	Valdivia Fingernail Decorated	–	–	–	–	1	0. 02	8	0. 10	2	0. 04	4	0. 2
	Valdivia Finger Grooved	10	0. 18	3	0. 07	12	0. 23	9	0. 11	4	0. 07	–	–
	Valdivia Incised	1	0. 01	7	0. 17	6	0. 11	4	0. 05	7	0. 13	5	0. 3
	Valdivia Modeled	315	5. 64	174	4. 30	200	3. 90	231	2. 93	181	3. 31	61	3. 3
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pseudo-Corrugated	–	–	4	0. 10	2	0. 03	6	0. 07	–	–	2	0. 1
	Valdivia Punctate	10	0. 18	4	0. 10	4	0. 07	9	0. 11	8	0. 14	9	0. 5
	Valdivia Red Incised	8	0. 14	6	0. 15	22	0. 41	18	0. 23	19	0. 35	6	0. 3
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	3	0. 03	3	0. 05	2	0. 1
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	–	–	–	–	–	–	–	–	–	–
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machililla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	5, 587	100. 0	4, 030	100. 0	5, 145	100. 0	7, 887	100. 0	5, 458	100. 0	1, 872	100. 0
	SUBTOTALS:												
	Plain types	5, 110	–	3, 727	–	4, 769	–	7, 430	–	5, 151	–	1, 697	–
	Decorated types	477	–	303	–	376	–	457	–	307	–	175	–
	Trade pottery	0	–	0	–	0	–	0	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G-31: Valdivia—Continued									
		Section D—Con.		Cut J: Section E							
		360–390 cm.		90–120 cm.		120–150 cm.		150–180 cm.		180–210 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain / Valdivia Plain	1,136	83.9	7,009	28.10	3,409	25.80	3,333	28.29	4,187	37.00
	Valdivia Polished Plain	78	5.7	6,679	26.68	3,814	29.06	3,214	27.28	2,816	24.90
	Valdivia Polished Red	71	5.2	3,658	14.63	1,881	14.32	2,102	17.88	2,080	18.35
	Valdivia Striated Polished Plain	4	0.3	732	2.93	253	1.92	409	3.48	398	3.55
DECORATED	Valdivia Applique Fillet	–	–	490	1.97	322	2.44	221	1.88	162	1.43
	Valdivia Broad-line Incised	–	–	1,360	5.45	699	5.34	554	4.70	413	3.64
	Valdivia Brushed	–	–	2,993	12.00	1,635	12.41	1,043	8.87	633	5.59
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	12	0.9	3	0.01	5	0.04	–	–	2	0.02
	Valdivia Cord Impressed	–	–	12	0.04	11	0.08	1	0.01	–	–
	Valdivia Corrugated	1	0.1	–	–	–	–	1	0.01	2	0.02
	Valdivia Cut-and-Beveled Rim	–	–	1	0.01	–	–	4	0.03	1	0.01
	Valdivia Embossed	–	–	–	–	–	–	1	0.01	–	–
	Valdivia Excised	–	–	23	0.9	43	0.32	28	0.23	41	0.36
	Valdivia Fine-line Incised	14	1.0	8	0.03	9	0.07	6	0.06	8	0.07
	Valdivia Fingernail Decorated	–	–	13	0.05	1	0.01	3	0.02	2	0.02
	Valdivia Finger Grooved	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Incised	3	0.2	1,659	6.65	873	6.64	672	5.66	428	3.78
	Valdivia Modeled	36	2.6	9	0.03	9	0.07	22	0.18	63	0.55
	Valdivia Multiple Drag-and-Jab Punctate	–	–	28	0.11	14	0.10	6	0.05	1	0.01
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	–	–	269	1.07	146	1.12	142	1.21	60	0.52
	Valdivia Pseudo-Corrugated	–	–	1	0.01	–	–	–	–	–	–
	Valdivia Punctate	–	–	24	0.09	29	0.21	12	0.10	16	0.14
	Valdivia Red Incised	–	–	3	0.01	1	0.01	3	0.02	1	0.01
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	1	0.01	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	2	0.01	–	–	2	0.02	3	0.03
	Unclassified	–	–	–	–	–	–	–	–	–	–
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	4	0.02	5	0.04	1	0.01	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	1,356	100.0	24,981	100.0	13,159	100.0	11,780	100.0	11,317	100.0
	SUBTOTALS:										
	Plain types	1,289	–	18,078	–	9,357	–	9,058	–	9,481	–
	Decorated types	67	–	6,899	–	3,797	–	2,721	–	1,836	–
	Trade pottery	0	–	4	–	5	–	1	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–31: Valdivia—Continued											
		Cut J: Section E—Continued											
		210–240 cm.		240–270 cm.		270–300 cm.		300–330 cm.		330–360 cm.		360–390 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain / Valdivia Plain	2, 428	38. 00	3, 627	40. 40	2, 483	48. 25	1, 116	47. 50	1, 975	47. 35	2, 128	57. 85
	Valdivia Polished Plain	1, 436	22. 53	2, 283	25. 62	1, 195	23. 20	356	15. 10	650	15. 60	372	10. 15
	Valdivia Polished Red	1, 256	19. 60	2, 222	25. 00	1, 101	21. 40	511	21. 80	1, 270	30. 50	997	27. 05
	Valdivia Striated Polished Plain	221	3. 46	336	3. 77	164	3. 19	65	2. 70	41	0. 98	6	0. 16
DECORATED	Valdivia Applique Fillet	88	1. 38	34	0. 38	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	155	2. 42	178	2. 00	41	0. 80	46	1. 90	19	0. 46	5	0. 13
	Valdivia Brushed	365	5. 72	74	0. 82	–	–	–	–	–	–	–	–
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	4	0. 06	5	0. 05	1	0. 02	5	0. 20	7	0. 16	9	0. 24
	Valdivia Cord Impressed	3	0. 04	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	1	0. 01	–	–	–	–	–	–	5	0. 12	–	–
	Valdivia Cut-and-Beveled Rim	1	0. 01	6	0. 07	3	0. 05	6	0. 20	6	0. 14	1	0. 02
	Valdivia Embossed	1	0. 01	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	15	0. 23	24	0. 27	6	0. 11	1	0. 10	1	0. 02	–	–
	Valdivia Fine-line Incised	13	0. 20	15	0. 17	23	0. 46	45	1. 90	28	0. 67	42	1. 14
	Valdivia Fingernail Decorated	5	0. 08	5	0. 05	2	0. 04	3	0. 10	5	0. 12	1	0. 02
	Valdivia Finger Grooved	3	0. 04	4	0. 04	–	–	–	–	3	0. 07	2	0. 04
	Valdivia Incised	273	4. 26	43	0. 48	33	0. 64	37	1. 60	20	0. 48	2	0. 04
	Valdivia Modeled	59	0. 92	52	0. 58	89	1. 72	152	6. 50	121	2. 90	114	3. 10
	Valdivia Multiple Drag-and-Jab Punctate	7	0. 11	3	0. 03	–	–	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	44	0. 69	13	0. 14	1	0. 02	–	–	–	–	–	–
	Valdivia Pseudo-Corrugated	1	0. 01	–	–	1	0. 02	–	–	7	0. 16	1	0. 02
	Valdivia Punctate	9	0. 14	10	0. 11	2	0. 04	4	0. 20	3	0. 07	1	0. 02
	Valdivia Red Incised	3	0. 04	2	0. 02	2	0. 04	5	0. 20	10	0. 20	1	0. 02
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	–	–	–	–	–	–	–	–	–	–
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	3	0. 04	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	6, 394	100. 0	8, 936	100. 0	5, 147	100. 0	2, 352	100. 0	4, 171	100. 0	3, 682	100. 0
	SUBTOTALS:				–		–						
	Plain types	5, 341	–	8, 468	–	4, 943	–	2, 048	–	3, 936	–	3, 503	–
	Decorated types	1, 050	–	468	–	204	–	304	–	235	–	179	–
	Trade pottery	3	–	0	–	0	–	0	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–31: Valdivia—Continued				G–54: Buena Vista							
		Cut J: Section E—Continued				Cut 1							
		390–420 cm.		420–450 cm.		0–20 cm.		20–40 cm.		40–60 cm.		60–80 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	53	3.3	77	3.3	22	0.70
	San Pablo Plain / Valdivia Plain	1,580	64.40	702	61.95	34 / 15	36.6 / 16.2	433 / 130	27.1 / 8.1	536 / 127	23.1 / 5.5	822 / 209	26.00 / 6.60
	Valdivia Polished Plain	530	21.62	143	12.64	11	11.8	198	12.3	295	12.7	464	14.68
	Valdivia Polished Red	195	7.95	172	15.18	3	3.2	114	7.1	160	6.9	154	4.90
	Valdivia Striated Polished Plain	8	0.32	16	1.41	6	6.5	97	6.0	147	6.3	225	7.10
DECORATED	Valdivia Applique Fillet	–	–	–	–	–	–	4	0.2	10	0.4	8	0.20
	Valdivia Broad-line Incised	3	0.12	1	0.09	2	2.1	51	3.2	76	3.2	149	4.70
	Valdivia Brushed	–	–	–	–	7	7.5	97	6.1	222	9.5	321	10.10
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	4	0.16	11	0.97	–	–	1	0.1	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	5	0.20	1	0.09	–	–	3	0.2	5	0.2	1	0.03
	Valdivia Cut-and-Beveled Rim	3	0.12	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	–	–	–	–	1	0.1	4	0.2	1	0.03
	Valdivia Fine-line Incised	12	0.49	12	1.06	–	–	–	–	–	–	–	–
	Valdivia Fingernail Decorated	3	0.12	2	0.17	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	1	0.04	–	–	–	–	1	0.1	–	–	–	–
	Valdivia Incised	3	0.12	1	0.09	10	10.8	266	16.6	393	16.9	502	15.9
	Valdivia Modeled	99	4.02	68	6.00	–	–	–	–	–	–	–	–
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	–	–	–	–	–	–	1	0.03
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	15	0.9	6	0.3	24	0.7
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	9	0.5	12	0.5	69	2.2
	Valdivia Pebble Polished	–	–	–	–	2	2.1	10	0.6	20	0.9	46	1.4
	Valdivia Pseudo-Corrugated	2	0.08	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	2	0.08	–	–	–	–	3	0.1	1	0.1	3	0.1
	Valdivia Red Incised	4	0.16	4	0.35	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	1	1.1	6	0.4	2	0.1	3	0.1
	Valdivia Rocker Stamped	–	–	–	–	–	–	5	0.3	11	0.5	17	0.5
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	1	0.1	1	0.03
	Unclassified	–	–	–	–	–	–	8	0.5	17	0.7	19	0.6
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	20	0.8	8	0.2
	Machalilla Embellished Shoulder	–	–	–	–	–	–	1	0.1	3	0.1	2	0.1
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	2	2.1	17	1.1	67	2.8	55	1.7
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	8	0.3	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	80	5.0	109	4.6	46	1.4
	GRAND TOTALS	2,454	100.0	1,133	100.0	93	100.0	1,603	100.0	2,329	100.0	3,172	100.0
	SUBTOTALS:												
	Plain types	2,313	–	1,033	–	69	–	1,025	–	1,342	–	1,896	–
	Decorated types	141	–	100	–	22	–	480	–	780	–	1,165	–
	Trade pottery	0	–	0	–	2	–	98	–	207	–	111	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–54: Buena Vista—Continued											
		Cut 1—Continued						Cut 2[c]					
		80–100 cm.		100–120 cm.		120–130 cm.		20–30 cm.		30–40 cm.		40–50 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	4	0.06	28	0.7	14	0.6	–	–	–	–	–	–
	San Pablo Plain	948	16.40	609	15.1	296	12.9	311	36.2	645	36.4	770	36.7
	Valdivia Plain	419	7.20	295	7.3	173	7.5	76	8.9	207	11.7	276	13.2
	Valdivia Polished Plain	1,218	21.10	799	19.7	559	24.4	53	6.2	132	7.4	125	5.9
	Valdivia Polished Red	445	7.70	346	8.6	214	9.4	47	5.5	148	8.4	112	5.4
	Valdivia Striated Polished Plain	716	12.40	595	14.8	344	15.1	17	1.9	87	4.9	112	5.4
DECORATED	Valdivia Applique Fillet	11	0.20	6	0.1	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	249	4.30	179	4.3	70	3.1	43	5.0	50	2.8	72	3.4
	Valdivia Brushed	535	9.30	273	6.7	122	5.3	84	9.7	149	8.4	91	4.3
	Valdivia Carved	–	–	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	6	0.10	8	0.2	–	–	16	1.8	5	0.3	10	0.5
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	3	0.03	4	0.1	–	–	–	–	–	–	1	0.1
	Valdivia Fine-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fingernail Decorated	–	–	2	0.1	1	0.1	–	–	–	–	1	0.1
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	8	0.3
	Valdivia Incised	951	16.50	692	17.2	394	17.2	181	21.5	306	17.3	477	22.6
	Valdivia Modeled	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Multiple Drag-and-Jab Punctate	1	0.01	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	28	0.50	31	0.8	37	1.6	–	–	4	0.2	6	0.2
	Valdivia Nicked Rib or Nubbin	61	1.00	47	1.2	14	0.6	–	–	7	0.4	7	0.3
	Valdivia Pebble Polished	72	1.20	43	1.0	15	0.6	4	0.5	11	0.6	9	0.4
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	7	0.20	3	0.1	2	0.1	5	0.6	4	0.2	2	0.1
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	1	0.01	7	0.2	4	0.2	–	–	–	–	1	0.1
	Valdivia Rocker Stamped	44	0.70	29	0.7	19	0.8	10	1.1	6	0.3	5	0.2
	Valdivia Shell Stamped	–	–	–	–	–	–	1	0.1	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	1	0.1	–	–	1	0.1
	Unclassified	48	0.80	32	0.8	12	0.5	4	0.5	8	0.5	9	0.4
TRADE	Machalilla Double-line Incised	2	0.02	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	1	0.1	–	–	–	–
	Machalilla Red Banded	7	0.20	7	0.2	–	–	3	0.3	3	0.2	5	0.2
	Unclassified Decorated (Machalilla Complex)	1	0.01	–	–	–	–	–	–	–	–	1	0.1
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	4	0.06	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	5,781	100.0	4,036	100.0	2,290	100.0	857	100.0	1,772	100.0	2,101	100.0
	SUBTOTALS:												
	Plain types	3,750	–	2,672	–	1,600	–	504	–	1,219	–	1,395	–
	Decorated types	2,017	–	1,357	–	690	–	349	–	550	–	700	–
	Trade pottery	14	–	7	–	0	–	4	–	3	–	6	–

[c] Level 0–20 cm. sterile.

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–54: Buena Vista—Continued											
		Cut 2—Continued											
		50–60 cm.		60–70 cm.		70–80 cm.		80–90 cm.		90–100 cm.		100–110 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain	501	33.4	508	32.9	381	26.8	243	26.6	470	29.1	568	28.9
	Valdivia Plain	208	13.8	182	11.8	205	14.4	161	17.3	264	16.3	260	13.2
	Valdivia Polished Plain	133	8.9	148	9.6	216	15.1	118	12.7	207	12.7	254	12.9
	Valdivia Polished Red	50	3.3	94	6.1	120	8.5	76	8.3	127	7.8	110	5.6
	Valdivia Striated Polished Plain	116	7.7	112	7.3	85	5.9	79	8.2	108	6.7	185	9.4
DECORATED	Valdivia Applique Fillet	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	62	4.1	49	3.1	35	2.5	11	1.1	34	2.1	39	2.0
	Valdivia Brushed	107	7.1	30	1.9	38	2.7	16	1.7	16	0.9	11	0.5
	Valdivia Carved	–	–	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	1	0.1	–	–	12	0.8	4	0.4	2	0.1	3	0.1
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fine-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fingernail Decorated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	289	19.3	371	24.0	309	21.7	202	21.7	352	21.7	479	24.5
	Valdivia Modeled	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	6	0.4	8	0.5	9	0.6	6	0.6	12	0.7	7	0.3
	Valdivia Nicked Rib or Nubbin	7	0.5	16	1.0	–	–	3	0.3	9	0.5	20	1.0
	Valdivia Pebble Polished	10	0.6	7	0.4	3	0.2	7	0.7	10	0.6	18	0.9
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	3	0.2	3	0.2	2	0.1	–	–	2	0.1	3	0.1
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	1	0.1	2	0.1	4	0.3	–	–	5	0.3	–	–
	Valdivia Rocker Stamped	8	0.5	3	0.2	6	0.4	4	0.4	6	0.4	3	0.1
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	2	0.1
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	11	0.7	–	–	–	–	–	–	5	0.3
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	1	0.1	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	1,502	100.0	1,546	100.0	1,425	100.0	930	100.0	1,624	100.0	1,967	100.0
	SUBTOTALS:						–						
	Plain types	1,008	–	1,044	–	1,007	–	677	–	1,176	–	1,377	–
	Decorated types	494	–	501	–	418	–	253	–	448	–	590	–
	Trade pottery	0	–	1	–	0	–	0	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–54: Buena Vista—Continued											
		Cut 2—Continued				Test Trench				Cut 1: NE. Extension			
		110–120 cm.		120–130 cm.		Ctr. of site		E. of burial area		0–85 cm.		85–120 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain	277	19.6	92	20.9	269	13.6	431	19.8	27	3.4	33	6.7
	Valdivia Plain	222	15.7	50	11.4	35	1.7	167	7.7	6	0.7	6	1.2
	Valdivia Polished Plain	203	14.3	106	24.2	111	5.6	327	15.6	34	4.3	34	6.9
	Valdivia Polished Red	135	9.5	31	7.1	115	5.8	229	10.6	60	7.5	38	7.6
	Valdivia Striated Polished Plain	195	13.8	48	10.9	135	6.8	304	14.0	53	6.6	45	9.1
DECORATED	Valdivia Applique Fillet	–	–	–	–	1	0.1	2	0.1	9	1.1	–	–
	Valdivia Broad-line Incised	24	1.7	12	2.7	171	8.7	87	4.0	89	11.2	50	10.1
	Valdivia Brushed	3	0.2	–	–	143	7.2	89	4.1	99	12.4	23	4.6
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	6	0.3	10	0.4	3	0.4	2	0.4
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	–	–	2	0.1	–	–	2	0.3	1	0.2
	Valdivia Fine-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fingernail Decorated	–	–	–	–	5	0.2	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	273	19.3	82	18.8	787	39.8	402	18.5	344	43.2	233	46.8
	Valdivia Modeled	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	4	0.2	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	5	0.3	3	0.6	37	1.8	5	0.2	11	1.4	7	1.4
	Valdivia Nicked Rib or Nubbin	18	1.2	6	1.3	52	2.6	16	0.7	12	1.5	2	0.4
	Valdivia Pebble Polished	27	1.9	5	1.1	34	1.7	48	2.2	13	1.6	8	1.6
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	1	0.1	–	–
	Valdivia Punctate	1	0.1	2	0.4	–	–	7	0.3	–	–	3	0.6
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	–	–	1	0.2	16	0.8	–	–	6	0.7	–	–
	Valdivia Rocker Stamped	1	0.1	2	0.4	32	1.6	11	0.5	16	2.0	5	1.0
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	32	2.3	–	–	28	1.4	10	0.4	5	0.6	7	1.4
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	1	0.1	2	0.3	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	15	0.7	6	0.7	–	–
	Ayangue Incised	–	–	–	–	–	–	2	0.1	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	1,416	100.0	440	100.0	1,983	100.0	2,163	100.0	798	100.0	497	100.0
	SUBTOTALS:						–						
	Plain types	1,032	–	327	–	(d)	–	(d)	–	(d)	–	(d)	–
	Decorated types	384	–	113	–	(d)	–	(d)	–	(d)	–	(d)	–
	Trade pottery	0	–	0	–	(d)	–	(d)	–	(d)	–	(d)	–

[d] Selected samples: totals not meaningful.

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–84: Posorja											
		Cut 1											
		40–50 cm.		50–60 cm.		60–70 cm.		70–80 cm.		80–90 cm.		90–100 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	234	61.3	464	61.3	301	51.5	572	53.2	204	53.5	206	53.7
	San Pablo Plain	5	1.3	5	0.6	11	1.8	25	2.4	11	2.9	8	2.0
	Valdivia Plain	37	9.7	40	5.4	50	8.6	62	5.7	30	7.9	20	5.2
	Valdivia Polished Plain	9	2.3	18	2.4	14	2.4	28	2.6	19	5.0	17	4.4
	Valdivia Polished Red	7	1.8	16	2.1	23	3.9	18	1.7	1	0.3	5	1.3
	Valdivia Striated Polished Plain	3	0.8	10	1.3	17	2.9	19	1.8	7	1.8	7	1.8
DECORATED	Punta Arenas Incised	–	–	8	1.0	3	0.5	7	0.6	5	1.3	1	0.2
	Valdivia Applique Fillet	4	1.0	6	0.8	14	2.4	14	1.3	7	1.8	8	2.0
	Valdivia Broad-line Incised	1	0.2	23	3.0	16	2.7	29	2.7	20	5.3	25	6.5
	Valdivia Brushed	55	14.4	109	14.4	78	13.4	208	19.4	52	13.7	69	18.0
	Valdivia Carved	16	4.2	33	4.3	30	5.1	56	5.2	12	3.1	8	2.0
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fine-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fingernail Decorated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	2	0.5	11	1.4	10	1.7	18	1.7	5	1.3	6	1.5
	Valdivia Modeled	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	1	0.2	4	0.5	–	–	1	0.1	1	0.3	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	3	0.8	5	0.6	4	0.7	14	1.3	5	1.3	5	1.3
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	2	0.5	1	0.1	3	0.6	2	0.1	–	–	1	0.2
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	2	0.1	–	–	–	–
	Valdivia Zoned Incised	3	0.8	6	0.8	6	1.2	2	0.1	2	0.5	1	0.2
	Unclassified	1	0.2	–	–	1	0.2	–	–	–	–	–	–
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	1	0.2	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	1	0.2	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	383	100.0	759	100.0	583	100.0	1,077	100.0	381	100.0	384	100.0
	SUBTOTALS:												
	Plain types	295	–	553	–	416	–	724	–	272	–	263	–
	Decorated types	88	–	206	–	165	–	353		109		121	–
	Trade pottery	0	–	0	–	2	–	0	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–84: Posorja—Continued						G–88: Palmar Norte					
		Cut 1—Continued						Cut 1:					
		100–110 cm.		110–120 cm.		120–130 cm.		30–50 cm.		50–70 cm.		70–90 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	165	49.9	80	54.5	189	47.9	–	–	–	–	–	–
	San Pablo Plain	10	3.0	4	2.7	10	2.5	4	3.5	58	8.9	40	9.8
	Valdivia Plain	22	6.7	9	6.1	32	8.1	21	18.3	232	35.6	121	29.8
	Valdivia Polished Plain	11	3.3	5	3.4	21	5.3	11	9.7	75	11.5	43	10.5
	Valdivia Polished Red	8	2.4	1	0.7	3	0.7	33	28.8	126	19.3	110	27.0
	Valdivia Striated Polished Plain	8	2.4	2	1.3	8	2.0	6	5.2	37	5.7	34	8.4
DECORATED	Punta Arenas Incised	5	1.5	–	–	4	1.0	–	–	–	–	–	–
	Validiva Applique Fillet	15	4.6	–	–	11	2.8	–	–	–	–	–	–
	Valdivia Broad-line Incised	17	5.1	7	4.8	40	10.1	2	1.7	12	1.8	6	1.5
	Valdivia Brushed	45	13.6	21	14.3	42	10.6	–	–	3	0.4	–	–
	Valdivia Carved	6	1.8	6	4.0	13	3.3	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	–	–	1	0.8	–	–	–	–
	Valdivia Cut-and-Beveled Rim	–	–	–	–	–	–	–	–	2	0.3	1	0.2
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Fine-line Incised	–	–	–	–	–	–	1	0.8	–	–	–	–
	Valdivia Fingernail Decorated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	9	2.7	6	4.0	9	2.3	31	27.0	93	14.2	47	11.5
	Valdivia Modeled	–	–	–	–	–	–	1	0.8	2	0.3	–	–
	Valdivia Multiple Drag-and-Jab Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	1	0.2	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	4	1.2	3	2.1	11	2.8	3	2.6	5	0.7	1	0.2
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	2	0.6	1	0.7	–	–	1	0.8	8	1.2	4	0.9
	Valdivia Red Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Red Zoned Punctate	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	3	0.9	1	0.7	1	0.2	–	–	–	–	–	–
	Unclassified	1	0.3	1	0.7	–	–	–	–	1	0.1	1	0.2
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	1	0.2	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	331	100.0	147	100.0	396	100.0	115	100.0	654	100.0	408	100.0
	SUBTOTALS:												
	Plain types	224	–	101	–	264	–	75	–	528	–	348	–
	Decorated types	107	–	46	–	131	–	40	–	126	–	60	–
	Trade pottery	0	–	0	–	1	–	0	–	0	–	0	–

TABLE 6.—*Frequency of pottery types in surface collections and stratigraphic and test excavations at sites of the Valdivia Phase (figs. 49–53)*—Continued

	Pottery types	G–88: Palmar Norte—Continued											
		Cut 1—Cont.		Cut 2						Cut 3		Test	
		90–110 cm.		0–30 cm.		30–60 cm.		60–90 cm.		0–20 cm.			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Punta Arenas Plain	–	–	–	–	–	–	–	–	–	–	–	–
	San Pablo Plain	18	7.5	77	6.3	46	7.7	23	6.0	11	2.2	1	1.3
	Valdivia Plain	59	24.2	255	21.0	119	20.2	108	28.4	245	49.8	8	10.8
	Valdivia Polished Plain	34	14.0	226	18.6	101	17.0	65	17.0	39	7.9	13	17.6
	Valdivia Polished Red	68	28.0	287	23.7	124	20.9	88	23.5	158	32.1	21	28.4
	Valdivia Striated Polished Plain	26	10.7	153	12.6	105	17.7	64	16.8	9	1.8	4	5.4
DECORATED	Valdivia Applique Fillet	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	5	2.1	16	1.3	10	1.7	3	0.8	–	–	2	2.7
	Valdivia Brushed	4	1.6	4	0.3	2	0.3	–	–	–	–	–	–
	Valdivia Carved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Combed	–	–	–	–	–	–	–	–	1	0.2	–	–
	Valdivia Cord Impressed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Corrugated	–	–	–	–	1	0.2	1	0.2	1	0.2	–	–
	Valdivia Cut-and-Beveled Rim	–	–	2	0.1	–	–	3	0.7	2	0.4	3	4.1
	Valdivia Embossed	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Excised	–	–	4	0.3	2	0.3	1	0.2	–	–	–	–
	Valdivia Fine-line Incised	1	0.4	–	–	–	–	–	–	5	1.0	2	2.7
	Valdivia Fingernail Decorated	–	–	–	–	1	0.2	–	–	–	–	–	–
	Valdivia Finger Grooved	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	24	9.9	177	14.6	70	11.8	16	4.2	–	–	16	21.7
	Valdivia Modeled	1	0.4	1	0.1	2	0.3	7	1.8	9	1.8	–	–
	Valdivia Multiple Drag-and-Jab Punctate	–	–	2	0.1	2	0.3	2	0.4	–	–	–	–
	Valdivia Nicked Broad-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Nicked Rib or Nubbin	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	–	–	5	0.4	–	–	–	–	–	–	1	1.3
	Valdivia Pseudo-Corrugated	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Punctate	3	1.2	–	–	6	1.0	–	–	1	0.2	2	2.7
	Valdivia Red Incised	–	–	–	–	–	–	–	–	10	2.0	1	1.3
	Valdivia Red Zoned Punctate	–	–	3	0.2	1	0.2	–	–	–	–	–	–
	Valdivia Rocker Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Shell Stamped	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Zoned Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified	–	–	5	0.4	1	0.2	–	–	2	0.4	–	–
TRADE	Machalilla Double-line Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Embellished Shoulder	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Red Banded	–	–	–	–	–	–	–	–	–	–	–	–
	Unclassified Decorated (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	Ayangue Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Types (Machalilla Complex)	–	–	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	243	100.0	1,217	100.0	593	100.0	381	100.0	493	100.0	74	100.0
	SUBTOTALS:												
	Plain types	205	–	998	–	495	–	348	–	462	–	47	–
	Decorated types	38	–	219	–	98	–	33	–	31	–	27	–
	Trade pottery	0	–	0	–	0	–	0	–	0	–	0	–

TABLE 7.—*Chronological distribution of decorative motifs of Valdivia Broad-line Incised*

Periods	Levels in seriated sequence			Motifs							
	Site	Cut	Level (cm.)	1	2	3	4	5	6	7	8
D	G–84	1	40–60	8	3	–	29	10	–	–	–
			60–80	18	7	–	39	8	–	–	1
			80–100	9	5	–	27	3	–	–	–
			100–130	11	7	–	30	6	–	–	1
C	G–54	1	20–40	3	9	11	3	–	–	–	1
			40–60	10	11	12	14	–	1	–	–
			60–80	20	31	32	26	–	1	–	–
			80–100	45	64	69	17	4	–	–	–
			100–120	29	19	60	20	2	–	–	–
			120–130	14	10	26	1	–	–	–	–
	G–31	H	0–20	9	10	–	17	2	–	–	–
			20–40	11	7	–	55	–	–	–	2
			40–60	11	2	–	45	1	–	–	1
			60–80	13	1	–	29	–	–	–	–
			80–100	16	6	–	18	2(?)	–	–	–
B			100–120	6	7	–	11	–	–	–	–
	G–31	F	0–20	26	8	–	13	4(?)	–	–	–
			20–40	13	5	–	4	–	–	–	–
	G–88	2	0–30	6	2	–	–	–	–	–	–
			30–60	3	2	–	2	–	–	–	–
	G–31	H	120–130	15	10	–	6	3(?)	–	–	–
	G–31	F	40–60	4	1	–	–	1	–	–	–
	G–31	H	130–140	19	8	–	8	–	–	–	–
	G–88	2	60–90	2	1	–	–	–	–	–	–
A	G–31	A	160–180	12	7	–	4	–	–	–	–
			180–200	15	2	–	–	–	–	–	–
			200–220	9	1	–	1	–	–	–	–
			220–240	5	–	–	1	–	–	–	–
			240–260	–	–	–	–	–	–	–	–
			260–280	–	–	–	–	–	–	–	–
			280–300	–	–	–	–	–	–	–	–
	G–88	3	0–20	–	–	–	–	–	–	–	–
	G–31	A	300–340	–	–	–	–	–	–	–	–
			340–360	–	2	–	–	–	–	–	–
			360–380	–	–	–	–	–	–	–	–
			380–400	–	–	–	–	–	–	–	–
			400–420	–	–	–	–	–	–	–	–

TABLE 8.—*Shell artifacts from Machalilla Phase*

Periods	Levels in seriated position based upon pottery types			Abraders and Polishers	Beads	Bracelet	Disks	Fishhook Blanks	Fishhooks Small-Medium	Fishhooks Large
	Site	Cut	Level (cm.)							
C	G–110	1	10–20	–	–	–	1	1	–	–
		2	0–20	1	–	–	–	7	–	6
		3	0–20	1	–	1	–	–	2	1
		1	20–30	1	–	–	–	1	–	1
		1	30–50	1	–	–	–	3	–	–
		Trench 1		–	1	–	–	–	3	4
		3	20–30	–	–	–	–	–	–	3
		1	50–70	–	–	–	–	–	–	–
		2	20–40	1	–	–	–	4	2	7
B	G–112	Surface		–	–	–	–	–	–	–
A	M–28	1	0–20	–	–	–	–	–	–	–
		1	20–40	–	–	–	–	–	–	–
G–110: Surface and Tests				3	–	–	–	8	–	–
TOTALS				8	1	1	1	24	7	22

TABLE 9.—*Chronological distribution of decorative motifs of Valdivia Fine-line Incised*

Periods	Levels in seriated sequence			Motifs						
	Site	Cut: Section	Level (cm.)	1	2	3	4	5	6	Uncl.
B	G–31	J:D	90–120	2	2	–	–	–	–	–
		J:E	90–120	3	–	–	–	–	–	–
			120–150	2	–	–	–	–	–	–
			150–180	1	–	–	1	–	–	1
			180–210	2	1	–	–	–	–	–
		J:D	120–150	2	2	–	–	–	–	1
		J:E	210–240	3	2	–	1	–	–	–
			240–270	6	–	–	–	1	1	5
		J:D	150–180	1	–	–	–	–	–	–
		J:E	270–300	13	–	–	–	–	–	2
A			300–330	11	5	–	–	–	–	–
			330–360	10	–	–	–	2	–	3
		J:D	180–210	2	1	–	–	–	–	–
		J:E	360–390	5	–	–	1	1	–	–
			390–420	4	1	–	–	–	1	–
		J:D	210–240	5	3	4	–	–	–	2
			240–270	13	–	–	2	1	1	2
			270–300	12	5	1	–	–	1	1
			300–330	16	2	2	–	–	–	–
			330–360	5	1	–	–	–	–	–
		J:E	420–450	3	3	–	–	–	1	1
		J:D	360–390	2	5	–	–	–	–	–

TABLE 10.—*Chronological distribution of decorative motifs of Valdivia Incised*

Periods	Levels in seriated sequence			Motifs							
	Site	Cut	Level (cm.)	1	2	3	4	5	6	7	Nicked row
D	G–84	1	40–60	1	2	–	–	–	–	–	–
			60–80	1	3	–	–	–	–	–	–
			80–100	–	1	1	–	–	–	–	–
			100–130	–	3	2	–	–	–	–	–
C	G–54	1	20–40	171	12	12	(a)	23	–	2	19
			40–60	254	9	14	(a)	24	2	–	21
			60–80	345	12	35	(a)	31	–	4	26
			80–100	–	–	–	(a)	–	–	–	–
			100–120	180	1	18	(a)	2	–	2	3
			120–130	275	12	32	(a)	40	4	–	16
	G–31	H	0–20	27	14	38	(a)	2	–	–	3
			20–40	46	19	29	(a)	–	–	–	2
			40–60	58	12	39	(a)	5	–	–	4
			60–80	24	13	20	(a)	3	–	–	1
			80–100	51	9	47	(a)	3	–	–	5
B			100–120	18	11	25	–	3	–	–	4
		F	0–20	169	40	85	–	5	–	1	9
			20–40	137	43	65	–	2	–	–	13
	G–88	2	0–30	110	7	51	–	–	–	2	2
			30–60	28	7	26	–	–	–	1	–
	G–31	H	120–130	26	5	19	–	1	–	–	2
		F	40–60	14	2	7	–	3	–	–	1
		H	130–140	10	8	16	–	3	–	1	2
	G–88	2	60–90	6	2	8	–	–	–	–	1
A	G–31	A	160–180	10	2	–	–	2	–	–	–
			180–200	–	1	5	–	–	–	–	–
			200–220	–	2	3	–	–	–	–	–
			220–240	2	–	–	–	–	–	–	1
			240–260	1	–	1	–	–	–	–	–
			260–280	1	–	1	–	–	–	–	–
			280–300	–	–	–	–	–	–	–	–
	G–88	2	0–20	–	–	–	–	–	–	–	–
	G–31	A	300–340	–	–	–	–	–	–	–	–
			340–360	–	1	–	–	–	–	–	–
			360–380	–	–	–	–	–	–	–	–
			380–400	–	2	–	–	–	–	–	–
			400–420	–	–	–	–	–	–	–	–

[a] Restricted to Period C: separate count for each level unavailable.

TABLE 11.—*Chronological distribution of tetrapod and concave bases and lobed rims in the Valdivia Phase*

Periods	Levels in seriated sequence			Bases		Lobed rim	
	Site	Cut	Level (cm.)	Tetrapod	Concave	Bowl	Jar
D	G–84	1	40–60	–	–	–	–
			60–80	–	–	–	–
			80–100	–	–	–	–
			100–130	–	–	–	–
C	G–54	1	20–40	–	3	–	–
			40–60	–	–	–	–
			60–80	–	7	–	–
			80–100	–	13	–	–
			100–120	–	4	–	–
			120–130	–	5	–	–
	G–31	H	0–20	3	1	2	–
			20–40	2	14	1	–
			40–60	2	2	2	1
			60–80	4	4	3	–
			80–100	4	–	2	–
B			100–120	1	2	3	–
		F	0–20	3	1	4	–
			20–40	3	4	1	–
	G–88	2	0–30	1	3	2	–
			30–60	6	1	1	1
	G–31	H	120–130	5	2	4	–
		F	40–60	1	2	1	–
		H	130–140	5	1	1	–
	G–88	2	60–90	1	1	–	–
A	G–31	A	160–180	5	2	1	–
			180–200	6	3	4	1
			200–220	5	1	4	–
			220–240	1	1	4	–
			240–260	8	–	–	–
			260–280	–	1	–	–
			280–300	1	–	–	–
	G–88	3	0–20	–	–	–	–
	G–31	A	300–340	–	–	–	–
			340–360	1	–	–	–
			360–380	–	–	–	–
			380–400	–	–	–	–
			400–420	–	–	1	–

TABLE 12.—*Chronological distribution of decorative motifs of Valdivia Excised*

Since this type does not occur in Period D levels, this portion of the sequence is omitted from the table.

Periods	Levels in seriated sequence			Motifs						
	Site	Cut	Level (cm.)	1	2	3	4	5	6	7
C	G–54	1	20–40	–	–	–	–	–	–	1
			40–60	–	–	–	–	1	1	1(?)
			60–80	–	–	–	–	–	–	1
			80–100	–	–	–	–	–	1	–
			100–120	–	–	–	–	3	–	1
			120–130	–	–	–	–	–	–	–
	G–31	H	0–20	1	2	1	–	–	–	1
			20–40	2	1	1	2	–	–	2
			40–60	1	2	1	1	–	–	2
			60–80	–	3	–	–	–	–	1
			80–100	2	3	–	2	–	–	1
B			100–120	1	1	–	–	–	–	1
	G–31	F	0–20	2	1	–	3	–	–	–
			20–40	–	3	–	4	–	–	–
	G–88	2	0–30	–	–	–	–	–	–	3
			30–60	–	–	1	–	–	1	–
	G–31	H	120–130	1	3	–	–	–	–	1
	G–31	F	40–60	–	2	–	–	–	–	–
	G–31	H	130–140	1	2	–	–	–	–	–
	G–88	2	60–90	–	–	–	–	–	–	1
A	G–31	A	160–180	1	3	–	2	–	–	1
			180–200	–	2	–	–	–	–	3
			200–220	1	–	–	–	–	–	1
			220–240	–	2	–	–	–	–	1
			240–260	–	–	–	1	–	–	–
			260–280	–	–	–	–	–	–	–
			280–300	–	–	–	–	–	–	–
	G–88	2	0–20	–	–	–	–	–	–	–
	G–31	A	300–340	–	–	–	–	–	–	–
			340–360	–	–	–	–	–	–	–
			360–380	–	–	–	–	–	–	–
			380–400	–	–	–	–	–	–	–
			400–420	–	–	–	–	–	–	–
			420–440	1(?)	–	–	–	–	–	–

TABLE 13.—*Provenience of Valdivia Phase figurine types and alternative kinds of body and leg treatment (fig. 64)*

Provenience			Stone Figurine Types			Pottery Figurine Types				Body Treatment		Leg Treatment		
Site	Cut: Section	Level (cm.)	Palmar Plain	Palmar Notched	Palmar Incised	Valdivia	San Pablo	Buena Vista	Punta Arenas	Red	Plain	Bulge	Tapered	Bent
G–31	A	40–60	–	–	–	1	–	–	–	–	–	–	–	–
		160–180	–	–	–	1	–	–	–	2	–	–	1	–
		180–200	–	–	–	–	–	–	–	1	–	–	–	–
	F	0–20	–	–	–	–	–	–	–	–	–	–	–	–
		20–40	–	–	–	2	–	–	–	3	–	2	1	–
		40–60	–	–	–	–	–	–	–	–	–	–	–	–
	H	0–20	–	–	–	2	–	–	–	1	1	1	–	1
		20–40	–	–	–	3	–	–	–	–	1	–	–	–
		40–60	–	–	–	–	–	–	–	1	–	–	1	–
		60–80	–	–	–	2	–	–	–	1	2	2	–	–
		80–100	–	–	–	1	–	–	–	1	–	–	–	–
		100–120	–	–	–	4	–	–	–	2	–	1	1	–
		120–130	–	–	–	4	–	–	–	5	1	2	2	–
		130–140	–	–	–	3	–	–	–	8	–	4	–	–
	J:D	90–120	–	–	–	–	–	–	–	–	–	–	–	–
		120–150	–	–	–	11	3	1	–	–	–	–	–	–
		150–180	–	–	2	4	–	–	–	–	–	–	–	–
		180–210	3	1	–	–	–	–	–	–	–	–	–	–
		210–240	1	1	–	–	–	–	–	–	–	–	–	–
		240–270	–	3	1	–	–	–	–	–	–	–	–	–
		270–300	3	2	–	–	–	–	–	–	–	–	–	–
		300–330	1	–	–	–	–	–	–	–	–	–	–	–
		330–360	–	–	–	–	–	–	–	–	–	–	–	–
		360–390	5	–	–	–	–	–	–	–	–	–	–	–
	J:E	90–120	–	–	–	–	–	–	–	–	–	–	–	–
		120–150	–	–	–	–	–	–	–	–	–	–	–	–
		150–180	–	–	–	10	–	–	–	–	–	–	–	–
		180–210	–	–	–	7	–	–	–	–	–	–	–	–
		210–240	–	–	–	4	–	–	–	–	–	–	–	–
		240–270	–	–	1	8	3	–	–	–	–	–	–	–
		270–300	–	–	–	2	–	–	–	–	–	–	–	–
		300–330	–	–	–	1	–	–	–	–	–	–	–	–
		330–360	1	–	–	2	–	–	–	–	–	–	–	–
		360–390	2	3	1	1	–	–	–	–	–	–	–	–
		390–420	–	–	–	–	–	–	–	–	–	–	–	–
		420–450	–	–	–	–	–	–	–	–	–	–	–	–
G–54	1	0–20	–	–	–	–	–	–	–	–	–	–	–	–
		20–40	–	–	–	–	1	1	–	1	1	–	–	–
		40–60	–	–	–	–	1	1	–	2	5	1	1	1
		60–80	–	–	–	1(?)	4	3	–	4	9	–	11	1
		80–100	–	–	–	–	1	7	–	2	12	–	14	–
		100–120	–	–	–	–	1	4	–	–	–	–	2	1
		120–130	–	–	–	–	1	–	–	–	4	–	2	1
	1	(NE Ext.):												
		0–85	–	–	–	–	–	–	–	–	5	–	6	1
		85–120	–	–	–	–	–	–	–	1	1	–	2	–
G–84	1	60–70	–	–	–	–	–	–	1	–	–	–	–	–
		90–100	–	–	–	–	–	–	1	–	1	–	1	–
		100–110	–	–	–	–	–	–	–	–	–	–	–	–
G–88	2	0–30	–	–	–	1	–	–	–	2	–	1	–	–
		30–60	–	–	–	1	–	–	–	1	–	–	–	–
		60–90	–	–	–	–	–	–	–	–	–	–	–	–

TABLE 14.—*Combined vessel forms of the pottery types of the Valdivia Phase (see text table A and fig. 54)*

Combined Forms	G–31: Valdivia																	
	Cut A																	
	160–180 cm.		180–200 cm.		200–220 cm.		220–240 cm.		240–260 cm.		260–280 cm.		280–300 cm.		300–340 cm.		340–360 cm.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	2	1.8	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–
2	2	1.8	4	3.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	13	11.9	23	21.7	10	17.2	1	1.2	1	1.3	–	–	–	–	–	–	–	–
4	1	0.9	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–
5	19	17.3	13	12.2	15	25.8	16	19.5	8	10.4	1	–	1	–	1	–	4	–
6	1	0.9	2	1.9	–	–	1	1.2	–	–	–	–	–	–	–	–	–	–
7	9	8.2	14	13.2	7	12.2	9	11.0	7	9.1	3	–	2	–	–	–	–	–
8	–	–	4	3.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11	3	2.7	–	–	–	–	1	1.2	1	1.3	–	–	–	–	–	–	–	–
12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	2	1.8	3	2.8	4	6.9	28	34.2	29	37.6	5	–	1	–	4	–	5	–
14	47	42.8	39	36.9	19	32.8	20	24.4	21	27.3	10	–	1	–	7	–	7	–
15	2	1.8	–	–	–	–	–	–	1	1.3	–	–	–	–	–	–	–	–
16	1	0.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
17	4	3.6	–	–	–	–	–	–	3	3.9	–	–	–	–	–	–	–	–
18	3	2.7	3	2.8	3	5.1	6	7.3	6	7.8	5	–	1	–	3	–	–	–
19	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
21	1	0.9	1	0.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–
22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTALS	110	100.0	106	100.0	58	100.0	82	100.0	77	100.0	25	[a]	7	[a]	16	[a]	16	[a]

[a] Sample too small for valid percentage calculations.

TABLE 14.—*Combined vessel forms of the pottery types of the Valdivia Phase (see text table A and fig. 54)*—Continued

Combined Forms	G–31: Valdivia—Continued																	
	Cut A—Continued						Cut F						Cut H					
	360–380 cm.		380–400 cm.		400–420 cm.		0–20 cm.		20–40 cm.		40–60 cm.		0–20 cm.		20–40 cm.		40–60 cm.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	–	–	–	–	–	–	3	0.9	–	–	–	–	–	–	2	0.9	1	0.4
2	–	–	–	–	–	–	1	0.3	–	–	–	–	–	–	–	–	1	0.4
3	–	–	–	–	–	–	7	2.3	5	2.6	–	–	9	5.7	13	6.1	22	9.7
4	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–
5	1	–	1	–	–	–	54	17.4	20	10.7	3	11.1	13	8.3	27	12.7	16	7.0
6	–	–	–	–	–	–	10	3.2	9	4.8	–	–	7	4.5	6	2.8	11	4.8
7	–	–	2	–	1	–	42	13.5	19	10.1	2	7.4	39	24.8	39	18.4	34	15.0
8	–	–	–	–	–	–	5	1.6	–	–	–	–	2	1.2	14	6.6	9	3.9
9	–	–	–	–	–	–	3	0.9	–	–	1	3.7	3	1.9	4	1.8	5	2.2
10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11	–	–	–	–	–	–	20	6.4	8	4.2	–	–	8	5.1	12	5.6	8	3.5
12	–	–	–	–	–	–	3	0.9	–	–	–	–	–	–	1	0.5	–	–
13	3	–	–	–	–	–	12	3.8	17	9.0	2	7.4	4	2.6	1	0.5	4	1.7
14	4	–	–	–	–	–	23	7.4	18	9.6	12	44.5	39	25.1	45	21.2	55	24.3
15	–	–	–	–	–	–	63	20.4	47	25.0	5	18.5	7	4.5	9	4.2	17	7.4
16	–	–	–	–	–	–	5	1.6	1	0.5	–	–	1	0.6	1	0.5	3	1.3
17	1	–	–	–	–	–	49	15.9	34	18.2	2	7.4	5	3.2	9	4.2	11	4.8
18	–	–	–	–	1	–	8	2.6	9	4.8	–	–	7	4.5	8	3.7	9	3.9
19	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
20	–	–	–	–	–	–	3	0.9	–	–	–	–	5	3.1	8	3.7	8	3.5
21	–	–	–	–	–	–	–	–	–	–	–	–	3	1.9	5	2.4	2	1.8
22	–	–	–	–	–	–	–	–	1	0.5	–	–	5	3.1	8	3.7	10	4.4
23	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	0.5	–	–
TOTALS	9	[a]	3	[a]	3	[a]	311	100.0	188	100.0	27	100.0	157	100.0	213	100.0	226	100.0

[a] Sample too small for valid percentage calculations.

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TABLE 14.—*Combined vessel forms of the pottery types of the Valdivia Phase (see text table A and fig. 54)*—Continued

Combined Forms	G–31: Valdivia—Continued										G–54: Buena Vista							
	Cut H—Continued										Cut 1							
	60–80 cm.		80–100 cm.		100–120 cm.		120–130 cm.		130–140 cm.		20–40 cm.		40–60 cm.		60–80 cm.		80–100 cm.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	–	–	–	–	–	–	3	2.8	–	–	–	–	–	–	–	–	–	–
2	–	–	–	–	1	0.8	1	0.9	–	–	–	–	–	–	–	–	–	–
3	9	8.2	13	8.4	8	6.4	29	27.9	24	12.7	9	8.3	5	3.3	17	5.3	20	3.3
4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	19	17.4	27	17.6	18	14.5	12	11.7	31	16.3	28	25.9	32	21.2	48	15.0	62	10.3
6	3	2.8	4	2.6	2	1.6	2	1.9	–	–	–	–	2	1.3	2	0.6	2	0.3
7	20	18.4	25	16.2	14	11.2	21	20.3	27	14.2	3	2.8	3	2.0	5	1.5	2	0.3
8	2	1.8	1	0.6	–	–	–	–	1	0.5	7	6.4	10	6.6	27	8.4	25	4.1
9	2	1.8	1	0.6	–	–	–	–	–	–	12	11.2	19	12.5	46	14.4	140	23.3
10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11	2	1.8	8	5.1	3	2.4	1	0.9	–	–	–	–	2	1.3	4	1.2	6	1.0
12	–	–	–	–	1	0.8	–	–	–	–	–	–	–	–	–	–	–	–
13	3	2.8	5	3.2	7	5.5	–	–	16	8.5	2	1.8	1	0.6	1	0.3	–	–
14	16	14.7	31	20.0	43	34.4	9	8.7	68	35.8	–	–	–	–	–	–	–	–
15	6	5.5	13	8.4	2	1.6	6	5.8	1	0.5	3	2.8	1	0.6	12	3.7	2	0.3
16	–	–	1	0.6	–	–	1	0.9	1	0.5	4	3.7	3	2.0	6	1.9	10	1.6
17	13	11.9	13	8.4	14	11.2	9	8.7	9	4.7	29	26.9	54	36.0	103	32.2	236	39.4
18	3	2.8	6	3.9	9	7.2	8	7.7	11	5.8	4	3.7	5	3.3	14	4.3	16	2.7
19	–	–	–	–	–	–	–	–	–	–	6	5.6	2	1.3	12	3.7	31	5.2
20	3	2.8	3	1.9	3	2.4	1	0.9	1	0.5	–	–	–	–	1	0.3	3	0.5
21	1	0.9	1	0.6	–	–	–	–	–	–	1	0.9	12	8.0	22	6.9	43	7.2
22	7	6.4	2	1.3	–	–	1	0.9	–	–	–	–	–	–	–	–	–	–
23	–	–	1	0.6	–	–	–	–	–	–	–	–	–	–	1	0.3	3	0.5
TOTALS	109	100.0	155	100.0	125	100.0	104	100.0	190	100.0	108	100.0	151	100.0	321	100.0	601	100.0

TABLE 14.—*Combined vessel forms of the pottery types of the Valdivia Phase (see text table A and fig. 54)*—Continued

Combined Forms	G-54: Buena Vista—Cont.				G-84: Posorja								Site G-88: Palmar Norte					
	Cut 1—Continued				Cut 1								Cut 2					
	100–120 cm.		120–130 cm.		40–60 cm.		60–80 cm.		80–100 cm.		100–130 cm.		0–30 cm.		30–60 cm.		60–90 cm.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	–	–	–	–	–	–	–	–	–	–	–	–	15	10.1	3	3.3	–	–
2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2.1	2	4.4
3	21	5.3	15	7.5	4	5.0	4	3.4	1	1.9	7	8.9	3	2.0	5	5.4	5	10.9
4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	82	20.4	39	19.4	3	3.8	2	1.7	3	5.8	2	2.5	21	14.1	16	17.4	5	10.9
6	–	–	–	–	1	1.2	2	1.7	2	3.8	2	2.5	6	4.1	4	4.4	–	–
7	7	1.7	4	2.0	26	32.6	31	26.3	14	26.9	19	24.0	23	15.4	10	10.9	11	24.0
8	32	8.0	18	8.9	5	6.2	8	6.7	4	7.7	8	10.2	–	–	–	–	–	–
9	56	14.0	15	7.5	2	2.5	2	1.7	1	1.9	1	1.2	–	–	–	–	–	–
10	–	–	–	–	5	6.2	15	12.7	8	15.4	5	6.4	–	–	–	–	–	–
11	3	0.7	5	2.5	–	–	–	–	–	–	–	–	19	12.8	7	7.6	1	2.1
12	–	–	–	–	–	–	–	–	–	–	–	–	2	1.3	–	–	–	–
13	4	0.9	–	–	–	–	–	–	–	–	–	–	5	3.3	15	16.3	11	24.0
14	–	–	–	–	–	–	–	–	–	–	–	–	3	2.0	1	1.0	6	13.0
15	3	0.7	4	2.0	5	6.2	13	11.0	4	7.7	8	10.2	13	8.8	13	14.2	–	–
16	12	3.0	7	3.5	2	2.5	5	4.3	2	3.8	1	1.2	19	12.8	8	8.7	1	2.1
17	138	34.4	76	37.8	4	5.0	7	5.9	–	–	2	2.5	10	6.7	3	3.3	1	2.1
18	11	2.7	6	2.9	2	2.5	4	3.4	–	–	1	1.2	7	4.7	2	2.1	2	4.4
19	9	2.2	1	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
20	–	–	1	0.5	–	–	–	–	–	–	–	–	2	1.3	3	3.3	1	2.1
21	16	4.0	10	5.0	16	20.1	20	17.0	10	19.3	18	22.9	1	0.6	–	–	–	–
22	–	–	–	–	1	1.2	1	0.8	–	–	1	1.2	–	–	–	–	–	–
23	8	2.0	–	–	4	5.0	4	3.4	3	5.8	4	5.1	–	–	–	–	–	–
TOTALS	402	100.0	201	100.0	80	100.0	118	100.0	52	100.0	79	100.0	149	100.0	92	100.0	46	100.0

TABLE 15.—*Frequency of combined vessel forms and unusual appendages in sites of the Machalilla Phase (fig. 90)*

Combined vessel forms	G–110: La Cabuya													
	Cut 1								Cut 2				Cut 3	
	10–20 cm.		20–30 cm.		30–50 cm.		50–70 cm.		0–20 cm.		20–40 cm.		0–20 cm.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	1	4.3	3	10.4	6	13.1	9	20.0	23	9.7	19	8.5	2	8.7
2	2	8.7	6	20.8	3	6.5	1	2.2	22	9.3	23	10.3	1	4.3
3	1	4.3	4	13.8	–	–	1	2.2	9	3.8	20	8.9	–	–
4	1	4.3	2	6.9	1	2.1	2	4.4	17	7.1	13	5.8	2	8.7
5	1	4.3	2	6.9	3	6.5	6	13.4	24	10.2	39	7.5	2	8.7
6	1	4.3	–	–	–	–	–	–	4	1.7	–	–	1	4.3
7	–	–	1	3.4	–	–	–	–	8	3.4	2	0.8	1	4.3
8	1	4.3	–	–	–	–	1	2.2	15	6.3	8	3.6	–	–
9	–	–	–	–	–	–	–	–	1	0.4	–	–	–	–
10	–	–	–	–	–	–	–	–	1	0.4	3	1.3	1	4.3
11	5	21.9	6	20.8	14	30.5	13	29.0	53	22.4	43	19.2	5	21.7
12	–	–	1	3.4	1	2.1	–	–	1	0.4	–	–	–	–
13	1	4.3	1	3.4	9	19.7	3	6.6	13	5.5	12	5.4	4	17.5
14	1	4.3	–	–	–	–	–	–	4	1.7	–	–	–	–
15	4	17.5	2	6.9	7	15.2	7	15.6	20	8.4	29	12.9	4	17.5
Uncl.	4	17.5	1	3.4	2	4.3	2	4.4	22	9.3	13	5.8	–	–
TOTALS	23	100.0	29	100.0	46	100.0	45	100.0	237	100.0	224	100.0	23	100.0
Unusual Appendages:														
Stirrup Spout	–	–	–	–	–	–	–	–	2	–	1	–	–	–
Cylindrical Spout	–	–	–	–	–	–	–	–	3	–	1	–	–	–
Boss	–	–	–	–	–	–	–	–	–	–	1	–	–	–

TABLE 15.—*Frequency of combined vessel forms and unusual appendages in sites of the Machalilla Phase (fig. 90)*—Continued

Combined vessel forms	G–110: La Cabuya—Cont.				M–28: Machalilla Cemetery				Machalilla Phase trade sherds at Valdivia Phase sites			
	Tests and surface		Trench		Cut 1				G–31: Combined levels of Cut J		G–54: Misc. tests and surface	
					0–20 cm.		20–40 cm.					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	52	9.4	14	7.8	22	11.2	4	3.9	8	–	3	6.4
2	57	10.3	26	14.5	41	20.8	14	13.6	–	–	4	8.5
3	47	8.5	13	7.3	29	14.7	22	21.4	–	–	1	2.1
4	32	5.7	12	6.6	10	5.1	6	5.8	–	–	5	10.6
5	100	18.1	18	10.1	8	4.0	3	2.9	1	–	13	27.7
6	20	3.6	2	1.1	–	–	–	–	2	–	–	–
7	2	0.3	–	–	–	–	–	–	–	–	–	–
8	20	3.6	10	5.6	11	5.6	8	7.8	–	–	–	–
9	2	0.3	2	1.1	–	–	–	–	–	–	–	–
10	3	0.5	–	–	–	–	–	–	–	–	–	–
11	119	21.5	46	25.8	32	16.3	20	19.4	–	–	12	25.6
12	2	0.3	1	0.5	7	3.5	6	5.8	–	–	–	–
13	35	6.3	10	5.6	12	6.1	9	8.7	–	–	4	8.5
14	–	–	5	2.8	1(?)	0.5	4	3.9	–	–	–	–
15	38	6.9	14	7.8	1	0.5	1	1.0	–	–	5	10.6
Uncl.	26	4.7	6	3.4	23	11.7	6	5.8	–	–	–	–
TOTALS	555	100.0	179	100.0	197	100.0	103	100.0	11	(a)	47	100.0
Unusual appendages:												
Stirrup spouts	5	–	–	–	4	–	–	–	–	–	1	–
Cylindrical spouts	2	–	–	–	3	–	1	–	–	–	–	–
Boss	2	–	–	–	2	–	–	–	–	–	–	–

[a] Sample too small for valid percentage calculations.

TABLE 16.—*Frequency of pottery types in surface collections and stratigraphic excavations at sites of the Machalilla Phase (fig. 89)*

	Pottery types	M–28: Machalilla Cemetery				G–110: La Cabuya							
		Cut 1				Cut 1							
		0–20 cm.		20–40 cm.		0–10 cm.		10–20 cm.		20–30 cm.		30–50 cm.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PLAIN	Cabuya Plain	217	13.32	131	13.7	24	27.6	69	21.0	64	17.8	47	12.2
	Chorrera Plain	54	3.32	13	1.4	5	5.8	16	4.8	8	2.2	25	6.5
	Machalilla Plain	95	5.85	59	6.2	–	–	2	0.6	2	0.6	–	–
	Machalilla Polished Plain	265	16.30	189	19.7	16	18.4	77	23.4	80	22.2	42	10.9
	Machalilla Polished Red	112	6.84	73	7.6	8	9.2	21	6.4	45	12.5	56	14.6
	Machalilla Striated Polished Plain	475	29.20	308	32.3	15	17.2	107	32.6	96	26.8	100	26.0
	Unclassified Plain	13	0.80	2	0.2	–	–	–	–	–	–	–	–
DECORATED	Ayangue Incised	1(?)	0.06	–	–	3	3.4	8	2.4	2	0.6	4	1.1
	Cabuya Black-on-White	–	–	–	–	–	–	1	0.3	–	–	–	–
	Cabuya Finger Pressed Rim	–	–	–	–	–	–	–	–	–	–	–	–
	Chorerra Incised	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Burnished Line	–	–	1	0.1	–	–	–	–	–	–	–	–
	Machalilla Double-line Incised	–	–	–	–	–	–	1	0.3	–	–	2	0.5
	Machalilla Embellished and Red Zoned	–	–	1	0.1	–	–	–	–	–	–	2	0.5
	Machalilla Embellished Shoulder	143	8.80	54	5.6	–	–	5	1.5	9	2.5	11	2.9
	Machalilla Finger Punched	2	0.12	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised	3	0.18	–	–	–	–	2	0.6	–	–	–	–
	Machalilla Incised and Punctate	4	0.24	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised and Red Zoned	1	0.06	–	–	–	–	–	–	2	0.6	4	1.1
	Machalilla Punctate	2	0.12	1	0.1	–	–	1	0.3	–	–	1	0.3
	Machalilla Punctate and Red Zoned	1	0.06	–	–	–	–	–	–	3	0.8	3	0.8
	Machalilla Red Banded:												
	Technique 1: Fine	166	10.20	94	9.8	13	15.0	14	4.3	31	8.6	60	15.6
	Technique 2: Wide	53	3.26	26	2.7	2	2.3	4	1.2	15	4.2	25	6.5
	Machalilla Red Incised	2	0.12	1	0.1	–	–	1	0.3	1	0.3	–	–
	Unclassified Decorated:												
	Chorrera Phase types	–	–	–	–	–	–	–	–	–	–	–	–
	Miscellaneous	3	0.18	1	0.1	–	–	–	–	–	–	2	0.5
TRADE	Valdivia Phase types:												
	Valdivia Applique Fillet	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	–	–	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Brushed	2	0.12	–	–	–	–	–	–	1	0.3	–	–
	Valdivia (?) Corrugated	4	0.24	1	0.1	–	–	–	–	–	–	–	–
	Valdivia Incised	2	0.12	–	–	–	–	–	–	–	–	–	–
	Valdivia Pebble Polished	–	–	–	–	1	1.1	–	–	–	–	–	–
	Valdivia Punctate	1	0.06	–	–	–	–	–	–	–	–	–	–
	Plain Pottery types	5	0.31	2	0.2	–	–	–	–	–	–	–	–
	Kotosh-like Zoned Punctate	2	0.12	–	–	–	–	–	–	–	–	–	–
	GRAND TOTALS	1,628	100.00	958	100.0	87	100.0	329	100.0	359	100.0	384	100.0
	SUBTOTALS:												
	Plain Types	1,231	–	775	–	66	–	292	–	295	–	270	–
	Decorated Types	381	–	179	–	20	–	37	–	63	–	114	–
	Trade Pottery.	16	–	4	–	1	–	0	–	1	–	0	–

TABLE 16.—*Frequency of pottery types in surface collections and stratigraphic excavations at sites of the Machalilla Phase (fig. 89)*—Continued

	Pottery types	G–110: La Cabuya—Continued										G–112		Grand Total
		Cut 1—Con.		Cut 2				Cut 3		Trench 1		Surface		
		50–70 cm.		0–20 cm.		20–40 cm.		0–20 cm.						
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
PLAIN	Cabuya Plain	55	14.1	429	16.48	612	23.30	56	21.9	352	20.62	110	38.8	–
	Chorrera Plain	23	5.9	125	4.80	289	11.00	15	5.8	66	3.86	90	31.7	–
	Machalilla Plain	–	–	32	1.23	8	0.30	–	–	25	1.46	–	–	–
	Machalilla Polished Plain	52	13.4	694	26.62	446	16.98	52	20.3	317	18.52	26	9.2	–
	Machalilla Polished Red	60	15.4	468	18.00	241	9.17	37	14.4	42	2.45	32	11.3	–
	Machalilla Striated Polished Plain	89	22.8	485	18.65	580	22.04	26	10.2	537	31.42	3	1.1	–
	Unclassified Plain	–	–	–	–	–	–	–	–	–	–	–	–	–
DECORATED	Ayangue Incised	6	1.5	80	3.08	37	1.41	9	3.5	10	0.58	–	–	–
	Cabuya Black-on-White	–	–	5	0.19	2	0.07	–	–	–	–	–	–	–
	Cabuya Finger Pressed Rim	–	–	5	0.19	3	0.10	–	–	–	–	–	–	–
	Chorerra Incised	1(?)	0.2	–	–	1	0.04	2	0.8	–	–	–	–	–
	Machalilla Burnished Line	5	1.3	4	0.15	3	0.10	–	–	2	0.11	–	–	–
	Machalilia Double-line Incised	1	0.2	8	0.32	15	0.57	–	–	3	0.17	–	–	–
	Machalilla Embellished and Red Zoned	–	–	3	0.12	1	0.04	1	0.4	–	–	–	–	–
	Machalilla Embellished Shoulder	14	3.6	30	1.15	53	2.01	2	0.8	51	2.98	7	2.4	–
	Machalilla Finger Punched	–	–	1	0.04	–	–	–	–	–	–	–	–	–
	Machalilla Incised	–	–	11	0.42	3	0.10	1	0.4	1	0.06	–	–	–
	Machalilla Incised and Punctate	–	–	–	–	–	–	–	–	–	–	–	–	–
	Machalilla Incised and Red Zoned	3	0.8	7	0.27	23	0.87	4	1.5	5	0.29	3	1.1	–
	Machalilla Punctate	–	–	–	–	2	0.07	–	–	–	–	1	0.3	–
	Machalilla Punctate and Red Zoned	4	1.0	12	0.46	30	1.14	1	0.4	9	0.52	2	0.7	–
	Machalilla Red Banded:													
	Technique 1: Fine	42	10.8	126	4.86	208	7.93	34	13.3	199	11.62	5	1.7	
	Technique 2: Wide	26	6.7	57	2.19	56	2.12	13	5.1	72	4.23	5	1.7	–
	Machalilla Red Incised	–	–	1	0.04	3	0.10	–	–	1	0.06	–	–	–
	Unclassified Decorated:													
	Chorrera Phase types	–	–	1	0.04	1	0.04	–	–	–	–	–	–	–
	Miscellaneous	8	2.1	10	0.38	10	0.38	3	1.2	9	0.52	–	–	–
TRADE	Valdivia Phase types:													
	Valdivia Applique Fillet	–	–	1	0.04	–	–	–	–	–	–	–	–	–
	Valdivia Broad-line Incised	1	0.2	1	0.04	1	0.04	–	–	–	–	–	–	–
	Valdivia Brushed	–	–	2	0.08	1	0.04	–	–	6	0.35	–	–	–
	Valdivia(?) Corrugated	–	–	–	–	–	–	–	–	–	–	–	–	–
	Valdivia Incised	–	–	1	0.04	–	–	–	–	1	0.06	–	–	–
	Valdivia Pebble Polished	–	–	3	0.12	–	–	–	–	1	0.06	–	–	–
	Valdivia Punctate	–	–	–	–	–	–	–	–	–	–	–	–	–
	Plain Pottery types	–	–	–	–	–	–	–	–	1	0.06	–	–	–
	Kotosh-like Zoned Punctate	–	–	–	–	1	0.04	–	–	–	–	–	–	–
	GRAND TOTALS	390	100.0	2,602	100.00	2,630	100.00	256	100.0	1,710	100.00	284	100.0	11,617
	SUBTOTALS:													
	Plain types	279	–	2,233	–	2,176	–	186	–	1,339	–	261	–	9,403
	Decorated types	110	–	361	–	451	–	70	–	362	–	23	–	2,171
	Trade Pottery	1	–	8	–	3	–	0	–	9	–	0	–	43

TABLE 17.—*Stone artifacts and natural stone from Machalilla Phase*

Periods	Levels in seriated position based upon pottery types			Abraders	Blades	Choppers	Gravers	Grinding Stones	Hammerstones	"Jaketown Perforators"	Paint Stones	Pebble Polishers	Reamers	Saws	Scrapers	Burnt Sandstone Fragments	Coquina Fragments	Mudstone Fragments	Chert, Quartzite, Chalcedony & Quartz Flakes	Natural Waterworn Pebbles
	Site	Cut	Level (cm.)																	
C	G–110	1	10–20	–	1	–	–	–	–	1	–	1	–	1	4	–	4	12	21	9
		2	0–20	1	5	1	2	–	2	–	–	1	1	1	3	–	–	15	100	10
		3	0–20	–	–	–	–	–	1	–	–	–	–	–	–	–	–	3	3	4
		1	20–30	–	2	–	2	–	–	1	–	4	–	–	3	–	–	3	8	1
		1	30–50	–	2	–	–	–	3	–	–	–	1	–	–	–	–	2	12	3
		Trench 1		–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	2
		3	20–30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		1	50–70	–	–	–	1	–	–	–	7	–	–	1	–	–	2	–	6	1
		2	20–40	–	4	1	1	–	–	3	1	9	2	1	–	4	–	12	85	5
B	G–112	Surface		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
A	M–28	1	0–20	–	2	–	1	–	–	–	–	1	–	1	–	1	–	13	5	–
		1	20–40	–	1	–	–	–	–	–	–	–	–	–	1	–	–	14	–	1
G–110: Surface & Tests				2	–	–	–	1	–	1	–	–	–	–	–	–	–	–	7	–
TOTALS				3	17	2	7	1	6	6	8	17	4	6	11	5	6	74	247	36

Appendix 2

SKELETAL REMAINS FROM SITES OF VALDIVIA AND MACHALILLA PHASES

Juan R. Munizaga

THE skeletal remains associated with the Valdivia and Machalilla Phases are of considerable potential interest, in spite of the small size and poorly preserved condition of the sample, because they constitute the earliest such remains from the Ecuadorian coast. Material has been segregated by Phase, following the organization of the cultural discussion, but this separation is justifiable also by the marked physical differences between the two populations in spite of their geographical and temporal juxtaposition. Although post-cranial fragments exist for many of the individuals, time allowed examination only of the skulls.

The present study was undertaken in the Division of Physical Anthropology of the U.S. National Museum during 1961. I should like to express my appreciation to the John Simon Guggenheim Foundation for fellowship support, and to the staff of the Department of Anthropology, U.S. National Museum, Smithsonian Institution for many courtesies during my stay. Particular thanks are due Dr. T. Dale Stewart, who encouraged and directed the work, and who has checked the accuracy of the translation of this manuscript from the original Spanish and to Mr. Donald J. Ortner, Division of Physical Anthropology, who devoted considerable effort to reconstruction and photography of the skulls. Mr. Olaf Holm of Guayaquil kindly granted permission for inclusion of measurements and observations on skulls from the Valdivia Phase site of San Pablo, which were made during my brief stay in Guayaquil.

THE VALDIVIA PHASE

Discovery of human skeletal remains at the Buena Vista site (G–54) of the Valdivia culture has a dual importance for South American physical anthropology. First, it provides one of the few undeformed cranial series on the continent for which both cultural association and chronological position (by carbon-14 dating) are known. Second, the population represented had a knowledge of potterymaking at so early a date that it may constitute the introducer of this craft.

These factors suggest two possible lines of inquiry: 1) Was so marked a change in culture as the introduction of potterymaking accompanied by a change in physical type? and 2) To what extent is the physical type of the Valdivians represented in later populations on the coast of Andean South America? In the following pages, we will attempt to find answers to these two questions.

Because of the extremely fragmentary condition of the material, requiring time-consuming restoration before study, and because of the limited time period available for the analysis, only the crania could be examined and compared. The poor state of preservation makes detailed description of methods of analysis important, as a basis for judging the validity of morphological observations and for understanding the basis for selection of certain measurements. A description of each skull is also given in detail because of the potential value of the series for future comparative studies.

Methods

RECONSTRUCTION.—The skull fragments in general show clean breaks. Reconstruction consequently did not present a difficult problem. Where pieces were missing, and it was necessary to give the vault

more strength to prevent damage during study, gaps were filled with plaster. In one case only (to be described below), plaster was used for interpretative reconstruction of a frontal bone. Restoration was limited to the fitting together of fragments, with minimal reconstruction of missing parts, to eliminate as far as possible the subjective element and to give measurements and observations maximum degree of validity.

MEASUREMENTS, INDICES AND MORPHOLOGICAL OBSERVATIONS.—Anterior-posterior diameter, maximum width and minimum frontal diameter were measured following the technique of Hrdlička (1939). The anterior-posterior diameter differs slightly from that of other authors in that it is obtained by measuring the distance from glabella to the most posterior portion of the skull, whether this is in the midline or at the sides of the occipital. Basio-bregmatic height could not be determined because of the absence of the basion on all the specimens, and auricular-bregmatic height was therefore substituted. In the very incomplete skulls, this measurement was calculated by using outline drawings made with the Schwarz stereograph. Vault thickness was measured in two places on the parietal, one in the region of obelion adjacent to the superior longitudinal sinus, and the other at the point of maximum thickness between the midline and the parietal eminence.

Cranial form was determined by the horizontal cranial index and the mean auricular height index. The latter index, elaborated by Stewart, is a variation of the classic mean height index (Stewart, 1942) and differs from it in that auricular-bregmatic height is employed in place of basio-bregmatic height (pers. commun.). Stewart has developed for this index the following categories, which are employed in the present study:

Low	–66
Medium	67–71
High	72–

Determination of skull size was difficult. Because of the poor condition of the crania neither capacity nor cranial module could be measured, although these are generally accepted as the most reliable indicators of size. In order to surmount this problem, we have employed a variant of the cranial module. Just as Stewart has elaborated his mean ear height index, we believe that it is possible to define an auricular cranial module. To calculate it, auricular-bregmatic height is substituted for basio-bregmatic height in the classic formula (length+width+height)/3.

Although we have not as yet arrived at a subdivision of cranial size based on the auricular module, the range of variation represented in six North American indigenous populations was from 136 to 156 mm. This can be used as a basis for comparison of the sizes of the skulls of the Buena Vista series.

MORPHOLOGICAL OBSERVATIONS.—In addition to the classical morphological characters, records were made of the presence or absence of such features as perforations of the floor of the auditory meatus, ear exostoses, apical and Inca bones, parietal foramina, and the emissary branch of the middle meningeal artery. There is high probability that these five features follow rather simple genetic patterns. The last, the emissary branch of the middle meningeal artery (which will be abbreviated as "emissary of the M.M." in the following pages), has been the subject of recent study and appears to be a useful character for the study of precolumbian populations (Munizaga, 1963).

Material

DESCRIPTION OF INDIVIDUAL SKULLS.—The 15 skulls represented in the Buena Vista series have the following metrical and morphological characteristics:

1. BV–1 (USNM 381930): Adult male, incomplete. In spite of the absence of the base, of several fragments of both right and left parietals and parts of the right sphenoid, almost complete reconstruction could be achieved (pl. 192 a–c). The principal metrical landmarks are present and the morphological characters are readily observable. The skull is undeformed, brachycranial (index, 81.3), high (mean auricular height index, 73.3), large (auricular cranial module, 150.3 mm.), with endocranial sutures obliterated and external sutures vestigial except for the right squamosal. With regard to morphological features, the Inca bone is absent, as are ear exostoses and the emissary of the M.M. The floor of the left auditory meatus contains a perforation of about 2 mm. diameter but this does not appear to be a normal dehiscence (pathological?). Parietal foramina symmetrical. Alterations of pathological origin include a wrinkle-like depression in the median part of the frontal (cicatrice?). Thickness of the vault is 5 mm. at the median point and 6 mm. at the lateral point.

2. BV–2 (USNM 381931): Young adult female; incomplete. This specimen is less complete than BV–1, lacking entirely the base, extensive portions of the lateral regions and the left half of the occipital; nevertheless, reconstruction was complete enough to permit description (pl. 192 d–f). Maximum anterior-posterior diameter was determined on the right half of the occipital, which does not appear to have distorted the result. Inspection shows the skull to be

undeformed, brachycranial (index, 81.7), high (index, 73.5), large (auricular cranial module, 150.0 mm.), with exocranial and endocranial sutures open both ecto- and endocranially. Absence of the relevant parts prevented observation of the floor and interior of the auditory meatus. The emissary of the M.M. is absent on the left side (the right side is missing). Neither parietal foramina nor an Inca bone are present; however, there is an apical bone. Pathological features include scarring of the orbital roof (pl. 195f) and arthritis in the right glenoid fossa. Thickness of the parietal is 5 mm. in the midline and 5 mm. at the lateral point.

3. BV–3 (USNM 381932): Young adult male; incomplete. The bones were coated with a hard calcium deposit, which was removed chemically. Reconstruction revealed the absence of the left half of the frontal, of both sphenoids, part of the left temporal squama, and the right side of the base (pl. 194 a–c). In spite of this, it was possible to identify all the principal landmarks except glabella. The position of glabella could be estimated by means of the right superorbital curve which reaches to the midline. Inspection showed the skull to be undeformed, brachycranial (index, 82.2), high (index, 79.2), of medium size (auricular cranial module, 143.3 mm.), with the sutures beginning to close on the interior. Auditory exostoses, perforations in the floor of the auditory meatus, and the emissary of the M.M. are absent. Present are a lateral Inca bone (pl. 195e) and bilaterally asymmetrical parietal foramina (left> right). No pathological lesions were observed. Thickness of the parietal is 5 mm. in the midline and 7 mm. at the lateral point.

4. BV–4 (USNM 381933): Young adult male; very incomplete. Absence of the bregmatic portion and the lower half of the occipital made determination of the sagittal contour impossible. Also missing was all of the base (pl. 193 a–c). Inspection showed the skull to be undeformed, symmetrical, brachycranial (index, 81.3), apparently high and large. Endocranial sutures are obliterated, while those on the exterior remain open. Perforations in the floor of the auditory meatus and the emissary of the M.M. are absent. Each auditory meatus contains a small oblong elevation (exostosis?). The Inca bone is of classic type, and there are faint parietal foramina. The only pathological sign is a possible arthritic condition of the glenoid condyles.

5. BV–5 (USNM 381394): Adult female; very fragmentary. Reconstruction permitted determination of the sagittal contour, but not the horizontal contour because of the absence of the temporal and part of the left parietal. Also missing are the base and

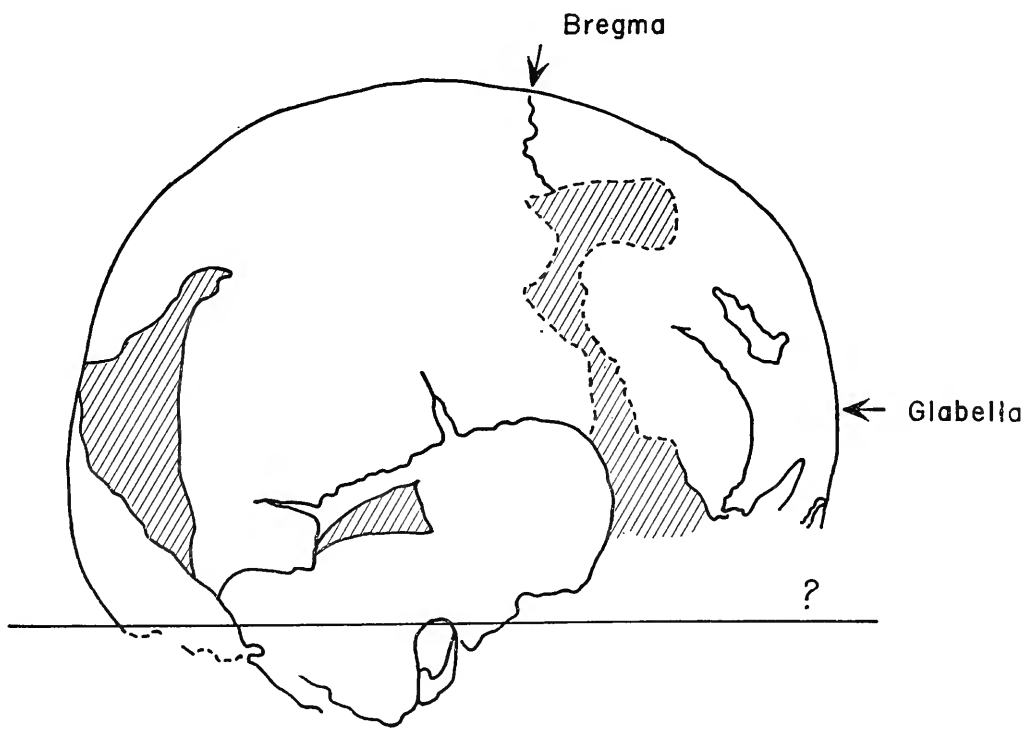

FIGURE 110.—Stereograph drawing of skull BV–5, G–54, Burial 8.

the sphenoids. Maximum width was consequently calculated by assuming symmetry. Auricular-bregmatic height was obtained from a stereographic drawing (fig. 110). Inspection showed the skull to be undeformed, brachycranial (index, 89.1), high (index, 72.6), medium sized (auricular cranial module, 142.6 mm.), with endocranial sutures completely closed and ectocranial sutures in the process of closure. Observations of the right side showed absence of exostoses of the auditory meatus, and absence of perforations in the floor of the auditory meatus. Present are a double emissary of the M.M. and bilaterial parietal foramina. Neither an apical nor an Inca bone is present, and no pathological lesion was observed. Thickness of the parietal bone is 5 mm. at the midline and 8 mm. at the lateral point.

6. BV–6 (USNM 381936): Adult female; incomplete. Except for the base, almost complete reconstruction was possible (pl. 193 d–f). Auricular-bregmatic height was obtained from a stereographic drawing (fig. 111). The skull is undeformed, brachycranial (index, 83.6), high (index, 72.6), large (auricular cranial module, 147.6 mm.), with endocranial sutures closed and ectocranial sutures in process of closure. Neither exostoses nor perforations of the floor of the auditory meatus are present. Existence of the emissary of the M.M. could not be determined in the absence of the relevant bones. A left parietal foramen was present. Inca and apical bones are absent. No pathological lesion was detected. Thickness of the parietal measured 5 mm. in the midline and 8 mm. at the lateral point.

7. BV–7 (USNM 381937): Adult male; very incomplete. Only the sagittal curve could be reconstructed because of the absence of the temporals and lower portions of the parietals (pl. 195 a–c). The auricular point was estimated for determination of basio-bregmatic height. The skull is undeformed, and has a sagittal profile similar to those previously described. Morphological features of the temporal bones could not be observed because of the absence of these bones. Inca and apical bones are absent. Double parietal foramina were present on the right side. No pathological lesion was evident.

8. BV–8 (USNM 381938): Adult female; incomplete. Reconstruction made it possible to take measurements and observe the principal morphological characters in spite of the absence of the base and left temporal (pl. 194 d–f). Auricular-bregmatic height was determined from a drawing (fig. 112). The skull is undeformed, brachycranial (index, 81.1), of intermediate height (index, 69.4), on the small side (auricular cranial module 138.3 mm.), with endocranial sutures closed and ectocranial sutures in the process

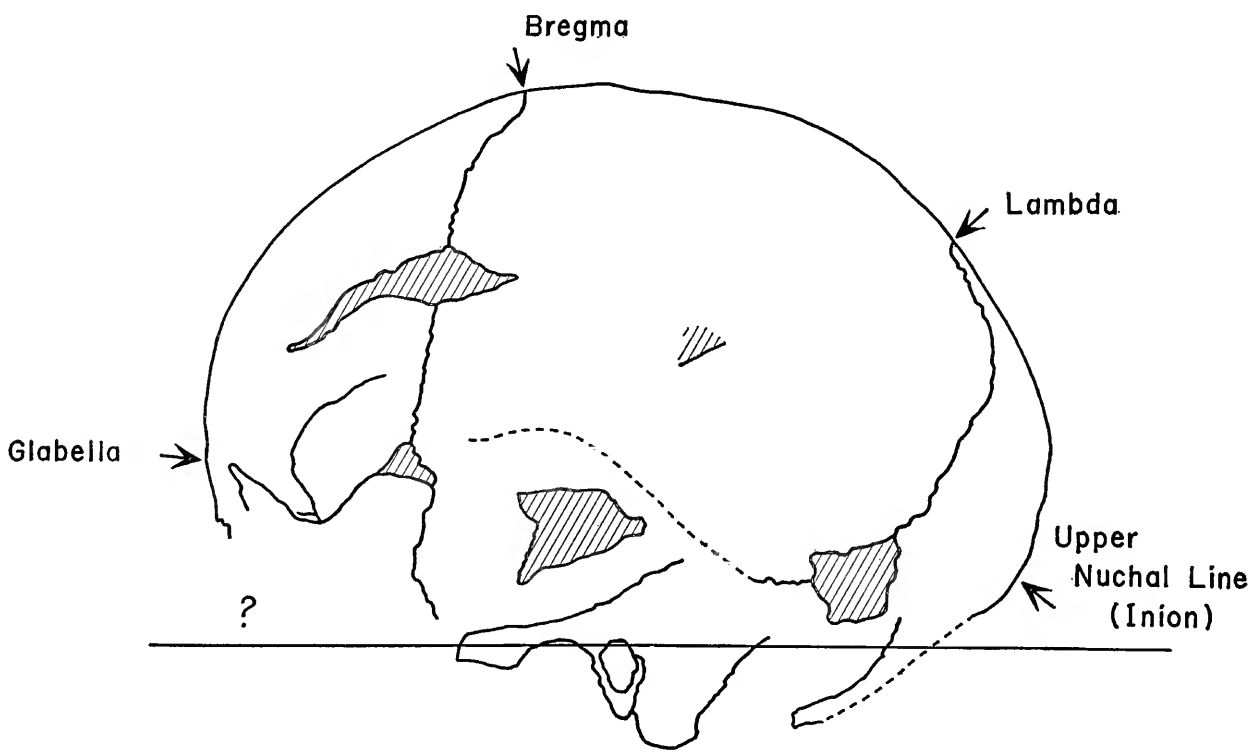

FIGURE 111.—Stereograph drawing of skull BV–6, G–54, Burial 9.

of closure. The right temporal exhibits neither exostoses nor perforations in the floor of the auditory meatus. The emissary of the M.M. is present on the right side. There is no Inca bone. The parietal foramen is marked on the left side but slight on the right side. No pathological lesion was observed. Thickness of the parietal is 5 mm. at the midline and 7 mm. at the lateral point.

9. BV–9 (USNM 381939): Adult male; very incomplete. In spite of the highly fragmentary condition, reconstruction was sufficient to permit definition of the sagittal profile. Absence of the midportion of the frontal and the parietals made it necessary to recreate these parts in plaster, which was done by taking as a basis certain points of these bones that approach the midline and using as a guide the contour of this region characteristic of the other skulls of the series. The position of bregma, consequently, is not entirely certain, but it is probably approximately correct. The horizontal contour could not be directly measured in the absence of part of the parietal and temporal, and the transverse diameter was calculated by assuming symmetry. Auricular-bregmatic height was calculated from a drawing. Inspection showed the skull to be undeformed, brachycranial (index, 78.1), high (index, 75.4), large (auricular cranial module, 149.6 mm.), with endocranial sutures completely closed and ectocranial sutures only partly closed. The left temporal shows neither exostoses nor perforations of the floor of the auditory meatus. The existence of the emissary of the M.M. could not be observed in the absence of that portion of the skull. A parietal foramen was limited to the left side. Neither Inca nor apical bones occur. No pathological lesion was evident. Thickness of the parietal is 6 mm. in the midline and 7 mm. at the lateral point.

10. BV–10 (USNM 381940): Adult male; very fragmentary. Restoration was limited to reconstruction of the anterior part of the right parietal, the superorbital area and a fragment that joins these portions along the right external frontal line. The skull appeared similar to others in the series. Several fragments showed sutures closed on the interior but open on the exterior. Morphological features observable include presence of the emissary of the M.M. on the left side (the right side is missing). Auditory meatuses do not show exostoses; the floor of the right meatus has a small perforation. The existence of an Inca bone and parietal foramina could not be ascertained. No pathological features were noted.

11. BV–11 (USNM 381941): Adult female; very incomplete. Reconstruction permitted establishment of the sagittal and horizontal contours in spite of the absence of fragments of both lateral norms and the frontal. Also missing is the base and the lower half of the occipital. Basio-bregmatic height was cal-

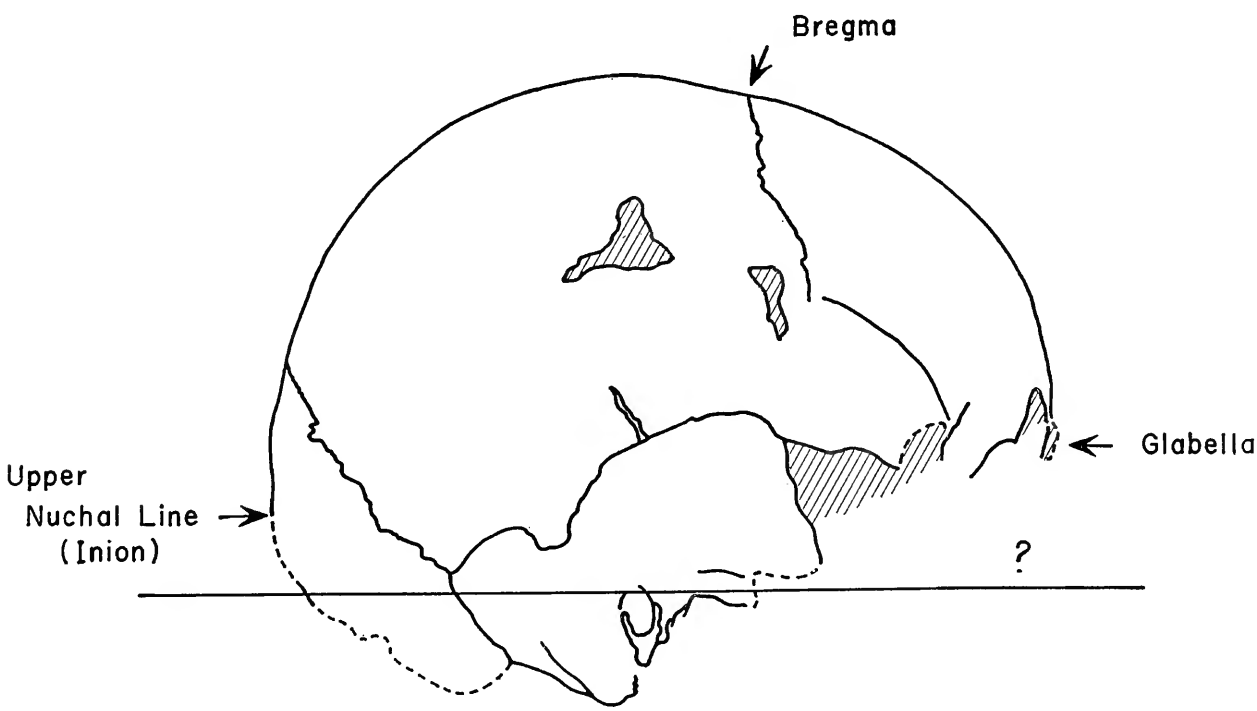

FIGURE 112.—Stereograph drawing of skull BV–8, G–54, Burials 1–7.

culated from a drawing (fig. 113). The skull is undeformed, brachycranial (index, 88.6), of intermediate height (index, 69.2), on the small side (auricular cranial module, 141.3 mm.), with endocranial sutures closed and ectocranial sutures in process of closure. The right temporal shows neither exostoses nor perforations in the floor of the auditory meatus (the left is missing). The existence of the emissary of the M.M. could not be ascertained. Neither Inca bone nor parietal foramina are present. No pathological features were observed. Thickness of the parietal is 5 mm. in the midline and 9 mm. at the lateral point.

12. BV–12 (USNM 381942): Adult male (?); incomplete. Although only the base was missing, reconstruction was not possible because of the extreme distortion of the fragments and the thick coat of calcium covering the surfaces. Nevertheless it was possible to observe that the general form was similar to other skulls in the series. Morphological observations were restricted to the temporal regions: the auditory meatuses do not exhibit exostoses but have numerous small circular perforations in the floor.

13. BV–13 (USNM 381943): Adult male (?); fragments of a skull. Reconstruction was limited to part of left side. The left temporal showed neither exostoses nor perforation of the floor of the auditory meatus.

14. BV–14 (USNM 381944): Child; fragments of a skull. Condition did not permit measurements or observations.

15. BV–15 (USNM 381946): Child; fragments of a skull. No reconstruction was possible. Size of the superorbital region indicated an age of under one year.

Summary of the Data

The measurements and observations obtained for the individual skulls show a number of consistencies that provide a basis for inference and comparison. These can be summarized under five general headings:

POPULATION.—The series is composed of 15 individuals of which 13 are adults, 1 a child of undetermined age and 1 an infant of less than one year. Among the adults, 5 are certainly female, 5 are certainly male, and 3 are probably male. The 10 adults of certain sex identification represent 1 young adult (female), 8 middle aged adults (4 female and 4 male) and 1 old adult (male).

GENERAL MORPHOLOGICAL CHARACTERISTICS.—Similarities between the individuals comprising the series are remarkable. All are round as viewed from above (vertical norm). From behind (occipital norm) the parietals appear parallel and the roof of the vault rather flat. In profile (lateral norm), the vault is moderately high. From the front (frontal norm), a

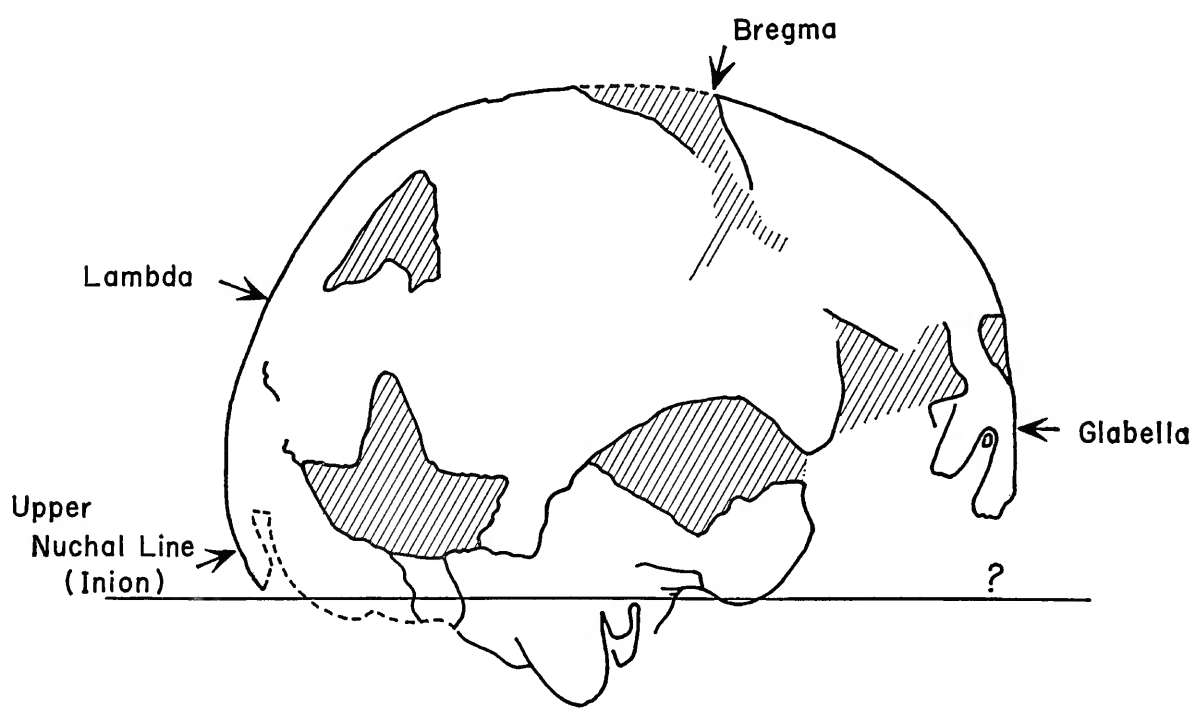

FIGURE 113.—Stereograph drawing of skull BV–11, G–54, Burial 8.

metopic crest can be clearly discerned. The superorbital ridges show marked sexual dimorphism. The skulls in general have smooth lines with attenuated eminences and occipital crests.

METRIC CHARACTERISTICS.—Measurements and indices are summarized on table 1.

TABLE 1.—*Measurements, indices, and module of individual crania comprising the Buena Vista series*

Sex	Identification No.	Measurements (mm.)				Indices		Module (mm.)
		MAP	MT	AB	MF	CI	MAHI	ACM
Male	BV–1	182	148	121	99	81.3	73.3	150.3
Male	BV–3	(169)	139	122	–	82.2	79.2	143.3
Male	BV–4	182	148	–	(91)	81.3	–	–
Male	BV–7	181	–	(115)	88	–	–	–
Male	BV–9	183	(143)	123	–	78.1	75.4	149.6
Male	BV–10	–	–	–	87	–	–	–
Female	BV–2	(181)	148	(121)	93	81.7	73.5	150.0
Female	BV–5	166	(148)	114	–	89.1	72.6	142.6
Female	BV–6	177	148	118	94	83.6	72.6	147.6
Female	BV–8	170	138	107	92	81.1	69.4	138.3
Female	BV–11	167	148	109	97	88.6	69.2	141.3

Key: MAP, maximum antero-posterior diameter; MT, maximum transverse diameter; AB, auricular-bregmatic diameter; MF, minimum frontal diameter; CI, cranial index; MAHI, mean auricular height index; ACM, auricular cranial module. Figures in parentheses are estimated.

PARTICULAR MORPHOLOGICAL FEATURES.—The frequency of morphological features observed on the Buena Vista skulls is summarized on table 2.

PATHOLOGY.—Signs of spongy hyperostosis (symmetrical osteoporosis) were observed in 4 of 10 individuals examined (5 male and 5 female). All showing the condition are female. Three exhibited thickening in the obelionic region and the fourth a vestigial criba orbitaria. The glenoid cavity of the temporal shows marked degenerative changes (arthritis) in one female; only the glenoid condyles are affected in another. One male has a scarlike depression on the frontal of unidentified origin (cicatrice? result of infection?).

TABLE 2.—*Frequency of independently variable traits in the Buena Vista population*

Trait	Individuals examined	Cases observed	Frequency (percent)
Ear exostosis	11	1?	9
Perforations of the floor of the auditory meatus	10	2	20
Inca bone	10	2	20
Apical bone	10	2	20
Emissary of the M.M.	5	3	60

Discussion

Discussion of the skulls that compose this series can be organized under two frames of reference. First, we will compare the individuals forming the group, defining their physical type and characteristics as a population, including pathology, and second, we will attempt to indicate the differences or similarities that the group as a whole shows with other groups from the coastal Andean area.

GROUP CHARACTERISTICS.—From inspection alone it is evident that there is great homogeneity in the skull type represented by individuals of the Buena Vista series. Characteristic are roundness when viewed from above, parallelism of the parietals and a rather flat vault when viewed from behind, a metopic crest when viewed from the front, and a general smoothness of contour. Metrically, all are brachycranial; cranial indices range between 78.1 and 89.1, with eight of nine individuals having an index above 81.1. It should be noted, furthermore, that the index of 78.1 ascribed to one skull was calculated from estimated reference points, making its mesocephalic condition hypothetical. In regard to height, the mean auricular index classifies all as high except two females, which have a medium high skull.

When viewed as a population, this group shows several interesting characteristics. First, there are three generations, including one old person, twelve middle aged adults and two children. Second, the skulls show striking homogeneity in certain features (for example six of the nine measureable skulls have a maximum transverse diameter of 148 mm.) to such an extent that superposition of the stereograms shows them in several cases to be almost identical. Thirdly, there is an unusually high frequency in certain phenotypic traits whose genetic origin is extremely probable, such as the high percentage occurrences of apical and Inca bones (20 percent in each case) and of the emissary artery of the M.M. (60 percent). The latter is exceptionally high in comparison with that for precolumbian populations in Peru, which vary between 20 and 40 percent (Munizaga, 1963). These three kinds of facts lead to the inference that the individuals represent an endogamous and possibly a family group.

In respect to pathology, we wish to comment only on the differential distribution of spongy hyperostosis between males and females. It is curious that in a population presumably sharing the same living conditions only the females are affected, and furthermore that nearly all of the females (4 out of 5) have been. This finding makes it difficult to accept the explanation that the condition originates from malaria.

COMPARISON WITH OTHER COASTAL ANDEAN SERIES.—Buena Vista and San Pablo: Since we have shown that the individuals from the Buena Vista site represent a homogeneous physical type, it is of interest to determine whether other skulls associated with Valdivia Phase cultural remains share the same physical characteristics. Some light can be shed on this question by comparing our series with that obtained by Carlos Zevallos Menéndez and Olaf Holm from G–115: San Pablo, located to the south of G–54: Buena Vista and representing the same general cultural period (see pp. 95, 104).

The San Pablo series comprises nine individuals, three male and six female. They were recovered in poor condition, but after reconstruction seven could be measured (table 3).

TABLE 3.—*Measurements, indices and module of individual crania comprising the San Pablo series*

Sex	*Identification No.*	*Measurements (mm.)*				*Indices*		*Module (mm.)*
		MAP	*MT*	*AB*	*MF*	*CI*	*MAHI*	*ACM*
Male	SP–1	190	134	118	80	70.5	72.8	147.3
Male	SP–2	178	133	–	96	74.7	–	–
Male	SP–3	188	132	–	94	70.2	–	–
Female	SP–4	182	131	110	90	71.9	70.2	141.0
Female	SP–5	–	(138)	–	–	–	–	–
Female	SP–6	168	132	–	–	78.5	–	–
Female	SP–7	163	(138)	–	–	84.6	–	–

Key: MAP, maximum antero-posterior diameter; MT, maximum transverse diameter; AB, auricular-bregmatic diameter; MF, minimum frontal diameter; CI, cranial index; MAHI, mean auricular height index; ACM, auricular cranial module. Figures in parentheses are estimated.

Comparison of the measurements, indices and modules with those of the Buena Vista series reveals both biological and cultural differences and similarities. From the biological point of view, the most striking aspect of the San Pablo series is its heterogeneity in contrast to that from Buena Vista, suggesting either that different groups are represented or that population mixture has taken place. The fact that cranial indices tend to group around disparate norms favors the inference that two different physical types are represented rather than the effect of intermixture. Culturally, a new trait is exemplified in an individual showing intentional cranial deformation, a treatment not encountered in the Buena Vista population. Since the same type of cranial deformation has been observed in skulls associated with the Machalilla Phase, this individual can be ascribed with reasonable certainty to that Phase (see pp. 172, 229.)

These differences and similarities between the two series suggest that the question regarding the physical type of the Valdivians may be answered in the following way: Brachycephaly was the predominant skull form, with a small minority of dolicocephalics. The distribution of indices suggests coexistence of two groups of different biological origin sharing the same culture. Can one of these physical types be designated as the basic Valdivia Phase population? In view of the larger number of brachycephalic individuals represented, and because of the evidence that the Buena Vista series comprises a social and possibly family group, we are inclined to believe that the original population resembled most closely that illustrated by the individuals included in the Buena Vista series.

Buena Vista and Cabezas Largas: To obtain an answer to the question of whether the introductoin of pottery to this part of the South American continent was paralleled by the introduction of a new physical type, it is necessary to compare the Buena Vista series with preceramic populations of equivalent or greater antiquity. One group suiting this criterion has been described by Hartweg (1961) from Cabezas Largas on the south coast of Peru. Carbon-14 dates give this site an antiquity of about 5000 years (Engel, 1960), making it some 1000 years older than the Ecuadorian series.

From the morphological point of view, none of the three types distinguished by Hartweg in his population of 28 individuals equates with the Buena Vista series. The delicate (fine) type, which is most frequent and encompasses 71.5 percent of the population, differs in possessing sphenoid bosses when viewed in the vertical norm, and a well marked sagittal crest. The Eskimoid type deviates in having an elipsoidal horizontal contour in addition to a well marked sagittal crest. The gross intermediate type is incomparable because of "its general grossness, the thickness of the bones and the prominence of the relief" (Hartweg, 1961, p. 124).

In making metrical comparisons, we are limited to the horizontal cranial index. The mean indices for the different physical types making up the Cabazes Largas series (a mean for the series as a whole is not given) diverge markedly from that for the Buena Vista series, which is 82.9. Specifically, the delicate type (mean 75.13) differs by 7.8 points, the Eskimoid type (mean 71.33) by 11.6 points, and the gross type (mean 77.89) by 5.1 points. Examination of differences in distribution of the cranial indices in individuals representing these types makes the lack of comparability still more apparent, since the Cabezas Largas skulls are found to be dolico- to meso-cranial, while the Buena Vista skulls are decidedly brachycranial (table 2).

Visual examination by Hartweg of the Cabezas Largas skulls led him to the conclusion that they are high, although in the gross intermediate type this is not so evident. In one case, the following indices could be obtained: height/length 74.44 (orthocranial) and height/width 92.41 (acrocranial). The mean auricular height index showed the Buena Vista skulls also to be high, with the exception of two females.

TABLE 4.—*Comparative distribution of cranial index in populations of Cabezas Largas and Buena Vista*

Cranial index	*Cabezas Largas*				*Buena Vista*
	Delicate	*Eskimoid*	*Gross*	*Total*	*Total*
65–69. 9	1	–	–	1	–
70–74. 9	6(?)	4	–	10	–
75–79. 9	13(?)	–	2	15	1
80–84. 9	–	–	2	2	6
85–89. 9	–	–	–	–	2
Totals	20	4	4	28	9

In summary, we are confronted with two basically different populations. The two brachycranial individuals in the Cabezas Largas series, incorporated in the gross intermediate type, are of most interest because they are the only ones that show any possible relationship to the Buena Vista population. Unfortunately, since Hartweg (1961) does not specify the conditions in which they were found at the site, and Engel (1960) suggests three different hypotheses to explain the origin of the ossuary from which these skulls may have come, their chronological position is not completely clear. The third hypothesis, which Engel feels to be the most plausible, attributes them to intrusion during subsequent reoccupation of the site. A cultural unity between these and the other burials is implied by similar specific burial goods, especially hides and totora (Engel 1960, pp. 24–25). However, this type of treatment of the dead survived into later times, so that similarity in cultural context does not necessarily imply contemporaneity. In view of these factors, the possibility cannot be discarded that the brachycranial individuals represent later intrusion. If so, the populations of the two sites are totally distinct.

Buena Vista and later populations: Our second problem—the affinities of the Buena Vista physical type with that of later populations—can be approached by comparison of cranial indices and observations on size and height of the skull.

In 1914, Hrdlička noted that brachycrania was one of the characteristic features of coastal Peruvian groups. Newman (1943, 1947) has confirmed this impression, and Stewart (1943b) has also encountered brachycranial individuals, although in smaller frequency, among north coastal populations. At least in respect to cranial index, these populations resemble that of Buena Vista. For purposes of comparing the cranial indices of several coastal Peruvian series with ours, the indices have been grouped into two categories, less than 79.9 and more than 80 (table 5).

In respect to height, we have already noted that the Ecuadorian skulls are high, a feature that agrees with reports on precolumbian populations of the Peruvian coast (Stewart, 1942, 1943a). Although the series is too small to permit significant conclusions regarding size, the large size of some of the skulls is striking since what we knew of the later populations of the region had not led us to expect it.

TABLE 5.—*Distribution of individuals by two categories of cranial index in five coastal Andean series*

Cranial index	*Peruvian Coast*				*Ecuador*	*Total*
	Central Coast	Cupis-nique	Mochica	Chica-ma	Buena Vista	
x–79.9	13	2	12	33	1	61
80–x	66	4	7	32	8	117
Totals	79	6	19	65	9	178

The Central Coast series (Newman, 1947) and that from the Chicama Valley (Stewart, 1943b) are composed entirely of males and represent several cultural periods. These factors, plus the large size of the samples, permit the derivation of valid conclusions from comparison. The Cupisnique and Mochica series, and our own from Buena Vista, on the other hand, represent a small number of individuals, both male and female, which makes comparative analysis unreliable. Nevertheless, these small series, well defined culturally and chronologically, permit us to approach the study of the physical types of the region from another point of view. They are of utility at the level of analysis that emphasizes their characteristic of constituting a social group. They may be viewed as endogamous populations, whose isolation in the coastal valleys contributed to the formation and maintenance of the brachycranial head form on the coast. They also may be viewed as representing a continuing migration of small groups from a point of origin where this physical type was characteristic. One or both of these hypotheses may reflect the role played by the Buena

Vista population in the racial history of the area, and account for the high proportion of brachycrany represented in table 5.

Conclusions

The Buena Vista series, associated with a potterymaking culture, represents a very homogeneous brachycranic type that probably corresponds to a family group. Total absence of any kind of intentional cranial deformation indicates that this practice was not of Valdivia Phase origin.

The Buena Vista physical type is totally different from the earlier preceramic Peruvian coastal population of Cabezas Largas, leading to the inference that the introduction of pottery also brought a new physical type. This new group may be to a large degree the source of the brachycrany observed in populations associated with the later potterymaking periods on the Peruvian coast.

THE MACHALILLA PHASE

The skeletal remains of two individuals from the site of G–110: La Cabuya are of particular importance for physical anthropological studies in South America. On the one hand, they constitute the only skeletal material clearly associated with the Machalilla Phase, and on the other, they furnish the earliest evidence on the Pacific coast of South America for the presence of intentional cranial deformation.

A sample containing only two individuals would be insufficient for making comparative studies of physical type, even if it were not for the alterations resulting from artificial deformation. Consequently, this report will be limited to description of the remains and of the type of cranial deformation. Subsequently, the distribution of this kind of deformation in time and space will be reviewed in order to evaluate the role played by the population associated with the Machalilla Phase in diffusion of the trait along the Pacific coast.

Material

The skeletal remains are very fragmentary. Time permitted detailed examination only of the crania, which have the following characteristics:

1. M–1 (USNM collection: Young adult female (?), deformed (pl. 196). Base, sphenoids, lower portion of occipital and part of the face missing (fig. 114). The existence of broad suture areas and the fact that many of the breaks were clean permitted reconstruction of the vault. The most difficult adjustment was along the coronal suture, where

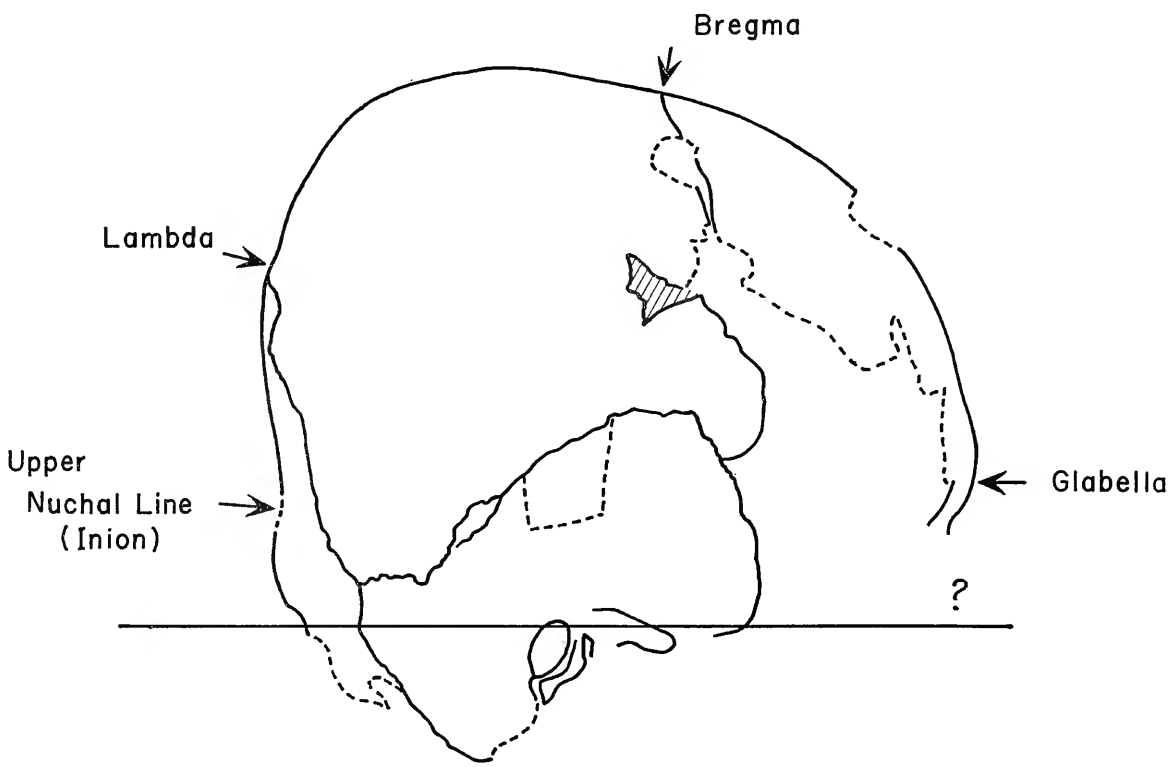

FIGURE 114.—Stereograph drawing of skull M–1, G–110, Cut 1.

contact between the frontal and parietals was reduced to a small part of the bregmatic zone. However, a small area between the middle of the right parietal and the frontal was complete, permitting correct positioning of the frontal. This factor is particularly important since observation of the inclination of the frontal bone is fundamental for identification of the kind and amount of deformation. Sutures remain open on both the interior and exterior of the vault. The teeth, with all four third molars erupted, show medium wear.

In regard to physical type, it can be noted that, had deformation not been present, the individual would have been brachycranic. Morphological features include absence of osteoma of the auditory canal, and presence in both tympanic plates of large perforations. An interparietal bone is absent, but the lambdoid region shows probable vestiges of an apical bone with the transverse suture closed. Signs of pathology are absent. Both maxilla and mandible exhibit a dental anomaly in the form of crowding of the canines. This is sufficiently marked in the maxilla to result in an anteroposterior orientation of the canines (pl. 196f).

2. M–2 (USNM collection): Young (?) adult female, deformed. Limited to the nearly complete occipital and superior posterior angle of the left parietal. Sutures in the lambdoid region are open both on interior and exterior. Teeth show medium wear. Reconstruction was limited to the sagittal curve of the posterior third or quarter of the parietals to a point on the under side of the occipital torus. This curve permits recognition of the cranium as deformed. Apical and Inca bones are absent and no pathology was observed.

Artificial Deformation of the Skull

IDENTIFICATION OF THE TYPE OF DEFORMATION.— The sagittal outline and photographs of Skull M–1 show clearly the presence of artificial deformation, resulting in a marked flattening of the occipital bone, especially the upper part (pl. 196 a, c–d). Pressure has altered the sagittal outline slightly on the frontal, strongly on the parietals (which have an index of curvature of 25*), and to an extreme degree on the occipital. The squamous portion of the latter bone, which under normal circumstances is more or less convex and inclined from front to back, has been altered to a concave contour and a back to front inclination. Consideration of all evidence leads to the diagnosis of the type of deformation as fronto-vertico-occipital, or tabular erecta in the terminology of Imbelloni. The fragments of the parietal and occipital bones representing Skull M–2 show the same type of deformation.

A third skull, which comes from the Valdivia Phase site of G–115: San Pablo, can be identified as representing an individual of the Machalilla Phase on the basis of its artificial deformation, which is the same type as that characterizing the examples from G–110 but more pronounced.

The particular details of the two most complete skulls permit classification of the deformation as the "cuneiform" or "Chavín" variety of the fronto-vertico-occipital type (Weiss, 1961). The more intense flattening of the occipital bone and absence of asymmetric form place them in this subtype.

IDENTIFICATION OF THE DEFORMING APPARATUS.— The different shapes that a normal skull can acquire by deformation have been classified into types and varieties according to the manner in which pressures were applied. This permits us to infer from the characteristics of a skull the kind of apparatus by which it was molded. The tabular erecta deformation shown by the Machalilla Phase skulls is the result of strong compression of the back of the head against a hard surface, to which it is fastened by appropriate binding. The "cuneiform" variety of this type indicates that the head was held so that the face invariably looked forward; the pronounced occipital flattening shows that the bindings were tightly applied; the concavity of the occipital permits the inference that a pillow-like object was placed between the skull and the board.

Weiss (1961) is the most recent to discuss this type of cranial deformation. After a review of the literature and reexamination of the skulls used to define the "cuneiform" variety, he encountered difficulties in reconstructing the apparatus by which it was produced, but inclined to the view that it was not a cradleboard but rather a device fastened to the head alone. He illustrates two probable examples of such apparatus from Peruvian archeological sites, one of which is a pillow attached to the occipital by a complicated system of binding (Weiss, 1961, pl. 4) and the other a small cradle-like object placed on the head only, which because of its special structure produces the "cuneiform" type of deformation (op. cit., pl. 39).

Because of the scarcity of both archeological and ethnological evidence relating to apparatus that might have been employed to produce tabular erecta deformation, it is worth calling attention to a figurine

*The mean values for the index of curvature of the parietal bone in normal skulls correspond, according to Aigner, to 22.44 for dolicocrania and 22.00 for brachycrania. Using this index, Dillenius (1910, p. 46) arrived at a mean value of 27.09 for skulls with fronto-occipital deformation, clearly separating them from the normal series. The value attributed to Skull M–1 helps to give an idea of the intensity of deformation of the Machalilla Phase skulls.

from Lambayeque showing a board attached to the occipital by two bands, one sagittal and the other transverse (Dembo and Imbelloni, 1938, pp. 288–289), which could have produced this result.

Distribution of Skull Deformation on the Pacific Coast of South America

Analysis of the pattern of occurrence of the various types of cranial deformation in South America is a complicated task, because of the ambiguous manner in which different types are distributed through time, space and culture, and because of the small number of samples whose cutural and chronological context has been established with reasonable confidence. Nevertheless, it is possible to recognize three large geographical areas or centers of dispersion: 1) the Caribbean coast; 2) the coast of Argentina, and 3) the Pacific coast (Stewart, 1950). In certain localities in Peru, the pattern of distribution of the practice by cultural phases has made it possible to give a temporal dimension, but no clear picture is yet available of when and where deformation was introduced into South America or how it was diffused over the continent. Within the Pacific coastal area, several skeletal series have been described in recent years, which in conjunction with the information now furnished by the Machalilla Phase skulls makes it useful to reexamine the evidence for the origin and dispersal of the trait.

The Machalilla Phase remains equate with Period C, with an initial carbon-14 date of 3320 ± 170 years ago (table G), and comprising the final portion of the Phase. The inception of the Phase, and by inference the introduction of the population represented by the Period C skeletal remains, has been given a minimum antiquity of 4000 years ago by the archeologists (pp. 148–149). At this time, complexes on the coast of Peru had not yet adopted ceramics. In order to trace the antiquity of the practice of deformation as well as its association with the spread of potterymaking, it is necessary to review evidence for the Peruvian Preceramic and Formative (or Cultist) Periods. Complexes failing within these periods for which skeletal information is available are shown on figure 115.

SKULL DEFORMATION IN THE PRECERAMIC PERIOD.—Only three series are available for the Preceramic Period on the coast of Peru and none exist from the coast of Ecuador. The earliest is from Cabezas Largas on the south coast and represents the early part of the period lacking cotton, dated at about 5000 years ago (Engel, 1960). Artificial cranial deformation does not occur (Hartweg, 1961).

More recent, but still associated with the Preceramic, are two populations from the north and central coast: Culebras and Asia. Both represent the late part of the period, dating around 3200 years ago (Engel, 1963, p. 20), in which cotton was present. All the individuals comprising these two populations show artificial skull deformation of the fronto-vertico-occipital or tabular erecta type, and the apparatus used to produce the deformation is inferred to be the cradle (Hartweg, 1958, p. 182). The position in which the head of the child was fixed to the board was not always the same, resulting in a high frequency of asymmetrical skulls in both populations. In other words, the position of the head against the board was not culturally defined, in contrast to what appears to have been the situation in the Formative Period.

SKULL DEFORMATION IN THE FORMATIVE PERIOD: ECUADOR.—The Machalilla Phase remains are the earliest so far discovered on the Pacific coast of South America showing artificial deformation. The 24 skulls available from earlier and partly contemporary Valdivia Phase sites on the coast of Ecuador show no evidence of deformation with the single exception of a female from G–115: San Pablo. Since this individual exhibits the type of deformation characterizing the Machalilla Phase skulls from G–110, it can confidently be considered a representative of the Machalilla Phase population. As such, it provides physical evidence to supplement cultural evidence (see pp. 147–148, 171–172) of contact between the two populations.

These data permit us to infer that artificial cranial deformation was introduced onto the coast of Ecuador by individuals representing the cultural complex known as the Machalilla Phase some 4000 years ago, and that the type was fronto-vertico-occipital or tabular erecta. This type continues to be practiced in various later periods of Ecuadorian prehistory.

SKULL DEFORMATION IN THE FORMATIVE PERIOD: PERU.—On the north coast, Stewart (1943b) encountered a sequence of cranial deformation beginning with the tabular erecta type in the Cupisnique (Coastal Chavín) Period. Newman (1947) found a similar situation on the central coast. A brief comparison made by Stewart (1943b, p. 172 footnote) between his results and those of Newman indicates clearly the pattern in which this practice is distributed on the north and central coasts:

> As for fronto-occipital deformity, Doctor Newman found it to be present in practically all his earliest or "Shell Mound" crania. In the Early (Interlocking Style) Period the incidence falls to about one-third, but in the Middle Period it increases to about two-thirds. Finally, in the Late Period intentional deformity almost disappears, and the great majority of the

crania are either undeformed or show slight to moderate posterior flattening. This situation seems to parallel that in the Chicama-Moche-Virú region, where intentional deformity is present in the Cupisnique period, disappears in the subsequent Mochica period, and reappears later only to taper off ultimately.

On the south coast, the situation is similar, with the tabular erecta type in its "cuneiform" or "Chavín Cavernas" variety occurring in Paracas Cavernas (Weiss, 1961, p. 72).

Comparison of cranial deformation characteristic of populations of the early Peruvian Formative brings to light not only a great similarity but an identity in the type employed. The closeness of the resemblance is evident from examination of illustrations of the Machalilla Phase skull (pl. 196) in conjunction with those from Cupisnique (Stewart, 1943b, pl. 11), early Ancon-Supe (Newman, 1947, pl. Ia), and Paracas Cavernas (Weiss, 1961, pl. 22B). Added to this identity in type of deformation is identity in the deforming apparatus used to produce it. Consistent repetition of the same kind of occipital flattening cannot be explained except as the product of applica-

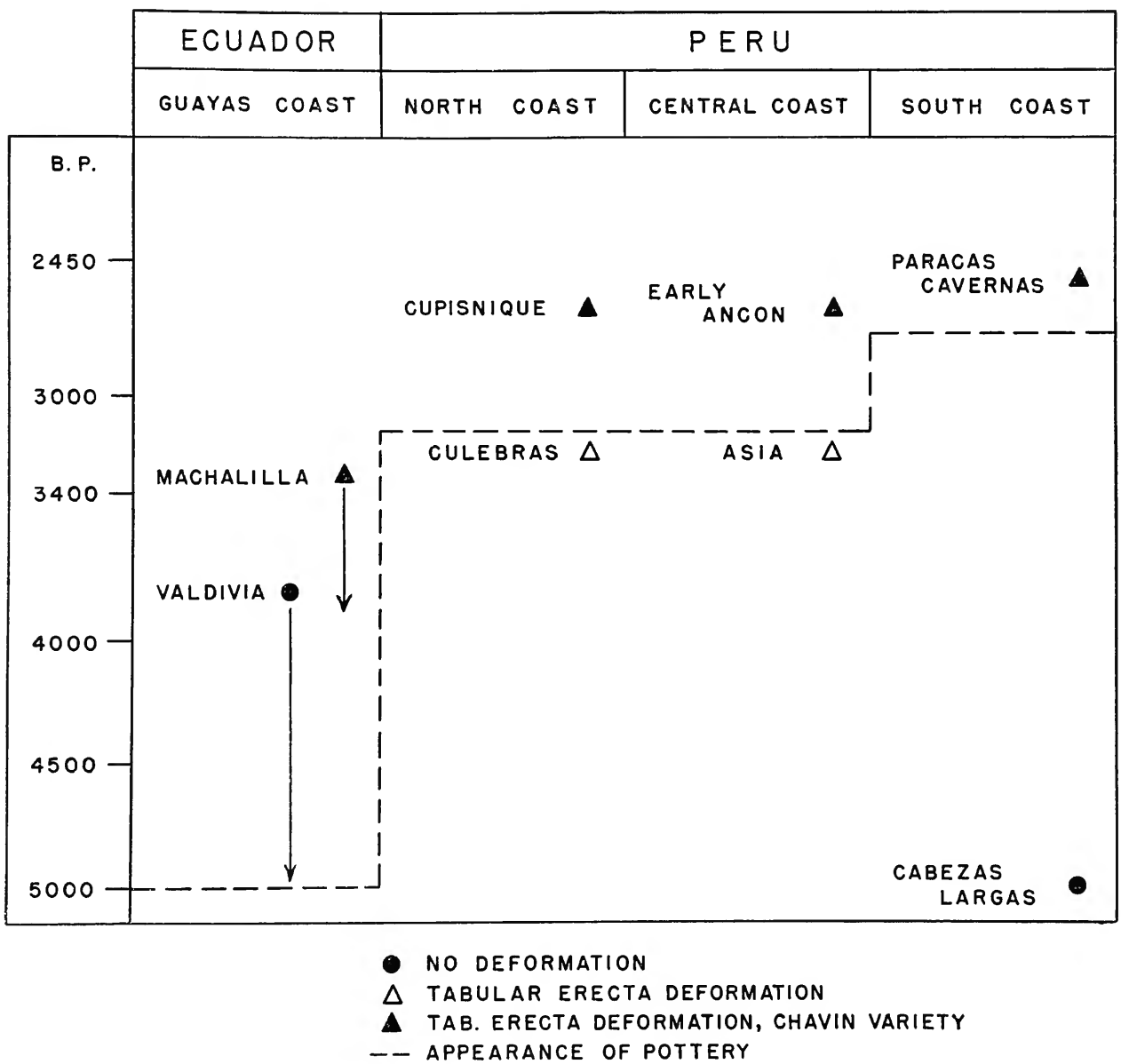

FIGURE 115.—Sites reflecting the first occurrence of skull deformation on the coasts of Ecuador and Peru.

tion of a deforming mechanism according to a rigidly defined cultural pattern. We may assume, as a result, that these populations shared not only an element of material culture (the deforming apparatus) but also a method of attaching to it the head of the child.

Problems

Having completed this brief review of the occurrence of cranial deformation on the Andean coast of South America, we may return to the problems raised in the introduction:

Since the population of the Machalilla Phase is according to existing evidence the earliest to show cranial deformation on the coast of the Andean Area, and since the type of deformation closely resembles that characteristic of later populations, can it be considered as the focal point for the diffusion of the practice in this area?

The fact that all the populations examined showed tabular erecta or fronto-vertico-occipital deformation suggests a single origin for the practice. This unity is even more strongly implied by the universality among Formative Period populations of the "cuneiform" variety, which reflects use of the same kind of deforming apparatus, making it seem probable that this variety of tabular erecta deformation was diffused from Ecuador to Peru during the Formative Period. On the other hand, an inference of similar diffusion toward the end of the Preceramic presents certain difficulties because of the absence of the "cuneiform" variety and the high frequency of asymmetrical skulls in Peru. This situation can be accounted for by one of the two following possibilities:

1. Diffusion of the idea of deformation without simultaneous diffusion of the deforming apparatus: Examination of the type and variety of deformation represented by the Machalilla Phase skulls suggests that it was produced by a deforming apparatus attached to the head. Using similar evidence, Hartweg (1961) has inferred that a deforming apparatus involving the whole body (a cradle) was utilized in the late Preceramic in Peru. Even if both these inferences are correct, diffusion of the idea of intentional deformation of the skull can still be postulated with modification in the method employed by the receiving population.

2. Simultaneous diffusion of the deforming apparatus and the idea of cranial deformation: Acceptance of Hartweg's inference that deformation among preceramic populations of Peru was accomplished by use of a cradle would not permit acceptance of this alternative hypothesis. However, although archeological and ethnographic evidence suggests that tabular erecta deformation was produced by use of the cradle, from the strictly technical point of view there is no reason to reject the possibility that such deformation may have been produced by use of a board or pillow applied to the back of the head and held in place by bindings. If this alternative is allowed, the earlier asymmetrical form of deformation can also be viewed as a diffusion from Ecuador to Peru in the Preceramic. The difference in symmetry can be explained by the hypothesis that during the Formative Period a board or pillow held by a system of bindings was employed to hold the head of the child in a forward position, while during the Preceramic this apparatus was employed without attention being paid to keeping the head in a position that would result in symmetrical deformation.

The latter hypothesis, which does not depend on the use of the cradle as the deforming apparatus, is in keeping with what is known of the archeology of these periods. Engel (1957, 1960, 1963) does not mention the cradle as one of the numerous cultural elements recognized from the Preceramic periods in Peru. Furthermore, Weiss (1961) in a review of the deforming apparatus employed in precolumbian Peru does not mention the cradle during the Formative, while listing several other kinds of cranial deformation apparatus. Although he distinguishes three periods during which cradleboard deformation was practiced (Preceramic of Asia and Culebras; Late Chimu, Chancay and other contemporary cultures; and Inca), archeological evidence for the use of the cradle is available from the latter two only (Weiss, 1961, pp. 19–25).

Do differences between the Preceramic and Formative varieties on the coast of Peru indicate a diverse origin for the practice? The answer appears to be negative. If the differences reflect separate origins, a possible center of diffusion can be sought on the Atlantic coast. Skulls from Intihuasi cave, Province of San Luis, Argentina, dating from 6000–8000 years ago exhibit deformation of the circular or pseudo-circular type, but not tabular erecta (Gonzalez, 1960, p. 160). These finds indicate the presence of a tradition of cranial deformation of greater antiquity than that on the Pacific coast, but the possibility of diffusion from this area is minimized by the fact that circular deformation is produced by binding whereas the tabular erecta type results from the use of a board.

Conclusions

Cranial deformation appears for the first time on the Pacific coast of South America in Ecuador at about 4000 years ago, as part of the Machalilla Phase.

The type of deformation is fronto-vertico-occipital or tabular erecta, of the variety known as "cuneiform" or "Chavín."

Tabular erecta deformation appears along most of coastal Peru in the late Preceramic, at a date subsequent to its occurrence in Ecuador, permitting the inference that it was diffused from north to south.

The north-south diffusion current is most clearly demonstrated by the Formative Period complexes (Machalilla, Cupisnique, Early Ancon-Supe, Paracas Cavernas), in which identity in the variety of deformation implies diffusion of the same deforming apparatus, a rather complicated system that seems to be correlated with this time period and zone.

Diffusion of cranial deformation from the Formative Machalilla Phase of Ecuador to the late Preceramic complexes of coastal Peru (Asia and Culebras) is highly probable but not as definite, since although the tabular erecta type is shared, the "cuneiform" variety is absent. To explain this, it has been suggested that the same type of deforming apparatus was used but differently applied during the two periods. In the Formative, a rigidly prescribed pattern seems to have existed in attachment of the head of the child to the board, producing a symmetrical and homogeneous result. In contrast, during the Preceramic, there appears to have been greater latitude in the use of the apparatus resulting in examples of asymmetrical deformation. The possibility of influence from the ancient center of deformation in Argentina is rejected on the basis that the type and by implication the deforming apparatus was totally distinct from that used on the Pacific coast during the Preceramic and Formative Periods.

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PLATE 1

Typical views of the Guayas coast. *a*, Playas Bay looking southward. *b*, Low sandy beach typical of coast from Santa Elena Peninsula north to G–88: Palmar Norte.

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PLATE 2

Typical views of the Guayas coast. *a*, Puerto Chanduy, a modern fishing village on the coast east of Santa Elena Peninsula. *b*, High cliff on which G–110 is located (scale is indicated by the pickup truck on the beach at the center right).

PLATE 3

Typical topography and xerophytic vegetation of the coast of Guayas Province. *a*, Inland terrain in the vicinity of the modern village of Palmar. *b*, Margin of Lagarto Salitre.

PLATE 4

Views of San Pablo Salitre. *a*, Looking toward the beach. *b*, Looking across the salitre toward the north.

PLATE 5

G–25: Punta Arenas, a Period D site of the Valdivia Phase. *a*, View of the site from across the salitre. *b*, Eroded surface of the site with the sterile central zone visible at the center right.

PLATE 6

Looking north toward the Valdivia Bay from the vicinity of G–31. *a*, View across the modern village of Valdivia to the lagoon formed by the Río Valdivia parallel to the beach. *b*, Excavation of Cut G at the upper edge of the site. *c*, Lower valley showing the closest approach of the river to the site at the present time.

PLATE 7

The environment of the Valdivia area. *a*, Looking up the Valdivia Valley from the ridge above G–31. *b*, View of Valdivia Bay from G–31, looking southward with the modern village of San Pedro in the foreground.

PLATE 8

G–31: Valdivia, the type site for the Valdivia Phase. *a*, Northwest edge of the site from the base of the hill; posts around Cut J at left. *b*, Cut J at the beginning of excavation.

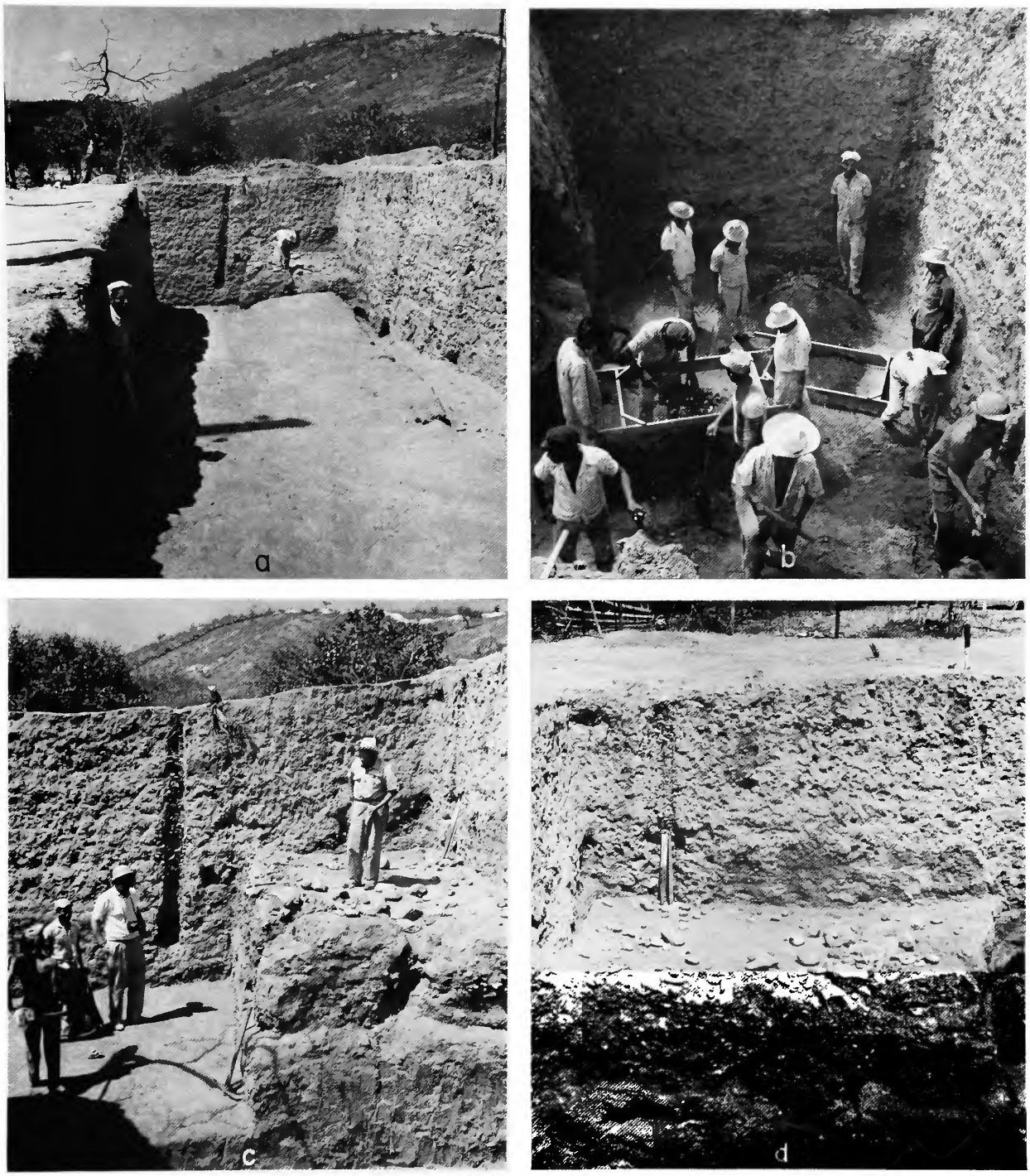

PLATE 9

G–31, Cut J at conclusion of excavation. *a*, Looking from Section A to Section F. *b*, Sifting refuse from lower levels of Section F. *c–d*, Lower portion of Section F prior to excavation, showing fireburnt stones.

PLATE 10

Stratigraphy of G–31, Cut J, southeast face. *a*, Sloping levels in Section B. *b*, Sections D and F.

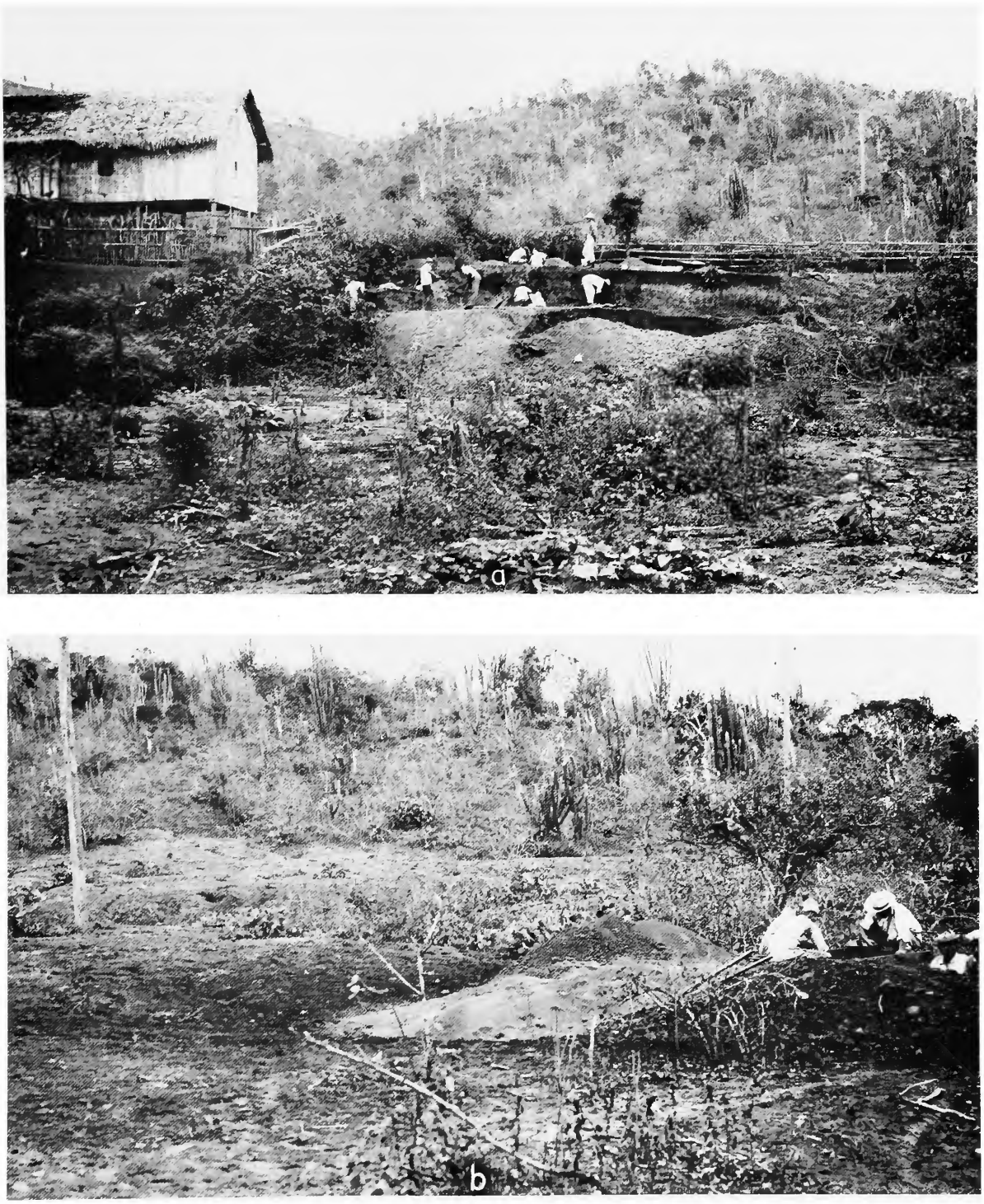

PLATE 11

G–54: Buena Vista, a Period C site of the Valdivia Phase, showing topography and modern vegetation. *a*, View from the first terrace toward the bank at the north edge of the site; the dark upper layer is sterile overburden (see fig. 6). *b*, Looking west with Cut 2 in the foreground.

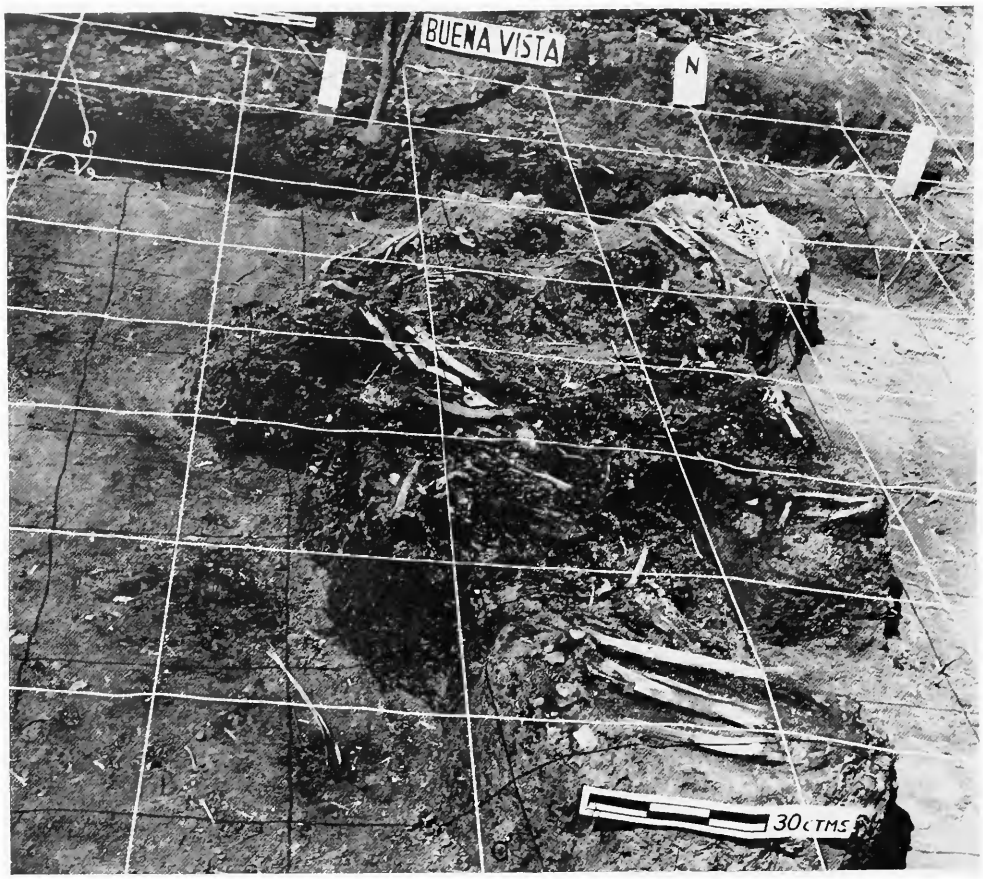

PLATE 12

G–54, Burials 1–7 during excavation. *a*, General view of skeletons. *b*, Closeup of polished ax (pl. 19r) adjacent to arm.

PLATE 13

The environment of the Posorja region. *a*, Edge of the hill occupied by G–84 and the modern town of Posorja, looking toward the Gulf of Guayas (shell refuse represents a late Mañteno occupation). *b*, View from the same hill toward Pesquería Salitre.

PLATE 14

Environment of Palmar Salitre. *a*, View from the south edge looking across the salitre toward the north. *b*, Northwest margin, showing the hill on which G–88 is located.

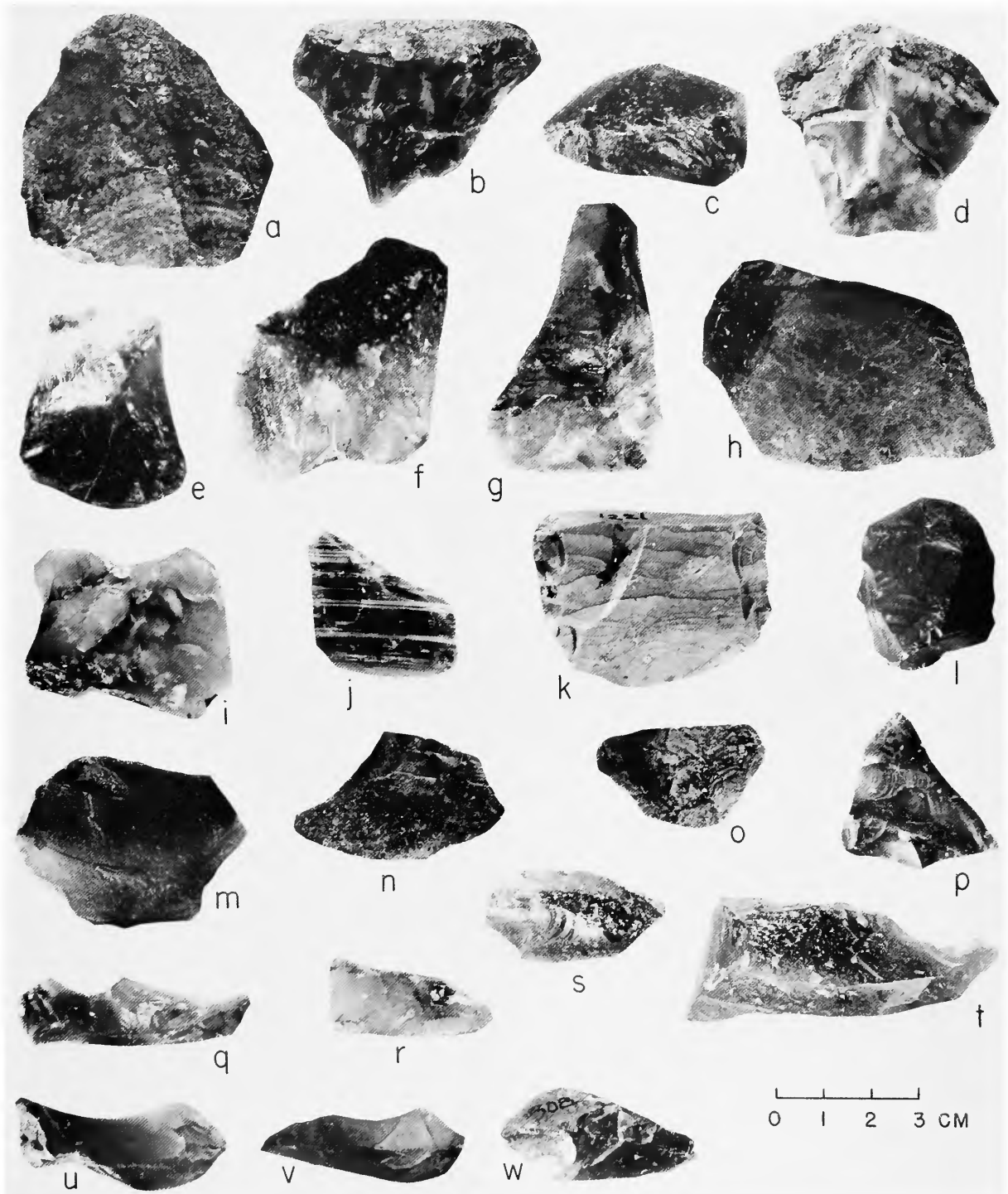

PLATE 15

Flake blades or knives from Valdivia Phase sites, with the cutting edge downward.

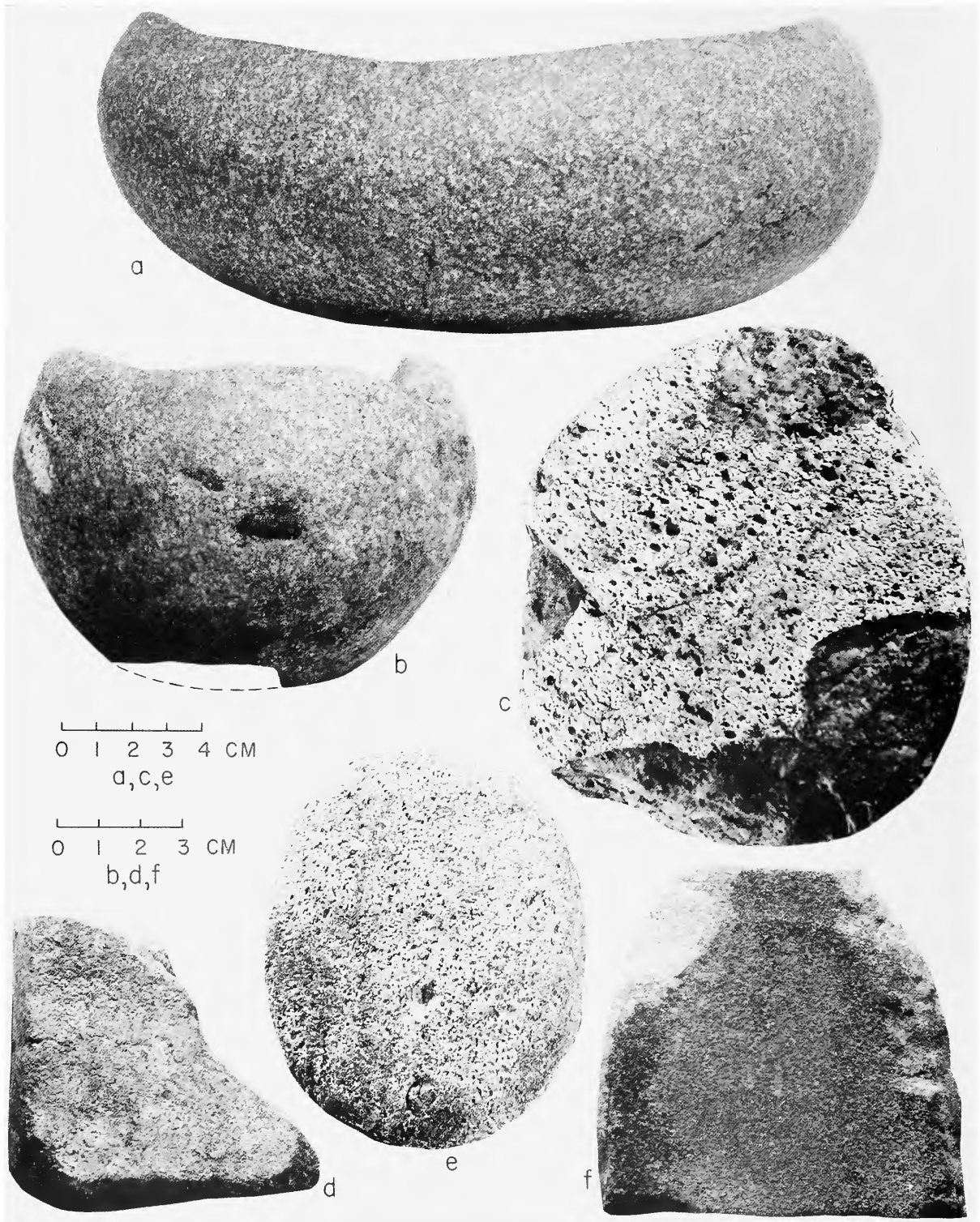

PLATE 16

Miscellaneous stone artifacts of the Valdivia Phase. *a–b*, Bowls. *c*, Pebble chopper. *d–f*, Grinding stones.

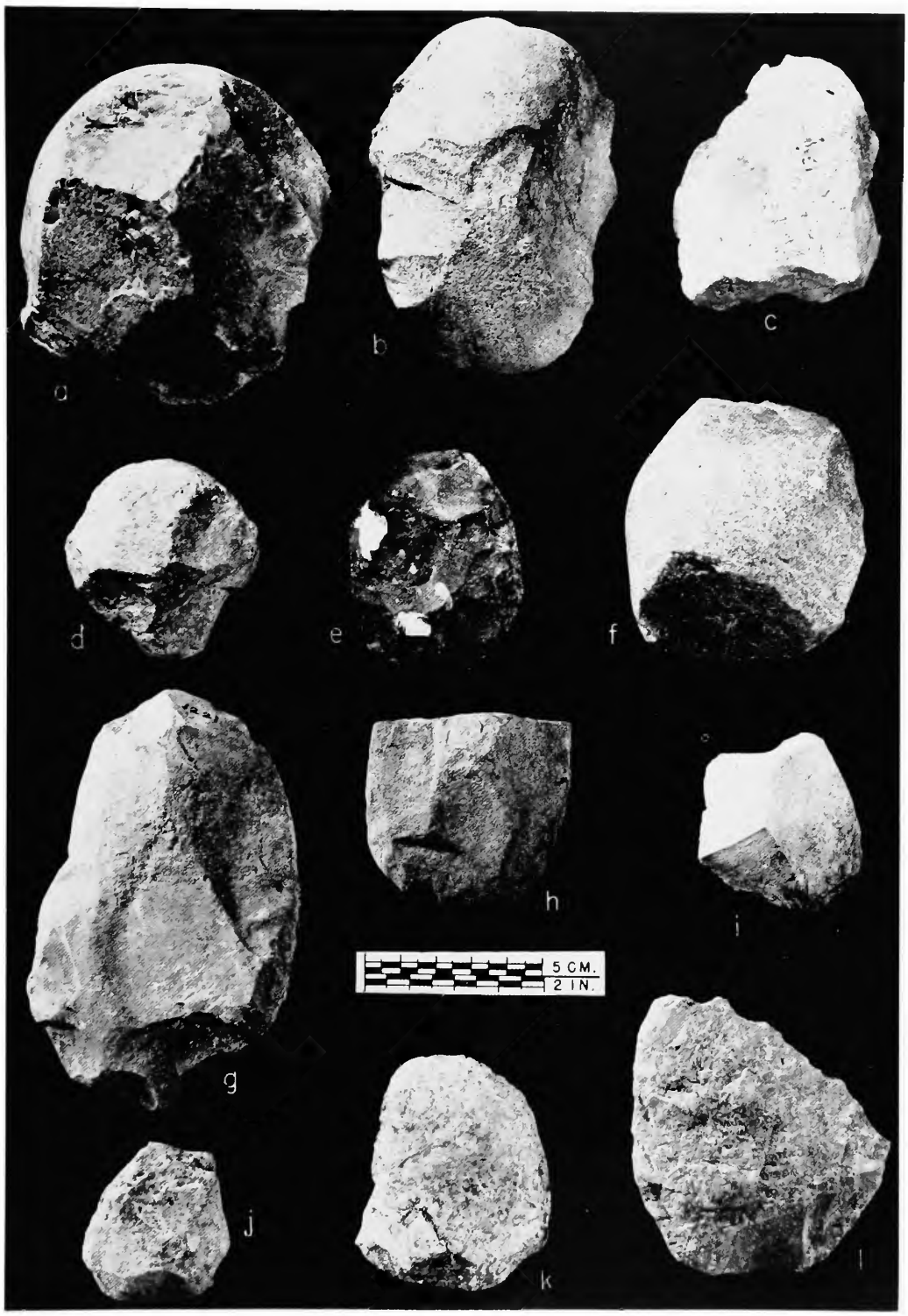

PLATE 17

Pebble choppers from the Valdivia Phase.

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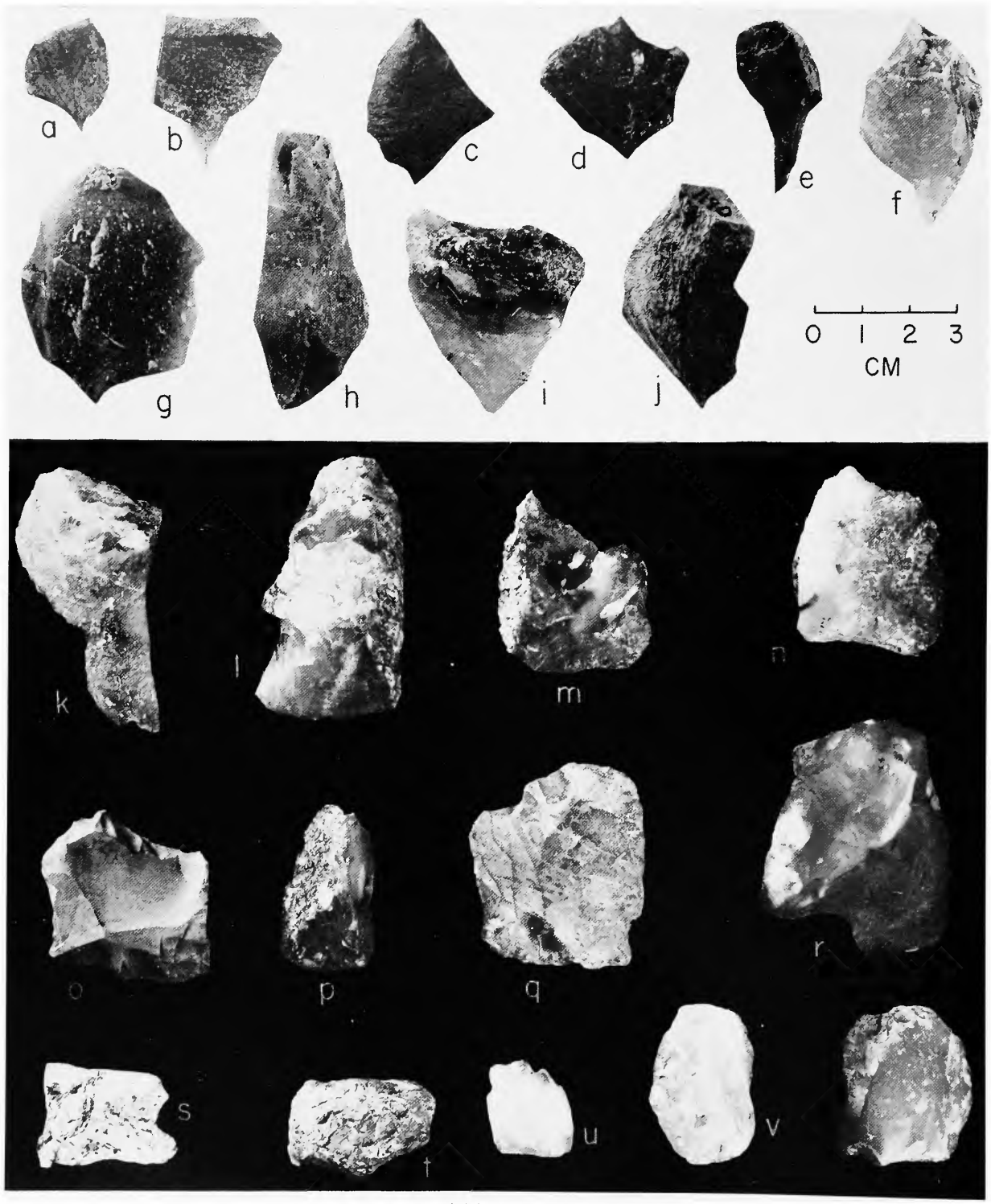

PLATE 18

Valdivia Phase stone tools. *a–j*, Gravers. *k–w*, Scrapers.

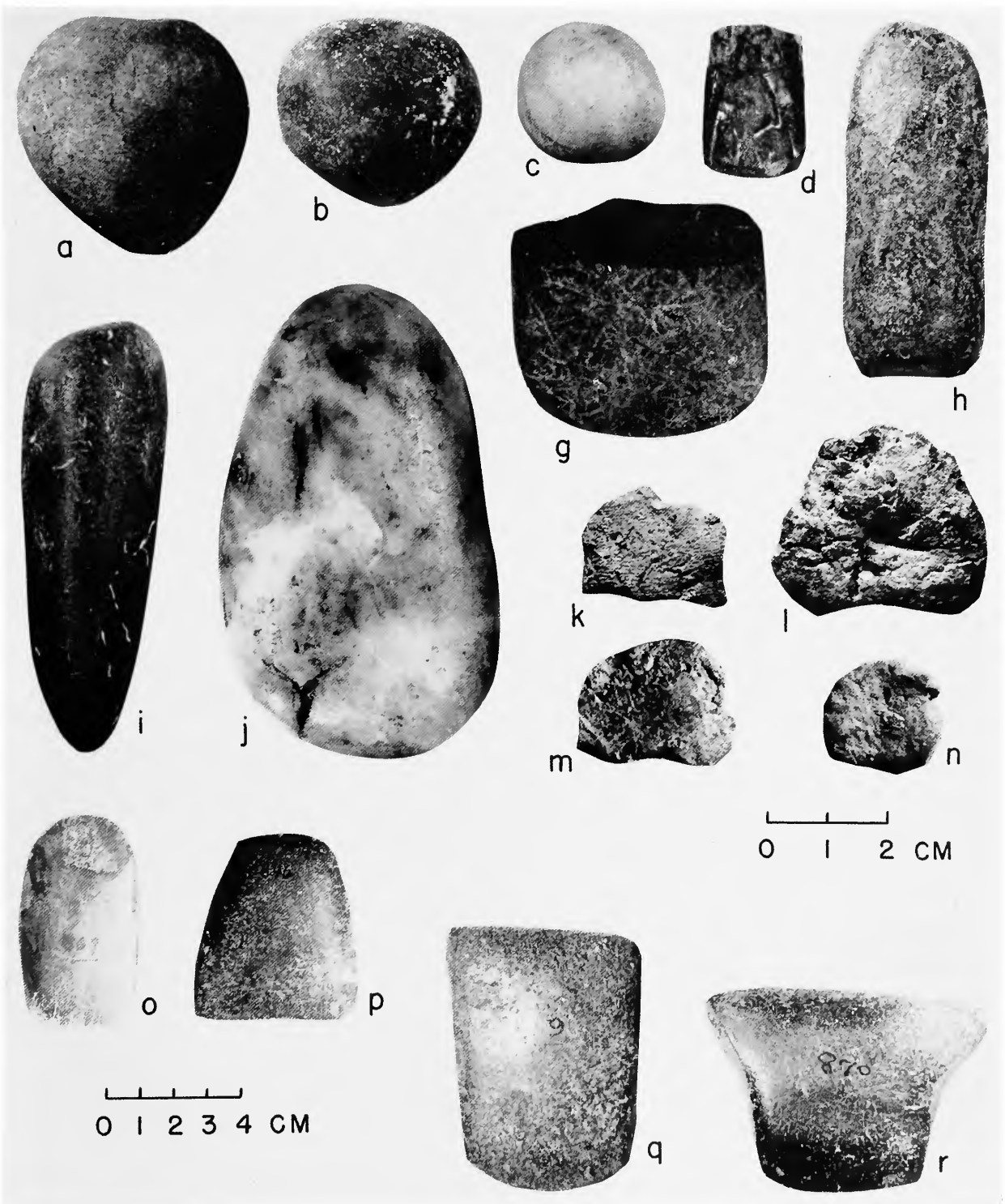

PLATE 19

Miscellaneous objects from Valdivia Phase sites. *a–j*, Natural pebble polishers. *k–n*, Clay lumps. *o–r*, Ground and polished axes.

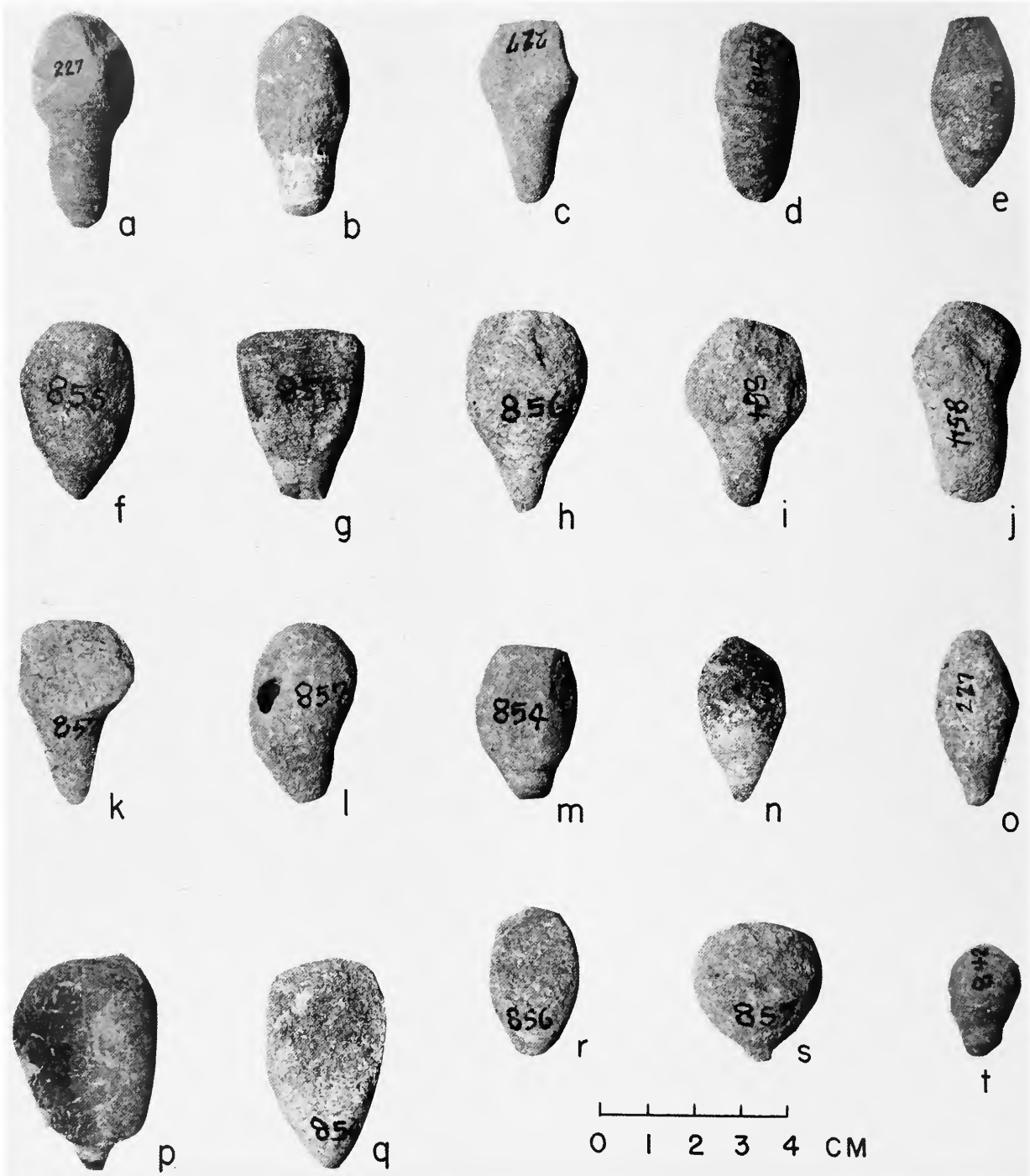

PLATE 20

Fishhook reamers from Valdivia Phase sites showing uniformity in size and form.

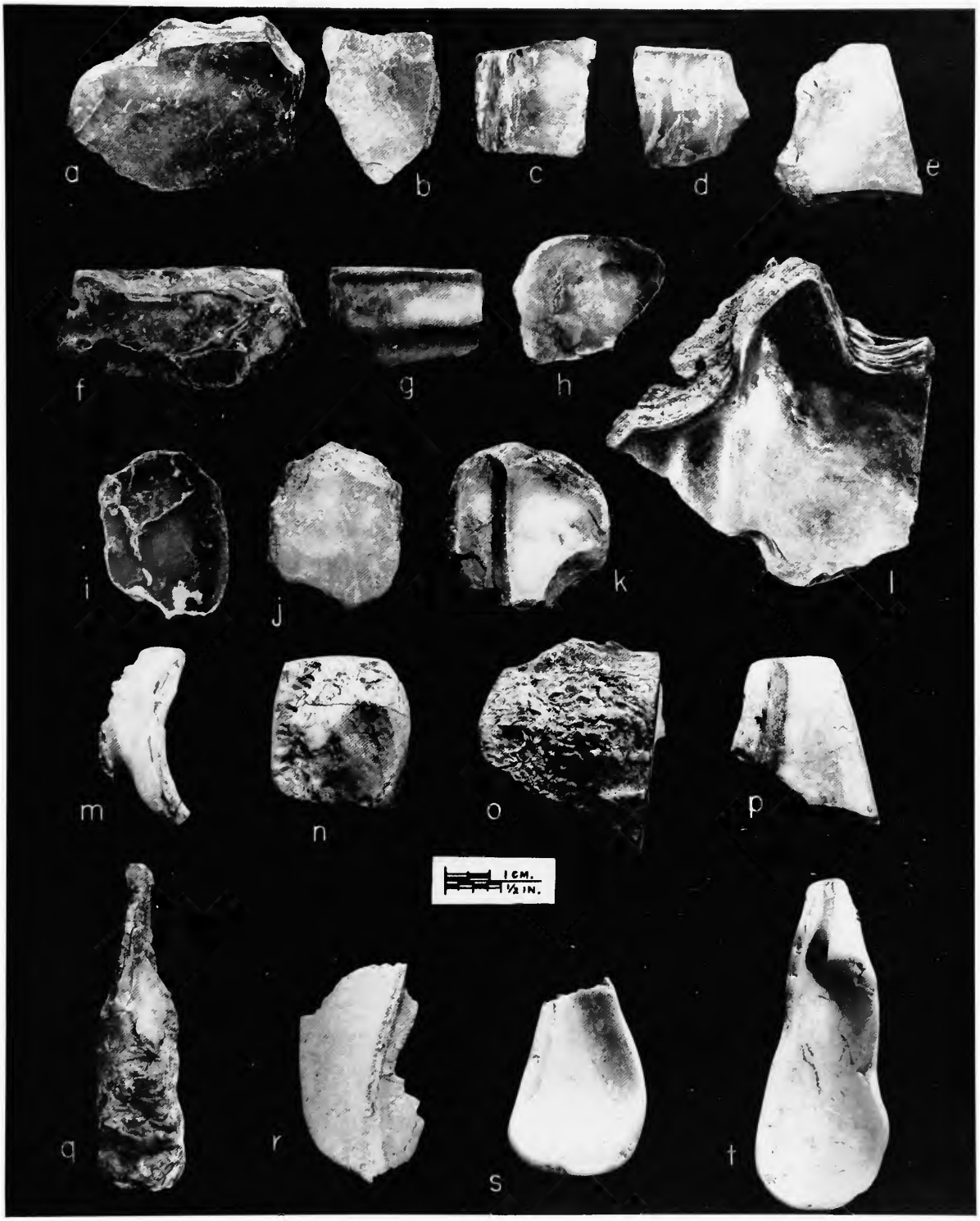

PLATE 21

Miscellaneous shell objects from the Valdivia Phase. *a–l*, Cut segments of pearl oyster shell, probably for preparation of fishhook blanks. *m–p*, Abraders and polishers of Group A. *q–t*, Scoops, spoons or spatulas.

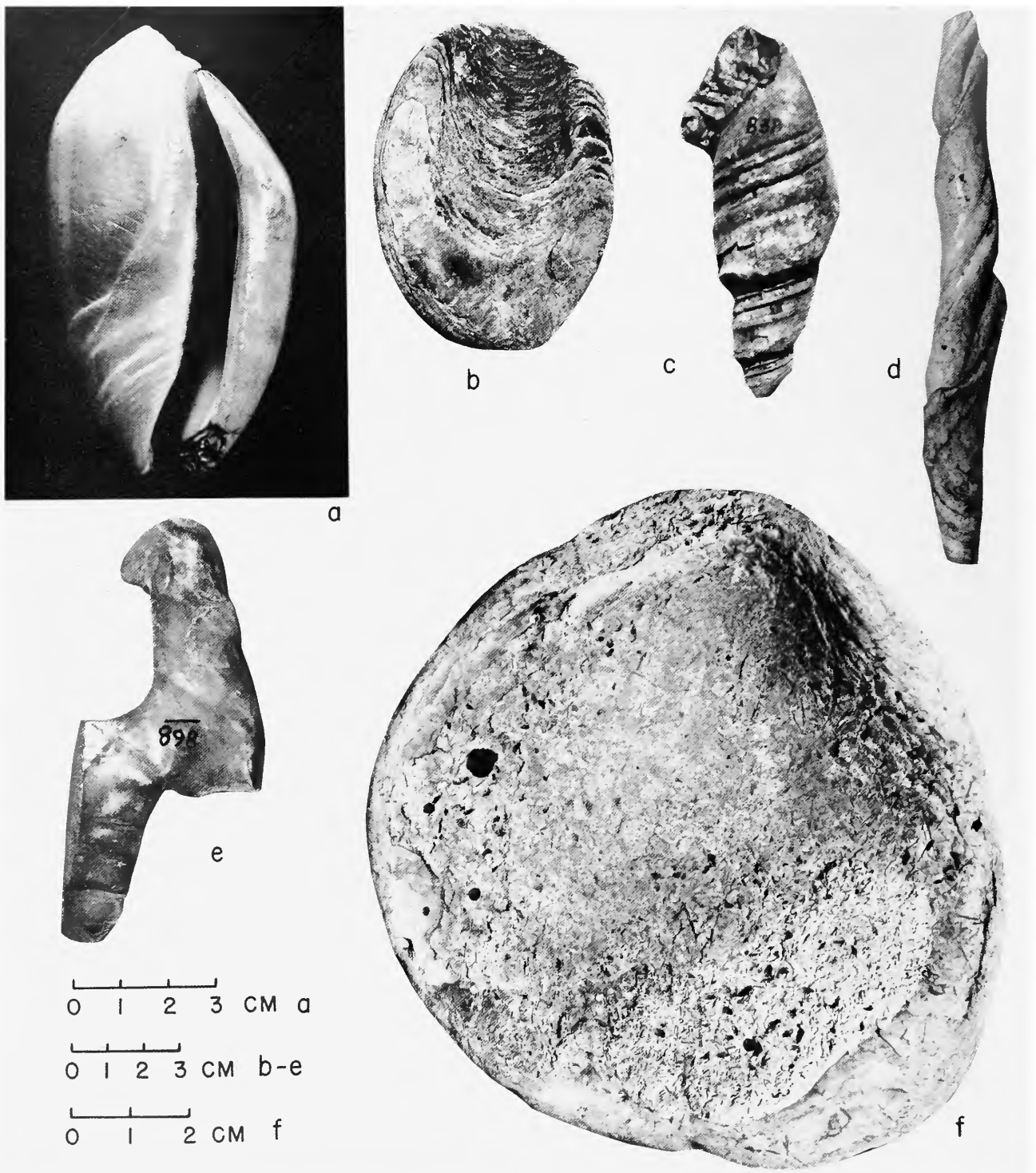

PLATE 22

Shell artifacts of the Valdivia Phase. *a–b*, Abraders. *c–e*, Unidentified objects. *f*, Bowl.

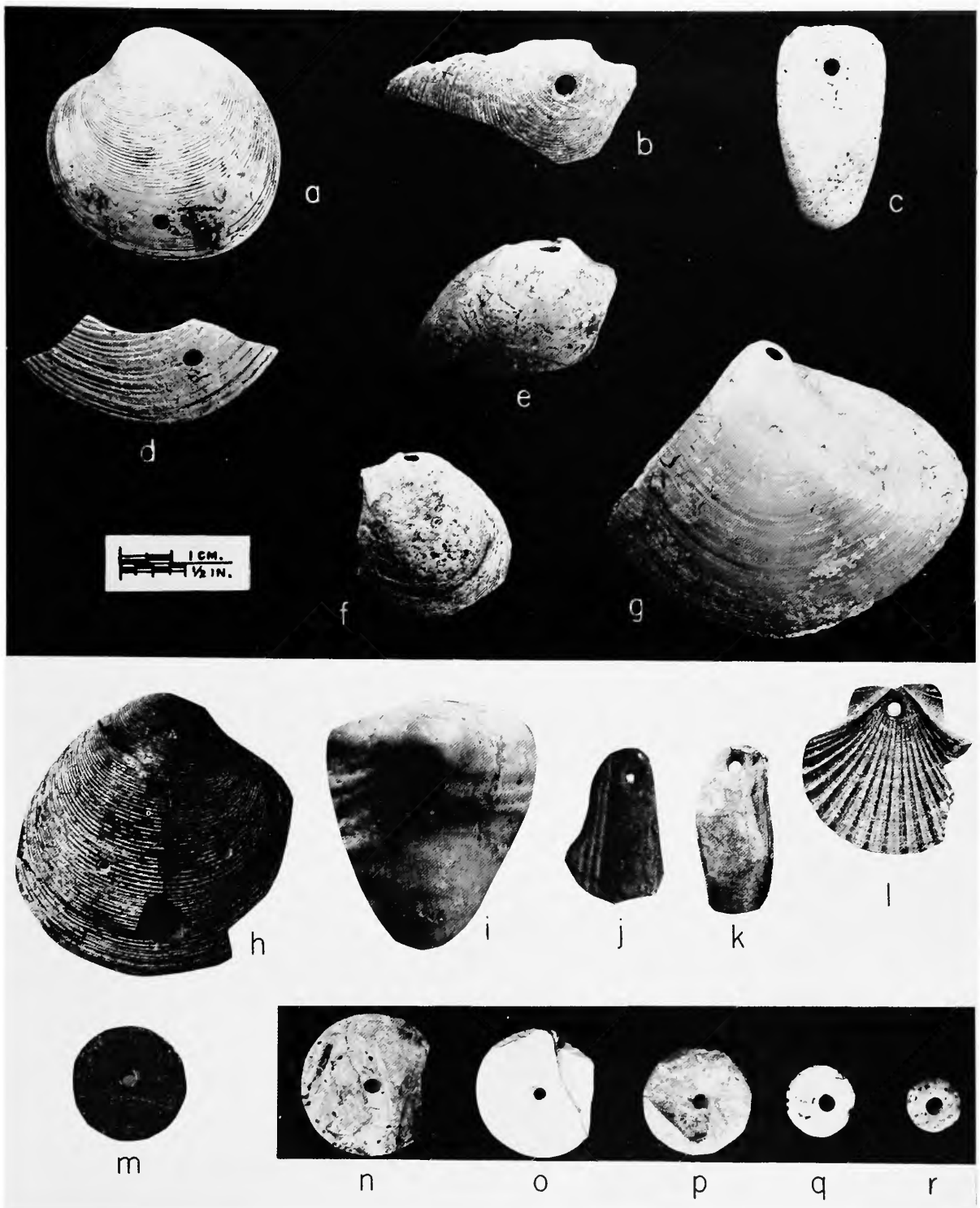

PLATE 23

Shell ornaments of the Valdivia Phase. *a–b*, *d–h*, Clam shell pendants. *c*, *j–k*, Shaped shell pendants. *l*, Pecten shell pendant. *m–r*, Beads.

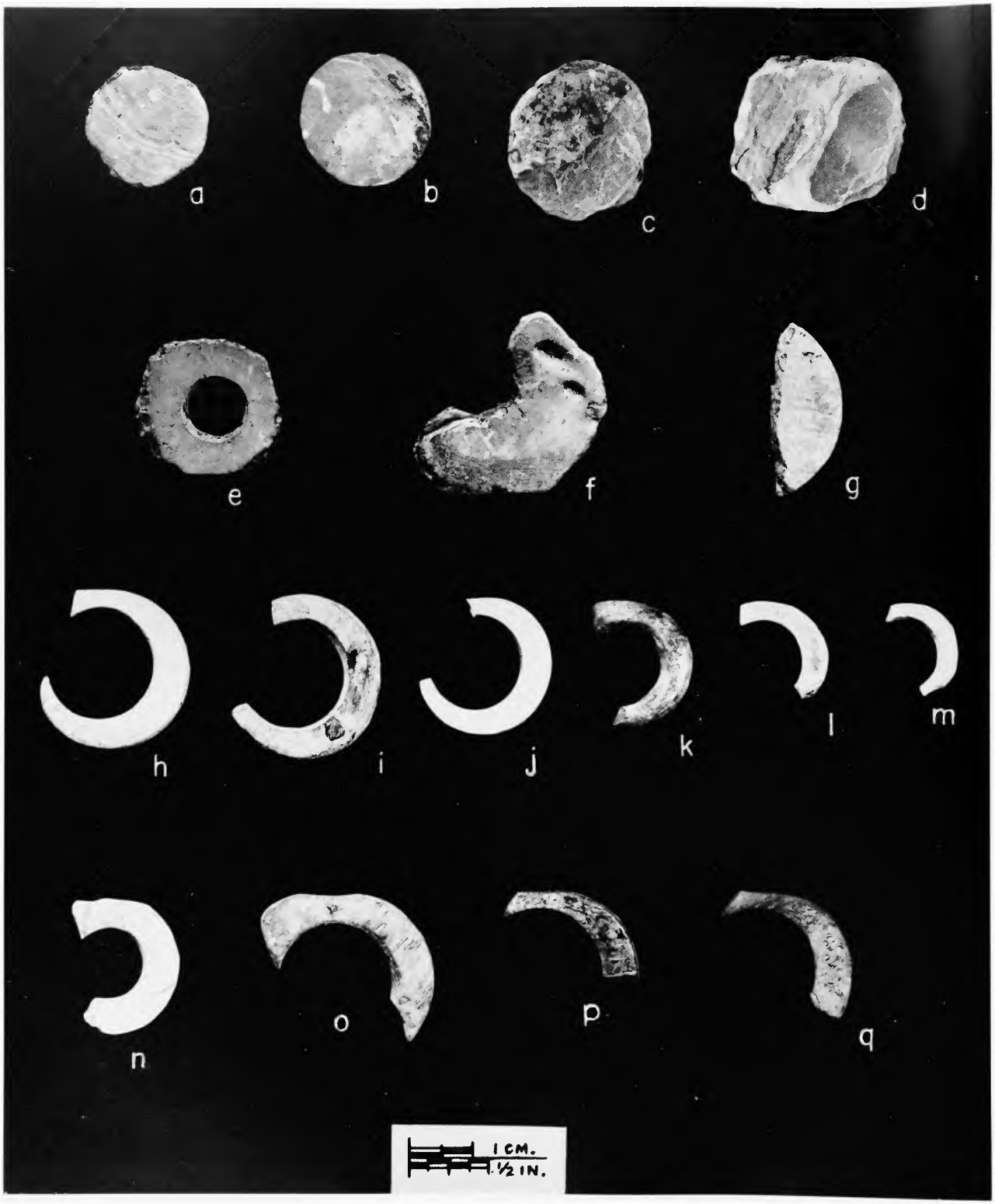

PLATE 24

Shell fishhooks of the Valdivia Phase. *a–d, g*, Roughed-out blanks. *e–f*, Drilled blanks. *h–q*, Complete and fragmentary fishhooks showing range of size.

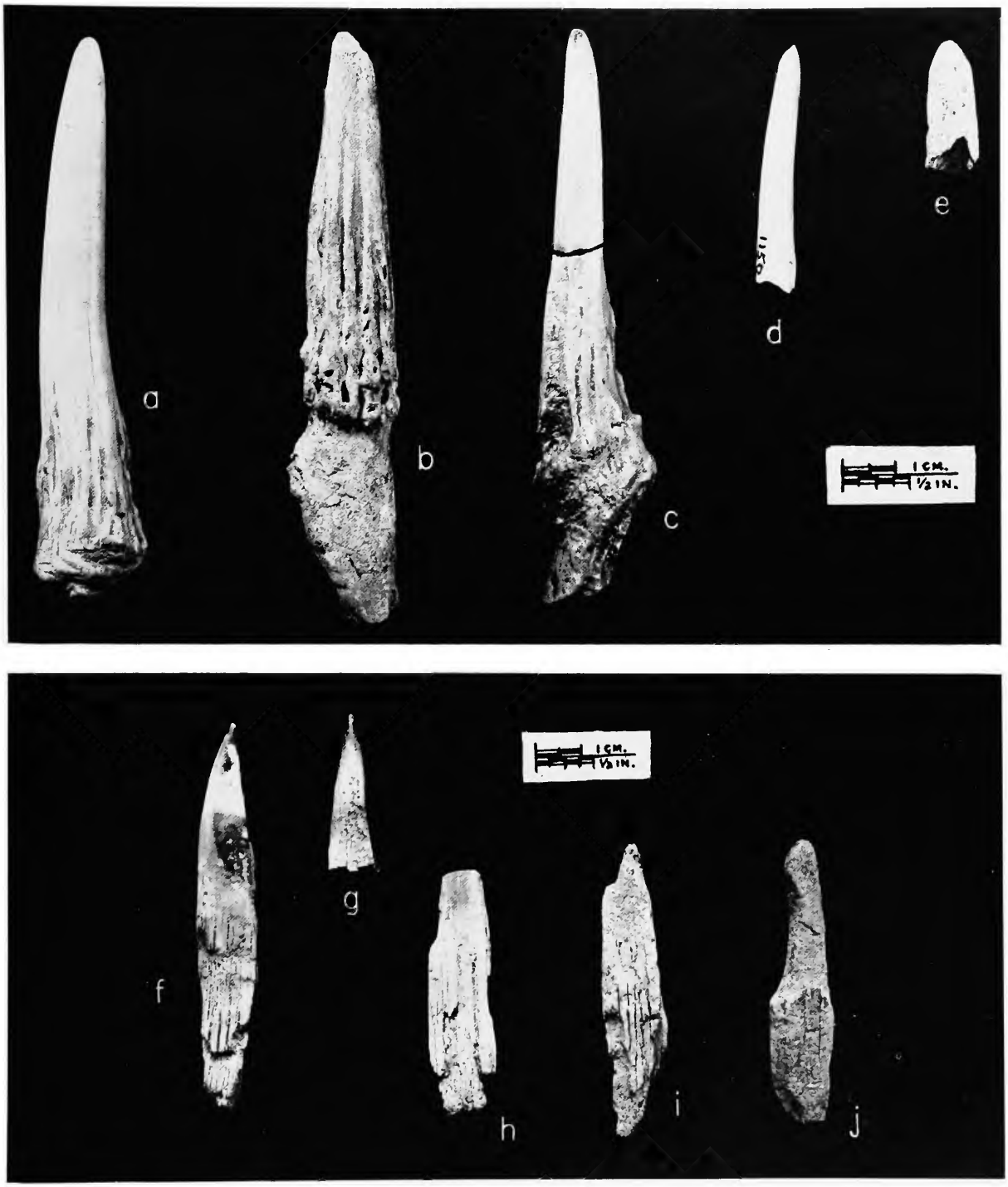

PLATE 25

Bone and tooth artifacts of the Valdivia Phase. *a–d*, Awls of antler. *e*, Antler tip projectile point. *f–j*, Awls of saw fish teeth.

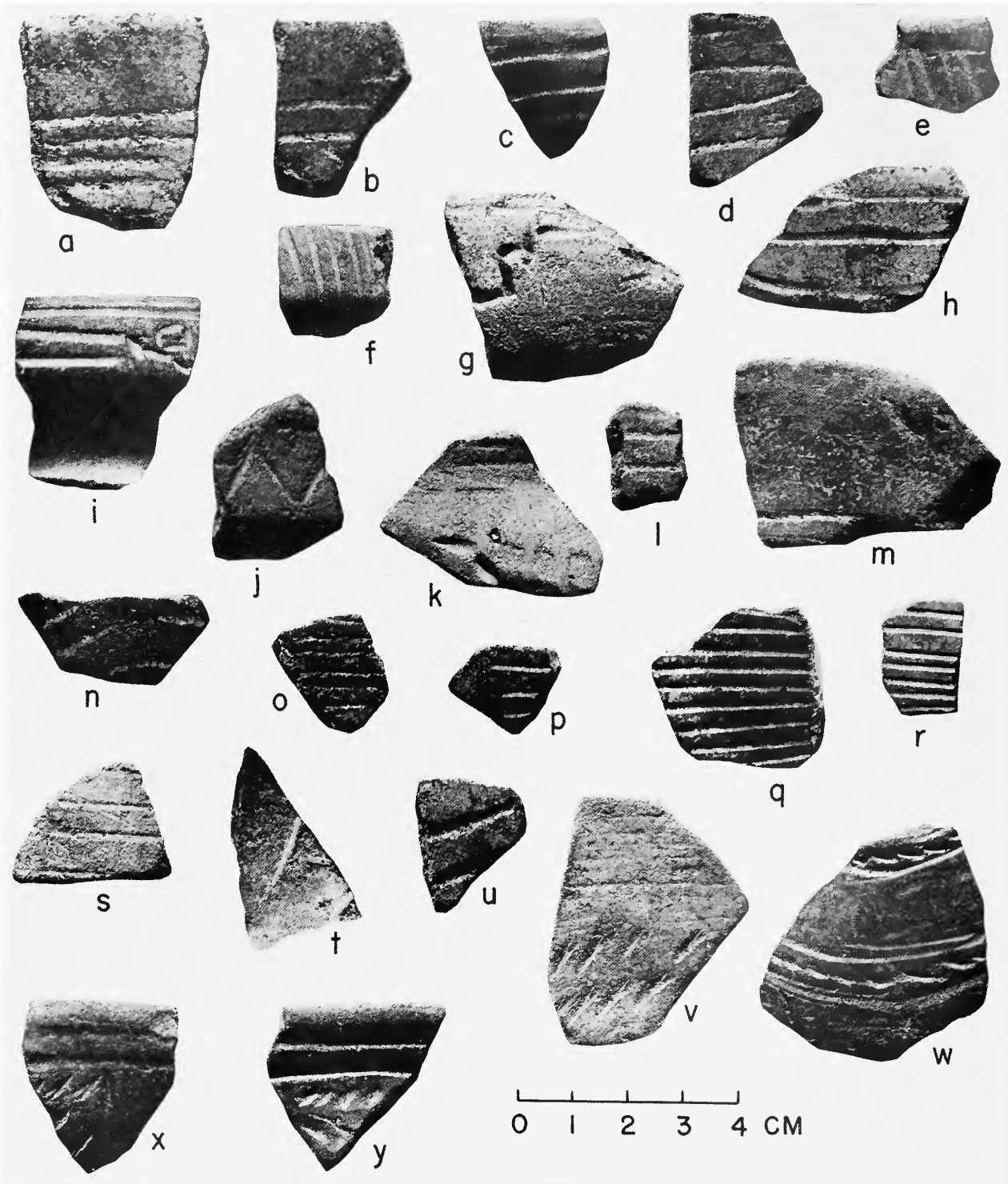

PLATE 26

Type sherds of Punta Arenas Incised.

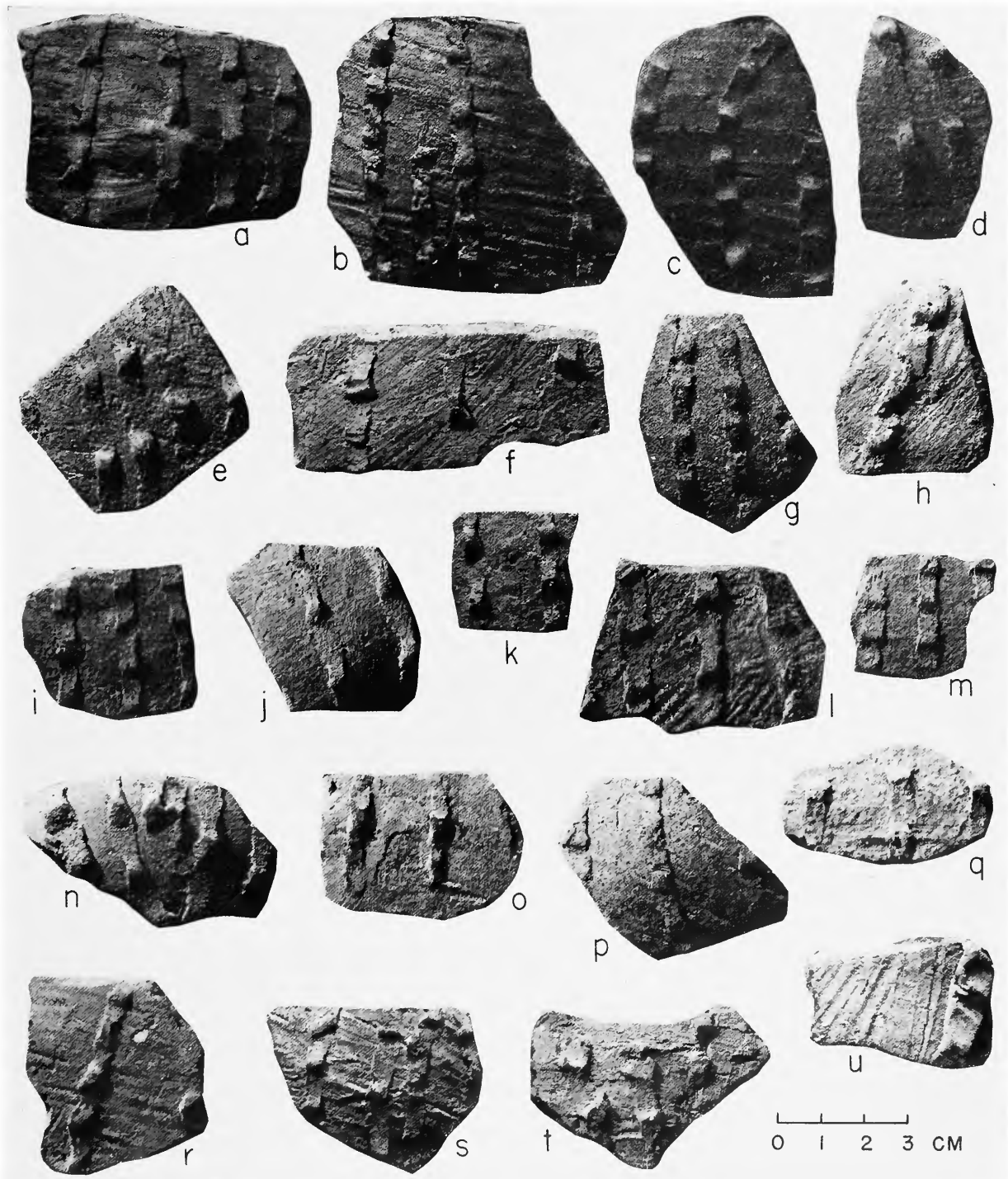

PLATE 27

Type sherds of Valdivia Applique Fillet, vertical parallel bands on body wall.

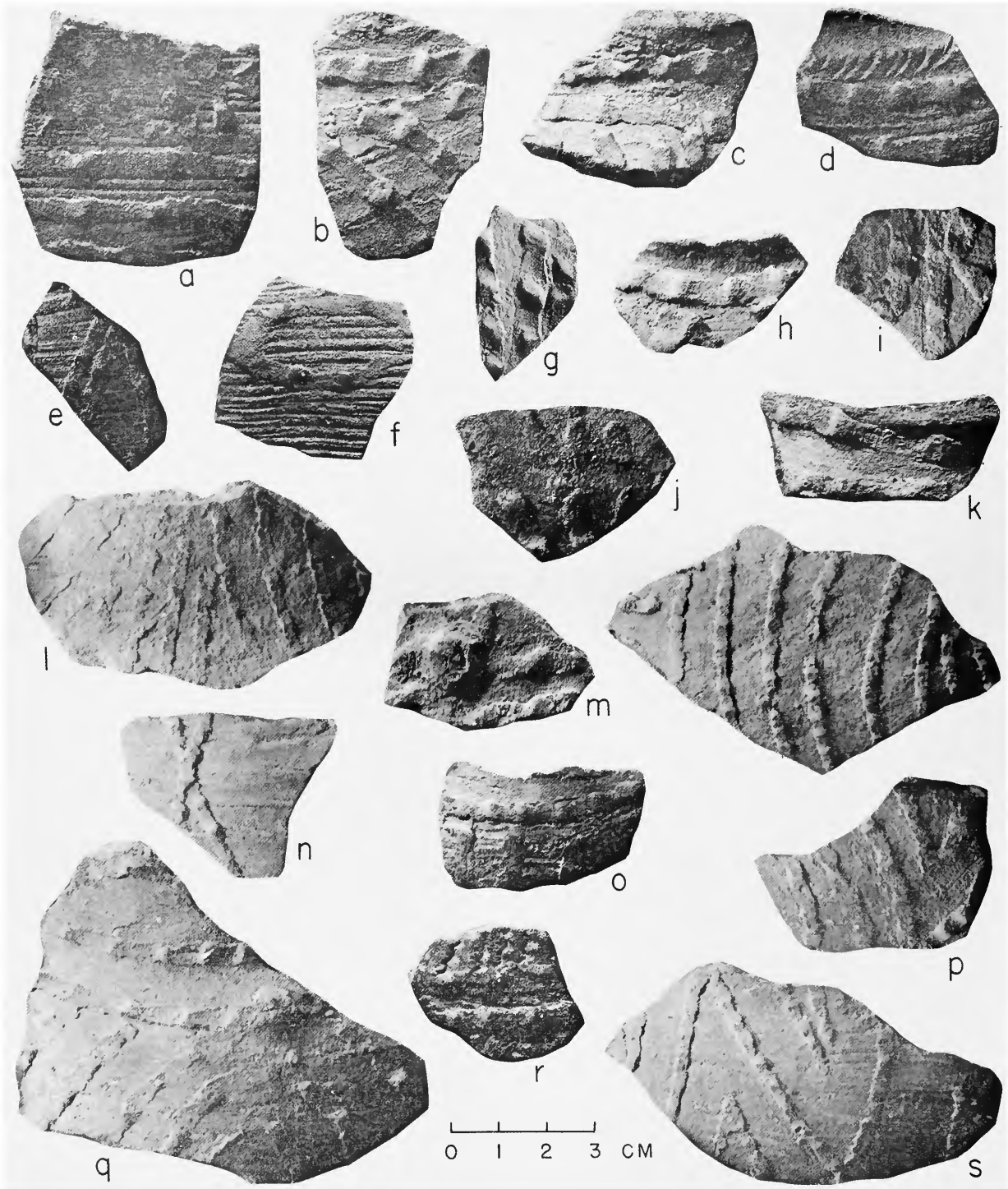

PLATE 28

Type sherds of Valdivia Applique Fillet, curvilinear and intersecting patterns on body wall.

PLATE 29

Type sherds of Valdivia Applique Fillet, variations in rim treatment.

PLATE 30

Type sherds of Valdivia Broad-line Incised, Motif 1.

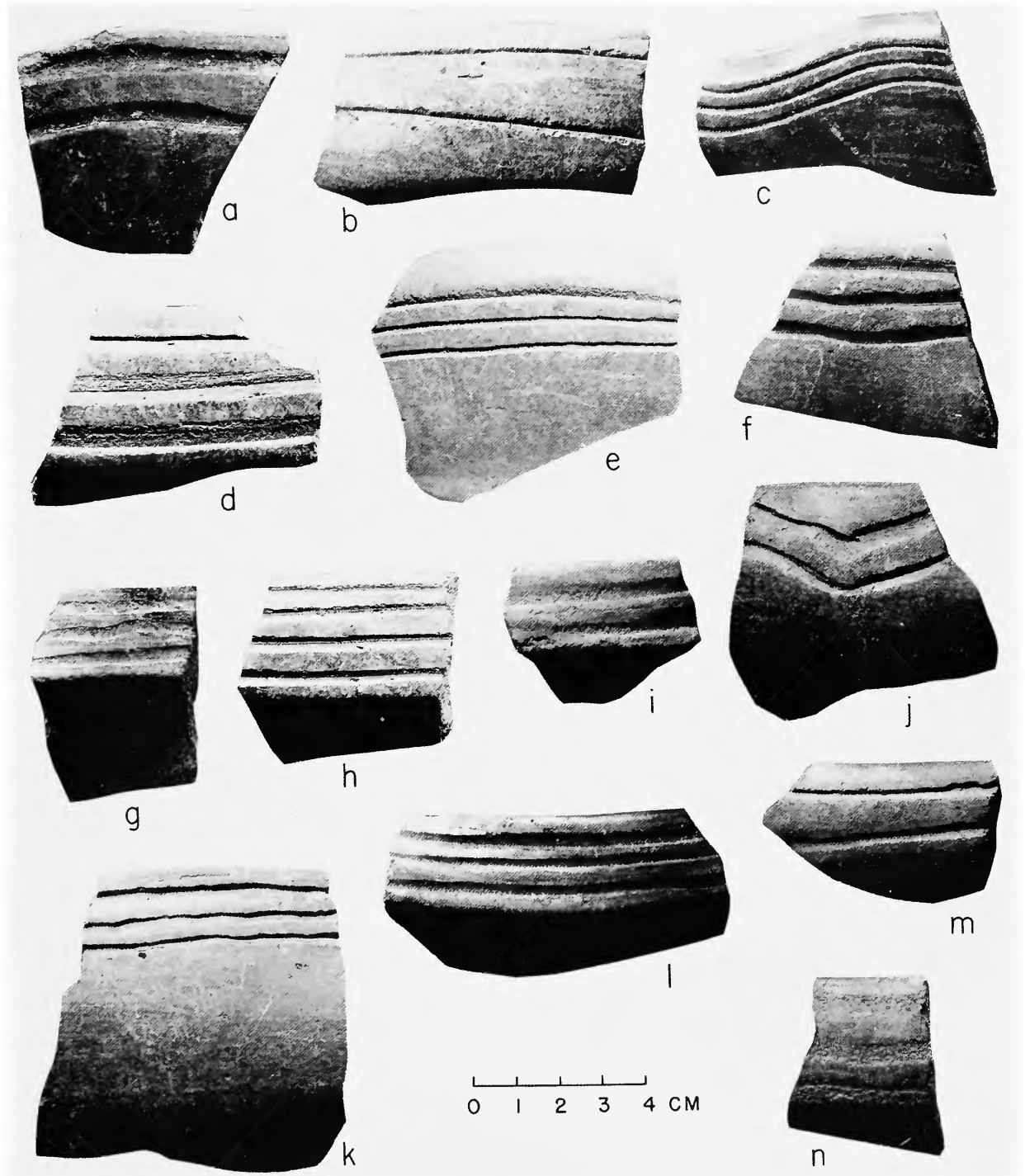

PLATE 31

Type sherds of Valdivia Broad-line Incised, Motif 1.

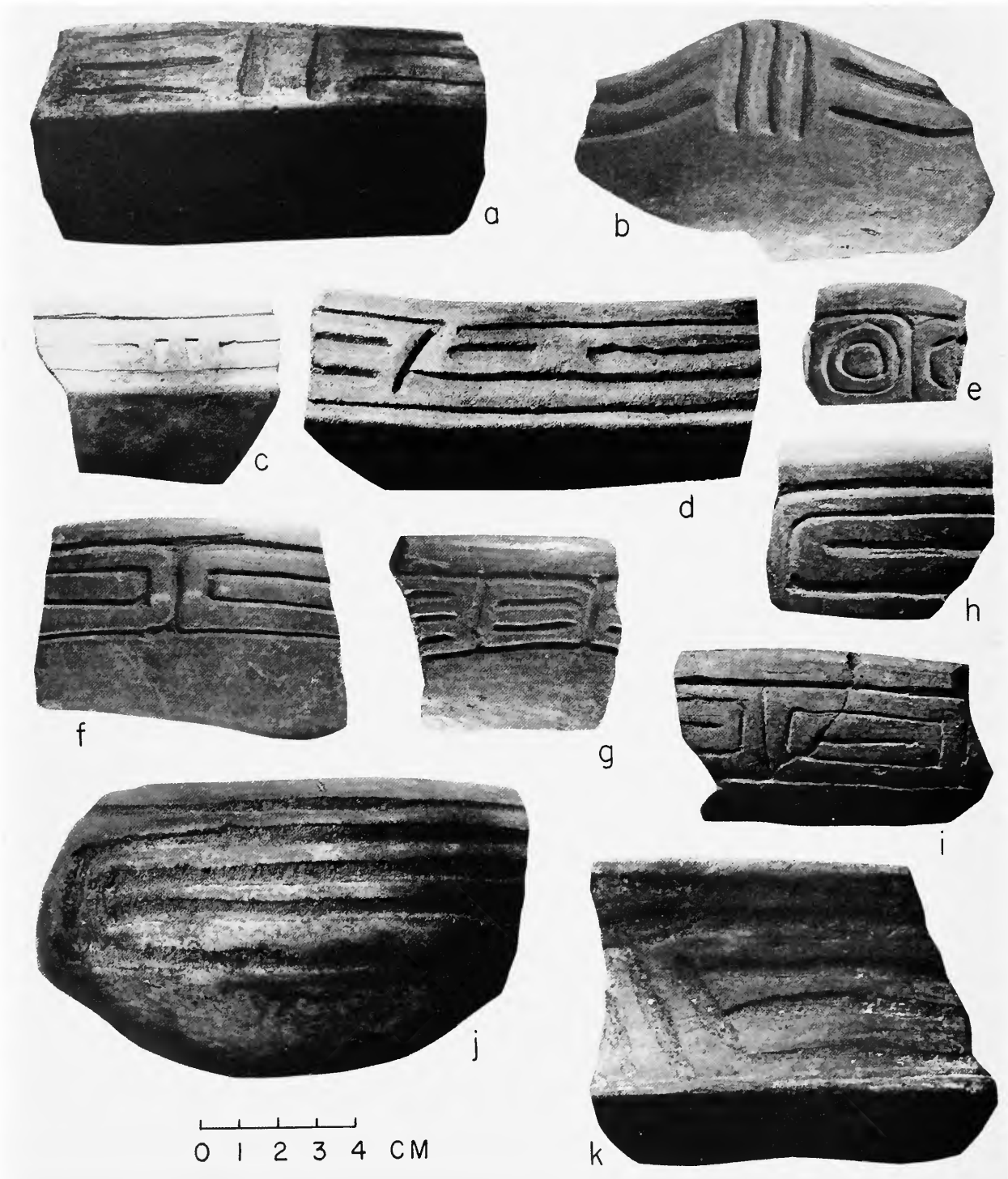

PLATE 32

Type sherds of Valdivia Broad-line Incised, Motif 2.

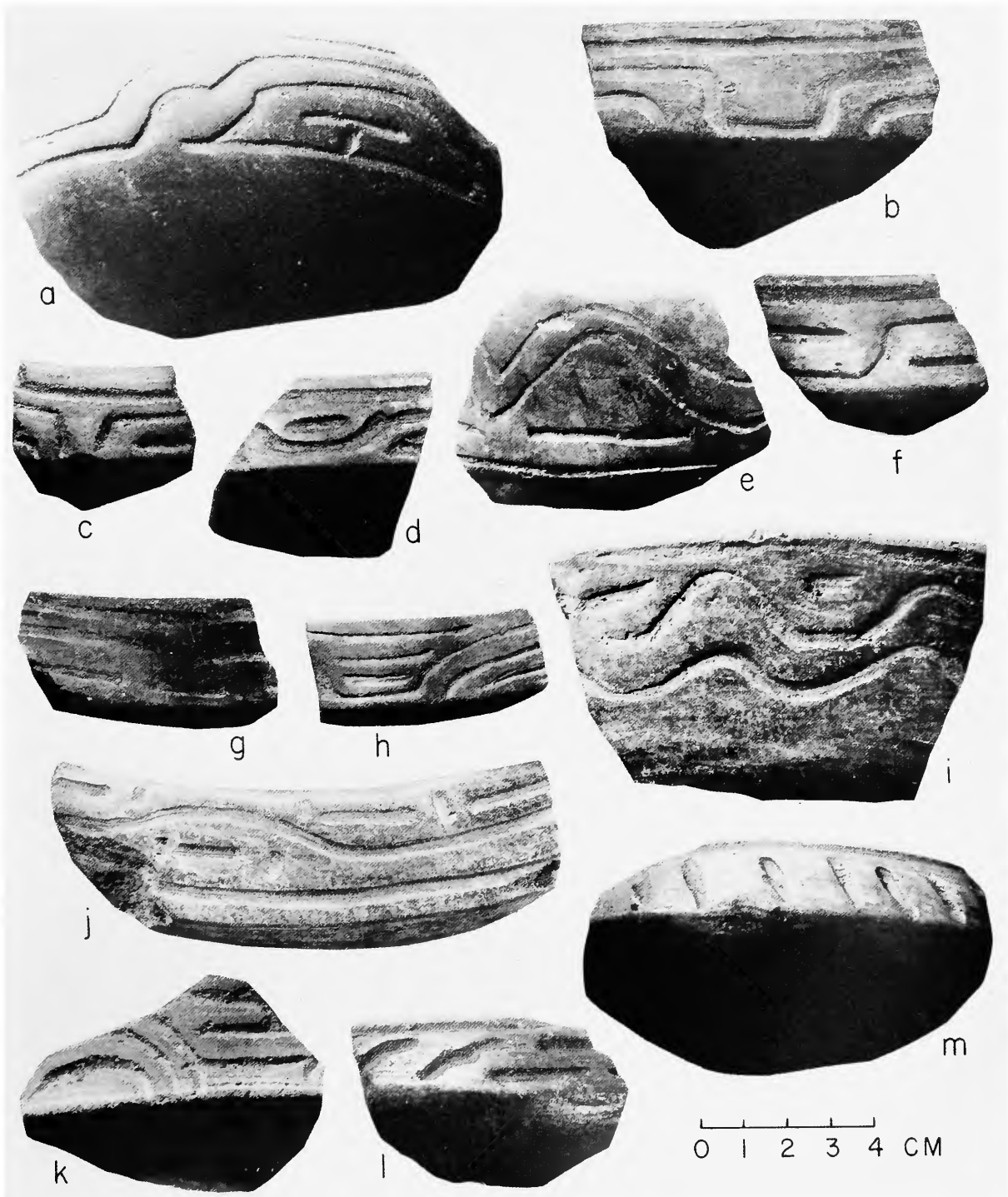

PLATE 33

Type sherds of Valdivia Broad-line Incised, Motif 2.

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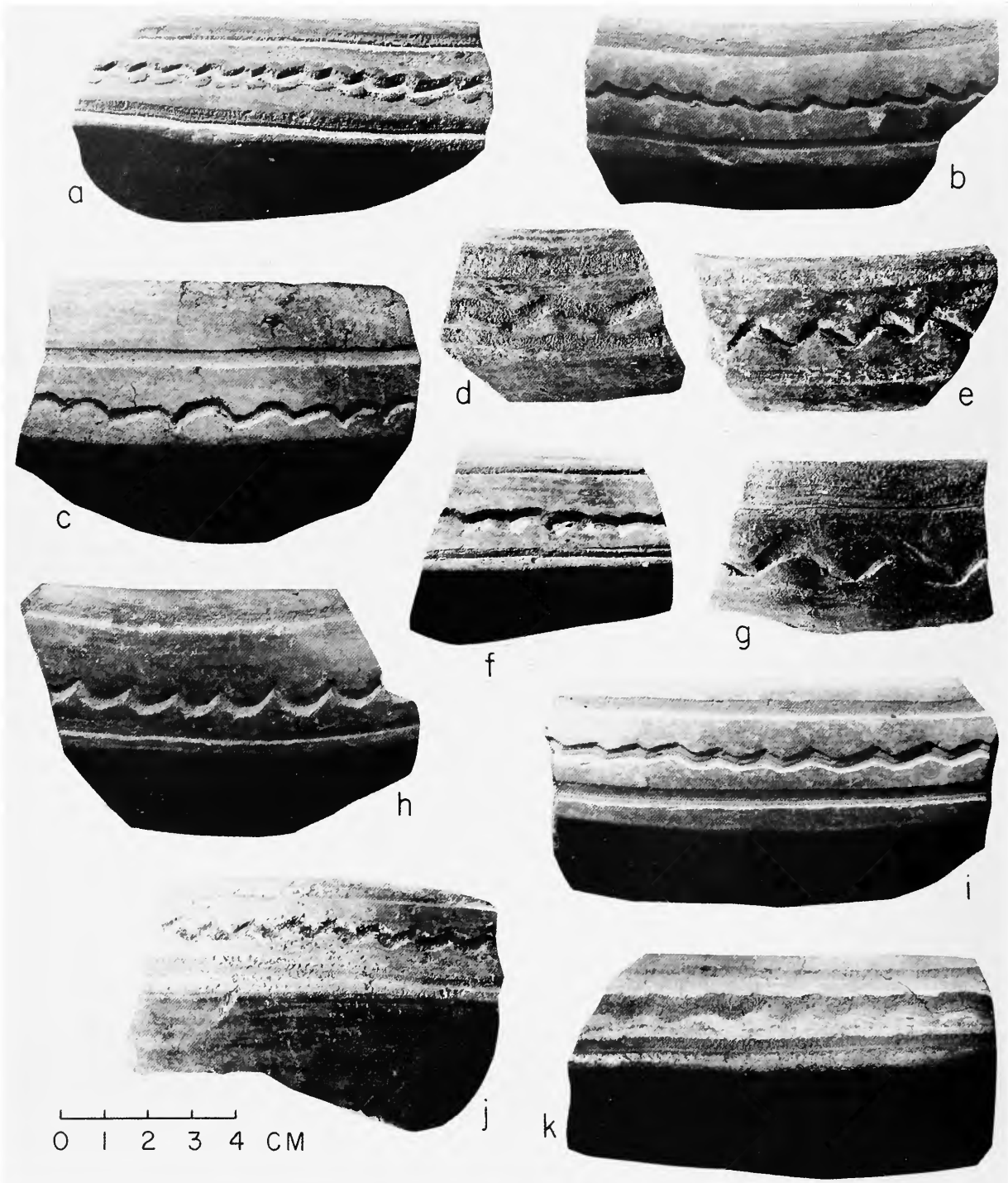

PLATE 34

Type sherds of Valdivia Broad-line Incised, Motif 3.

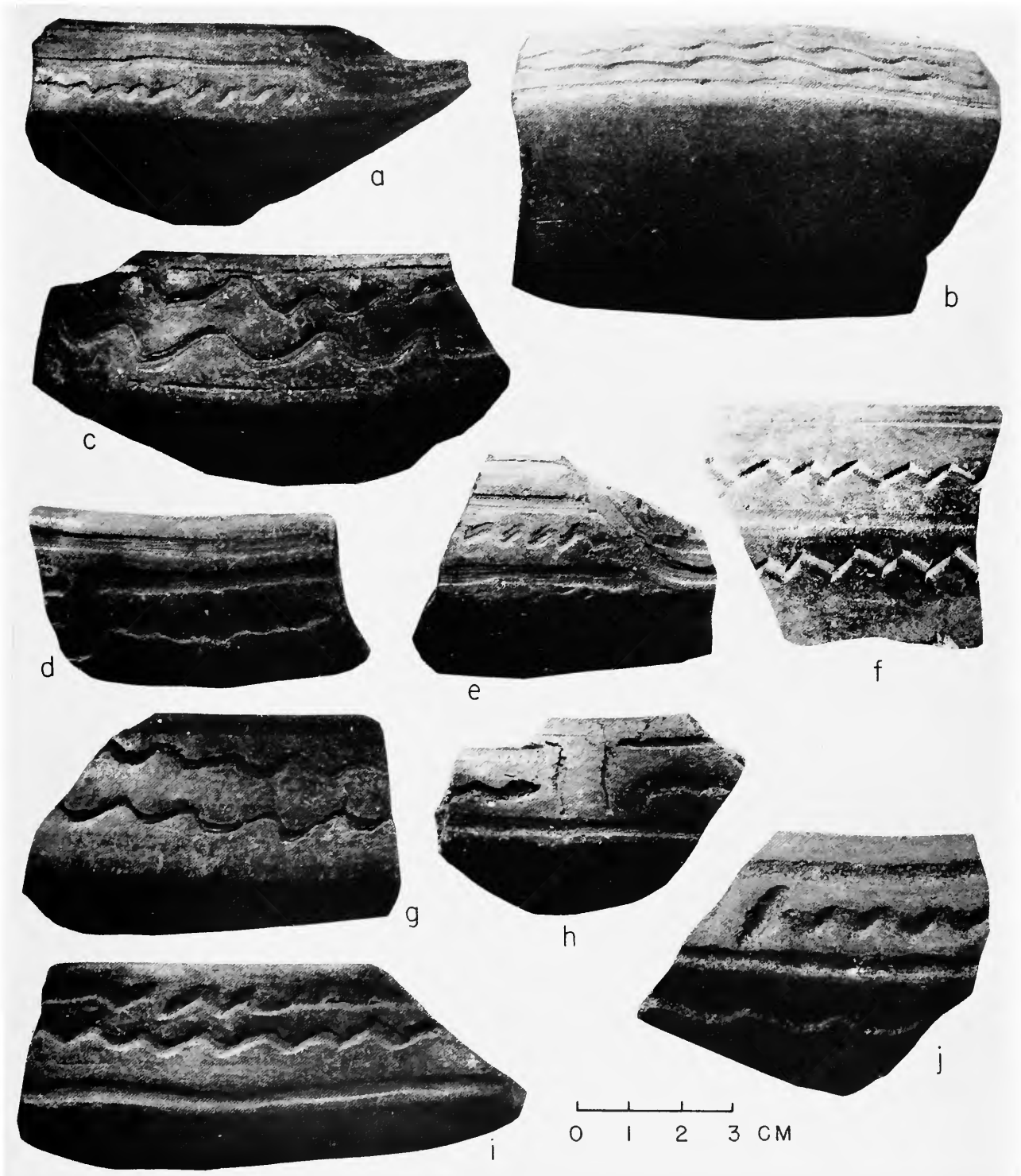

PLATE 35

Type sherds of Valdivia Broad-line Incised, Motif 3.

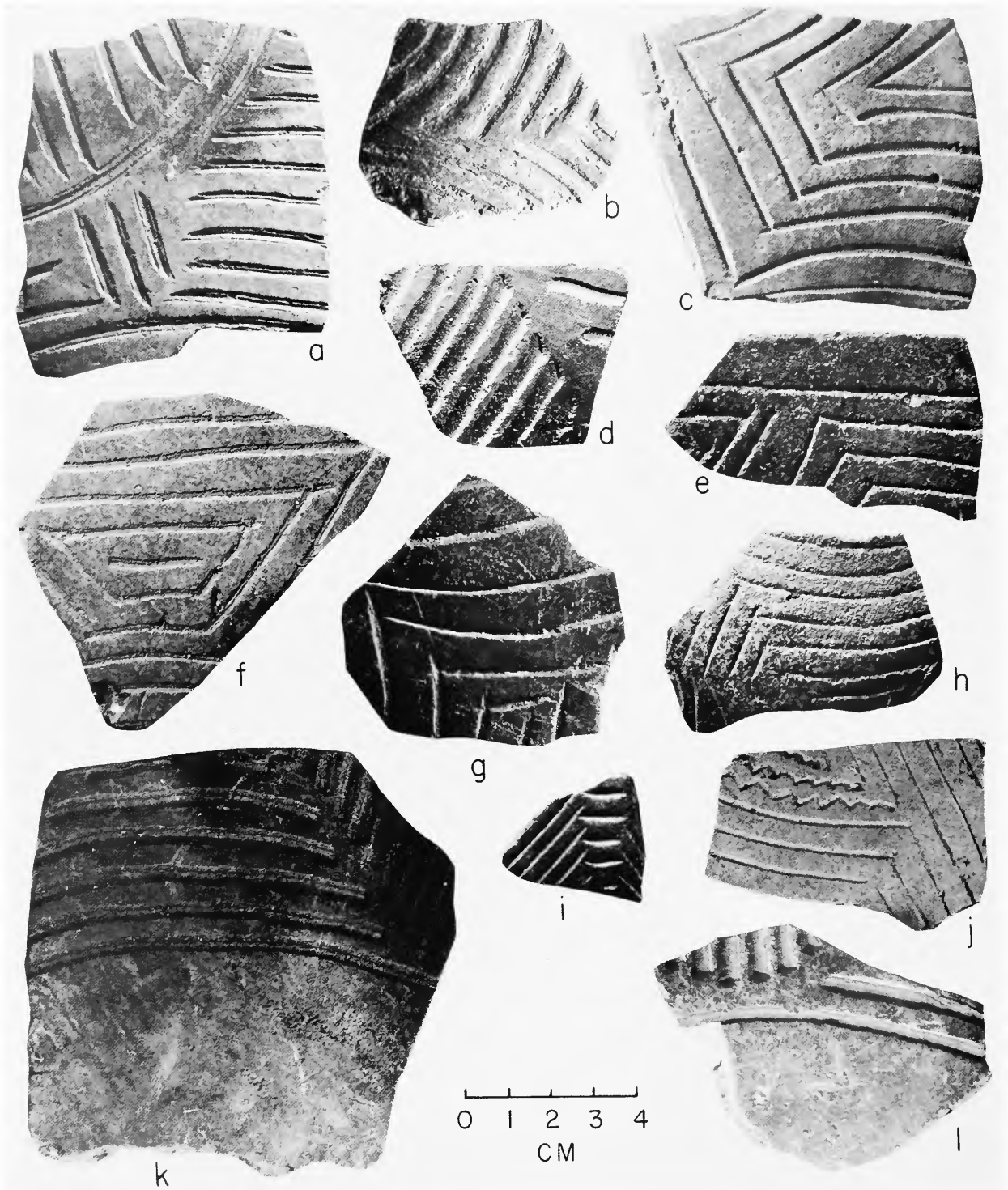

PLATE 36

Type sherds of Valdivia Broad-line Incised, Motif 4.

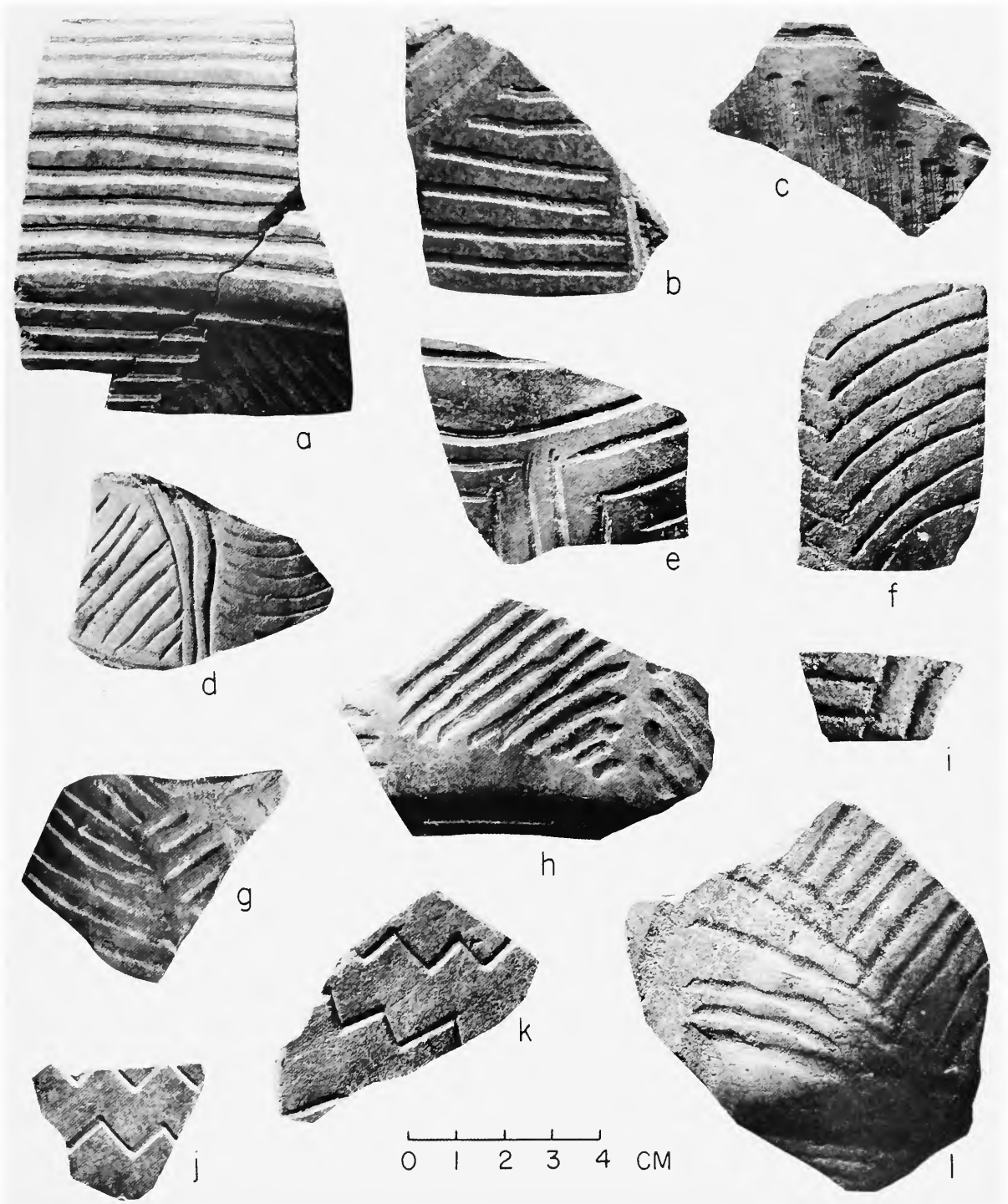

PLATE 37

Type sherds of Valdivia Broad-line Incised, Motif 4.

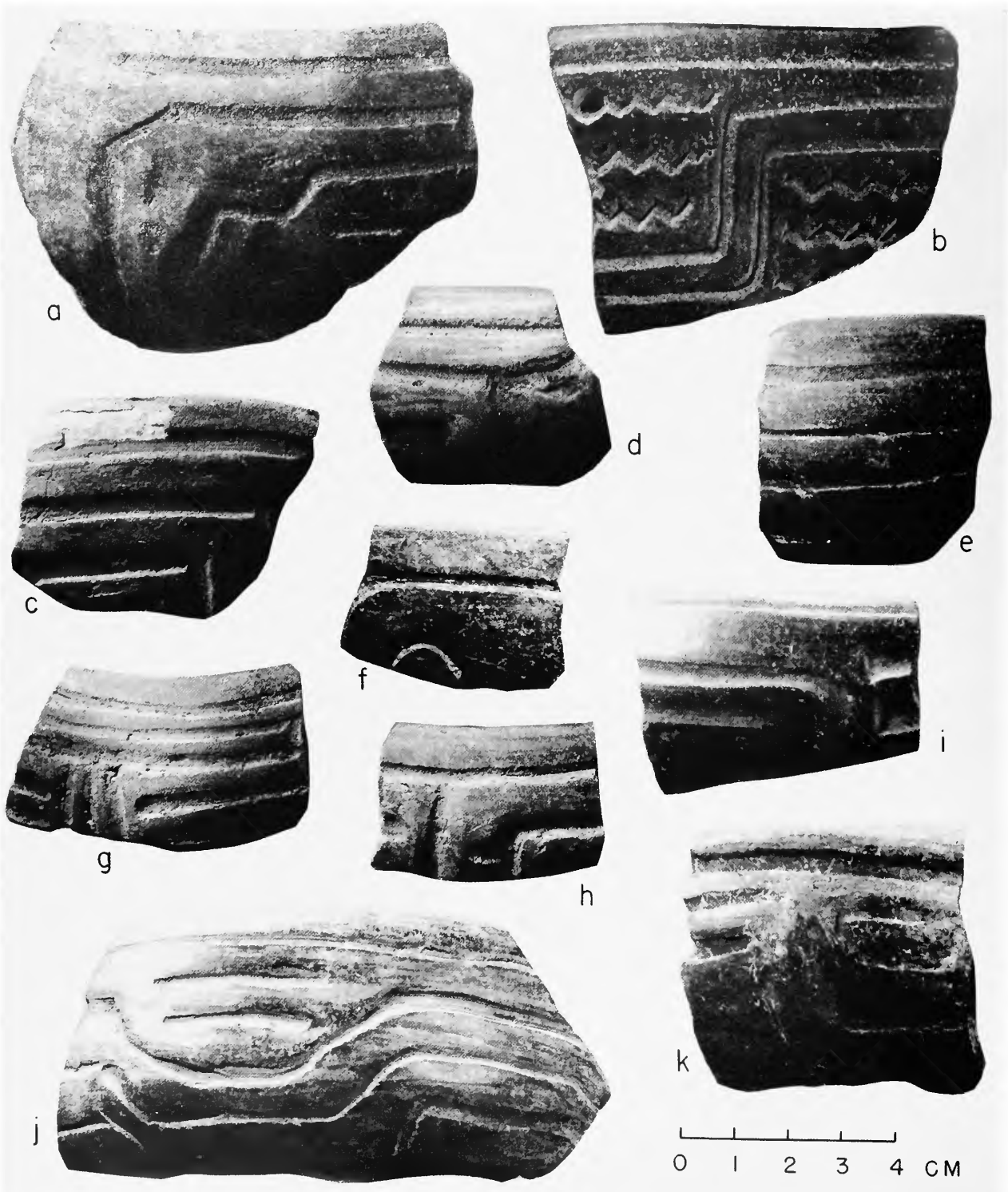

PLATE 38

Type sherds of Valdivia Broad-line Incised, Motif 5.

PLATE 39

Type sherds of Valdivia Broad-line Incised, Motif 5.

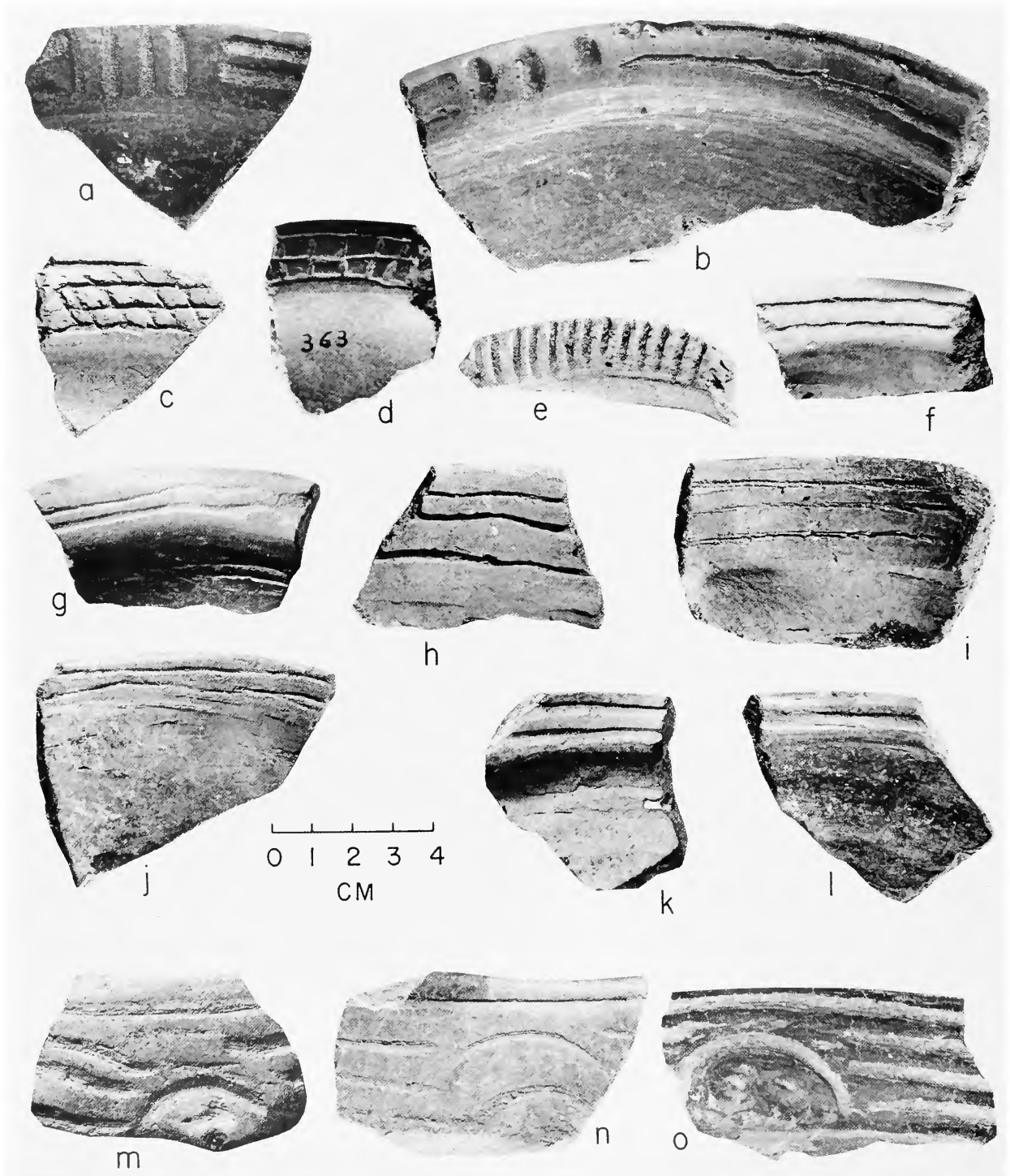

PLATE 40

Type sherds of Valdivia Broad-line Incised. *a–l*, Motif 6. *m–o*, Motif 8.

PLATE 41

Type sherds of Valdivia Broad-line Incised, Motif 7.

PLATE 42

Complete vessels of Valdivia Broad-line Incised. *a*, Form 3, Motif 2, rim diameter ca. 24 cm. *b*, Form 3, Motif 2, rim diameter 29.5 cm. *c*, Form 6, Motif 3, rim diameter ca. 25 cm. *d*, Miniature vessel, unclassified form, Motif 2, height 4.7 cm. *e*, Form 6, Motif 4, rim diameter 32.5 cm.

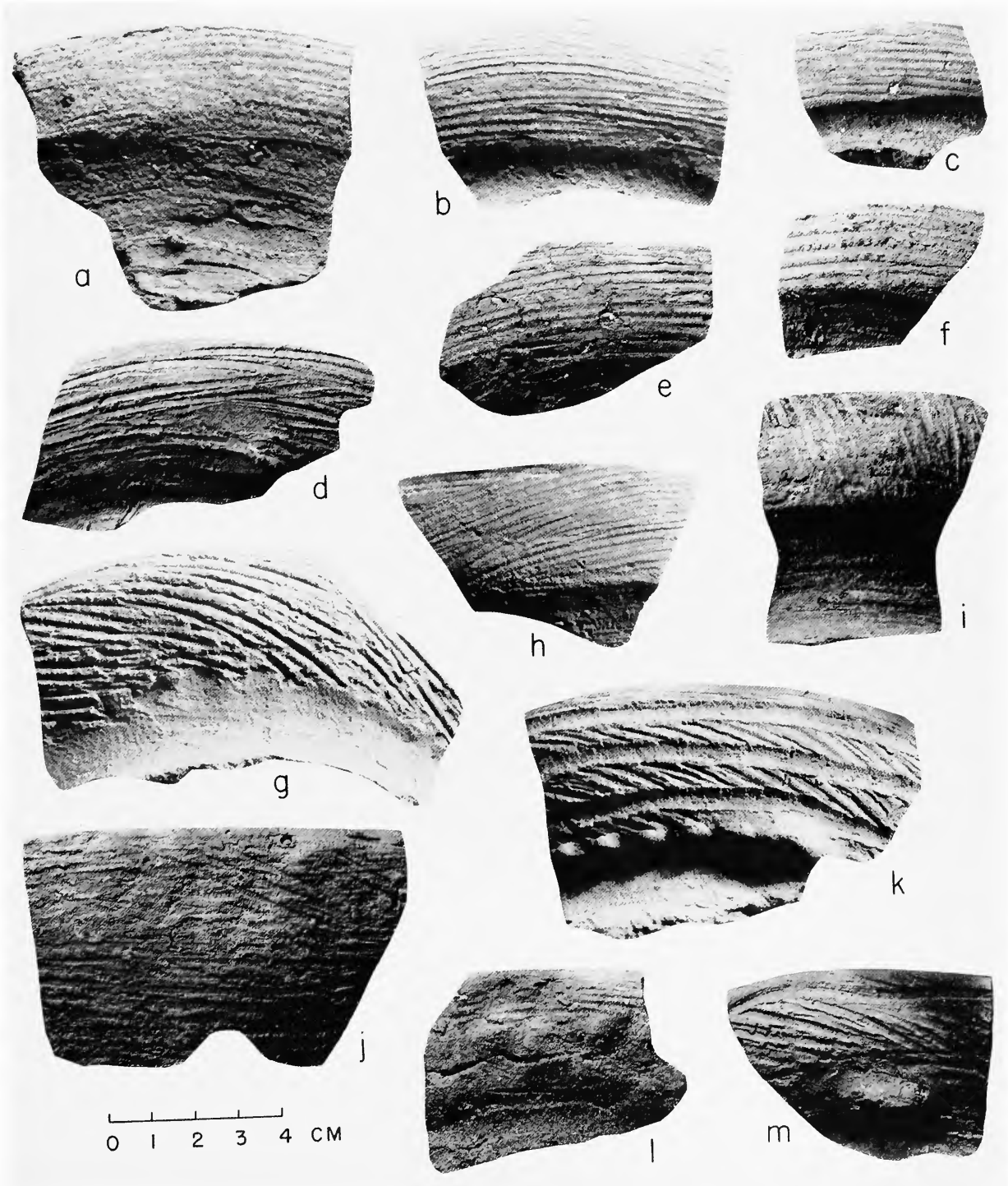

PLATE 43

Type sherds of Valdivia Brushed, Technique 1, variations in rim treatment.

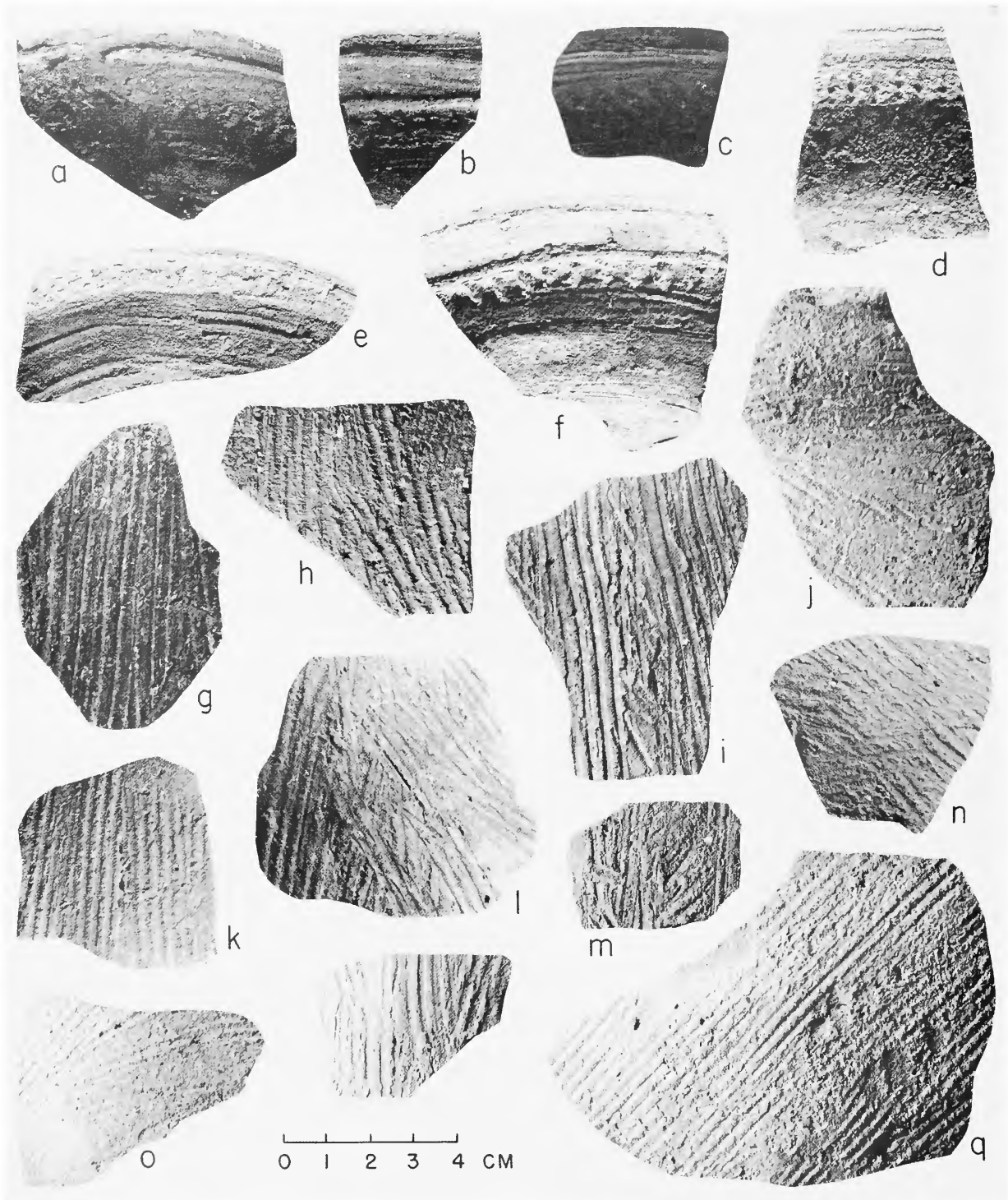

PLATE 44

Type sherds of Valdivia Brushed, Technique 1. *a–f*, Variations in rim treatment. *g–q*, Over-all texturing.

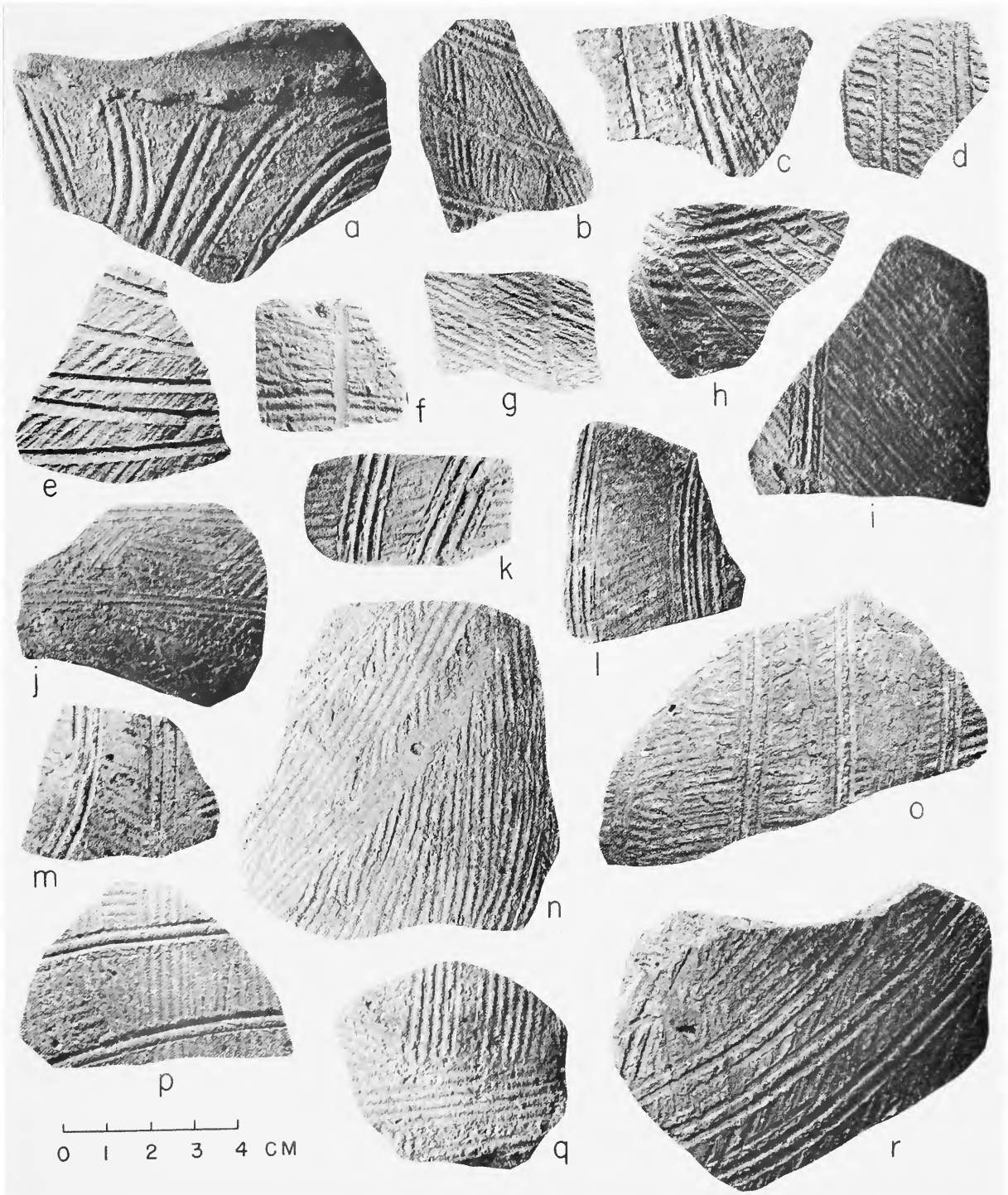

PLATE 45

Type sherds of Valdivia Brushed, Technique 1, patterned variant.

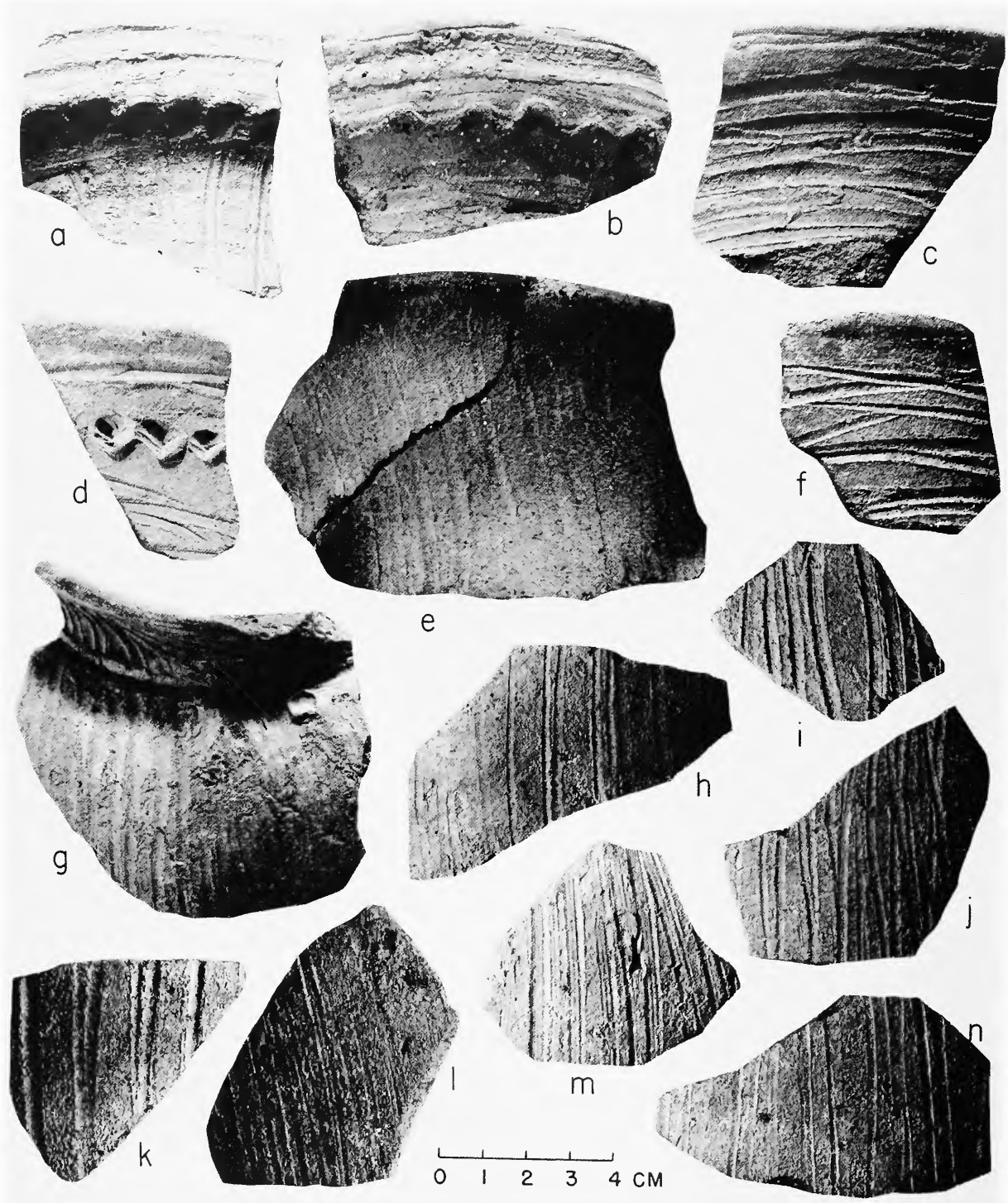

PLATE 46

Type sherds of Valdivia Brushed, Technique 2.

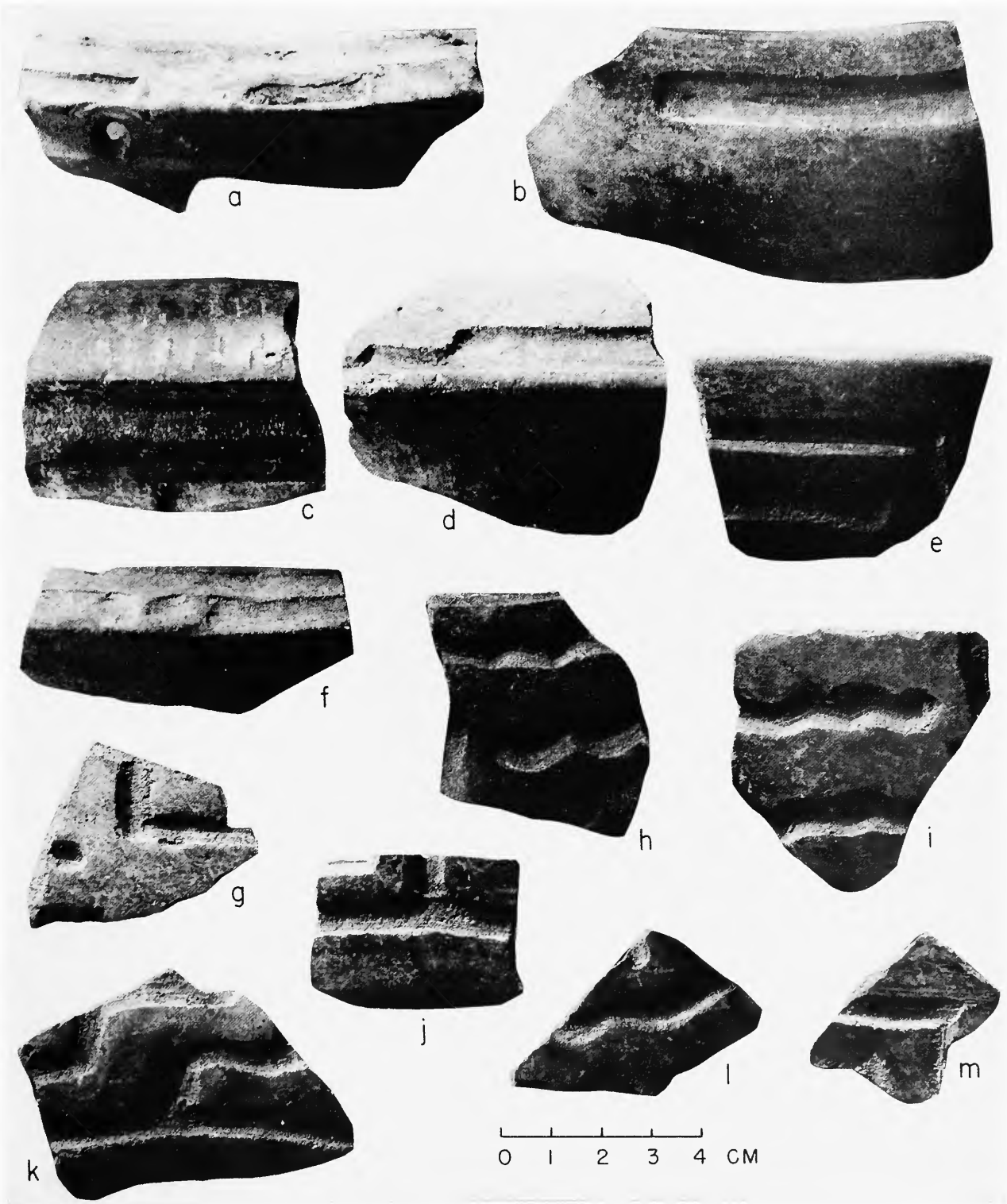

PLATE 47

Type sherds of Valdivia Carved.

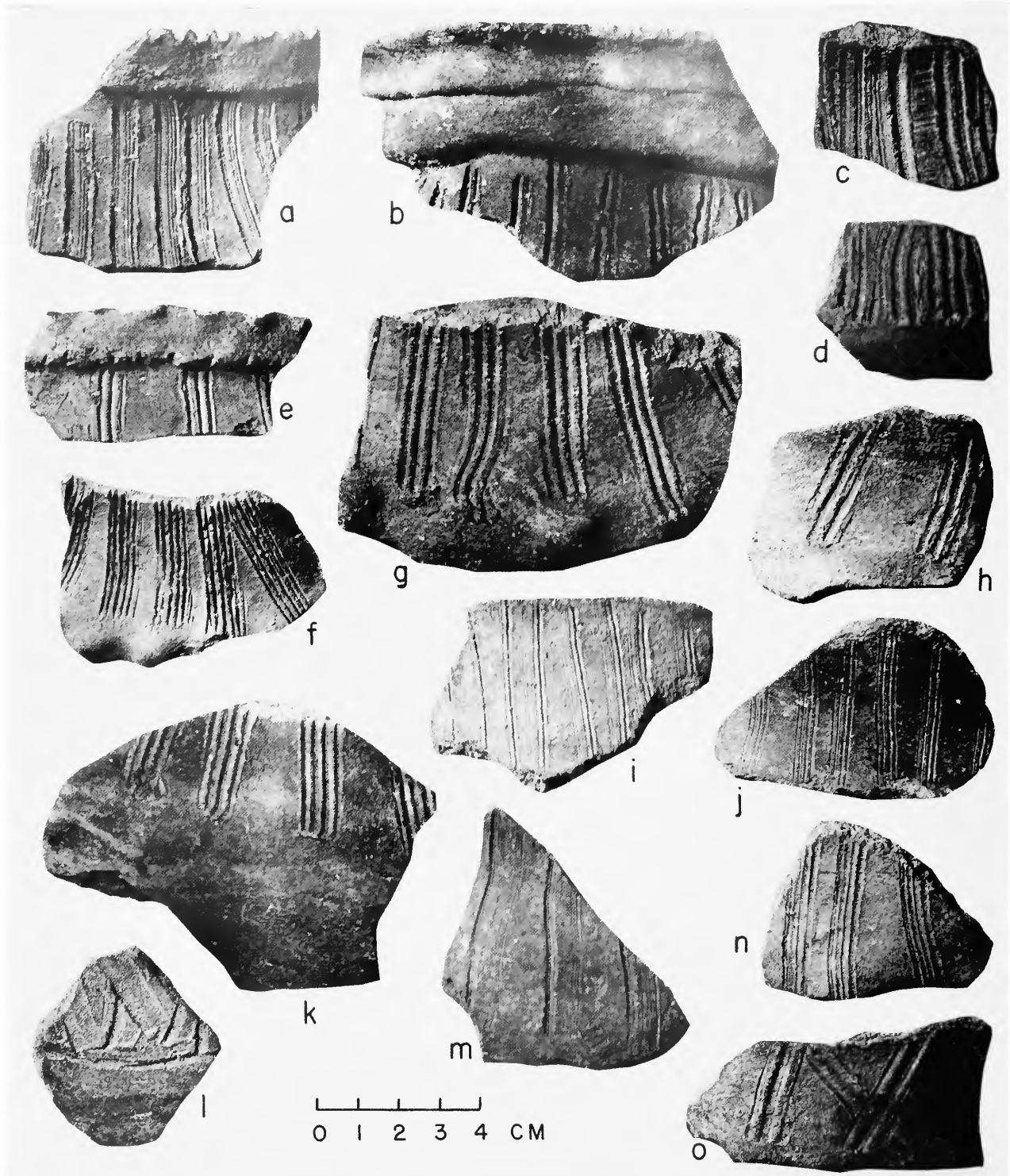

PLATE 48

Type sherds of Valdivia Combed, Technique 1.

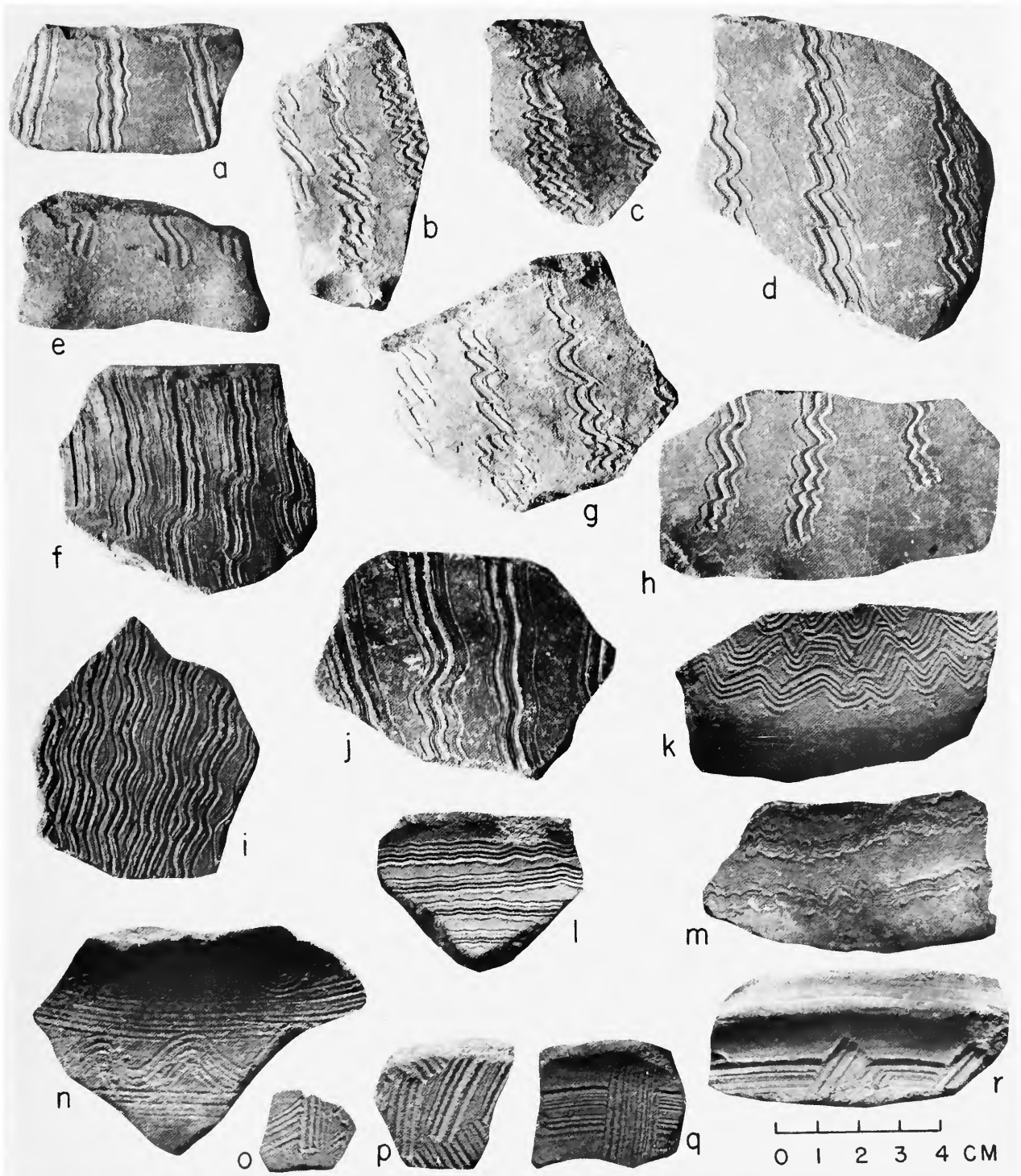

PLATE 49

Type sherds of Valdivia Combed, Technique 1.

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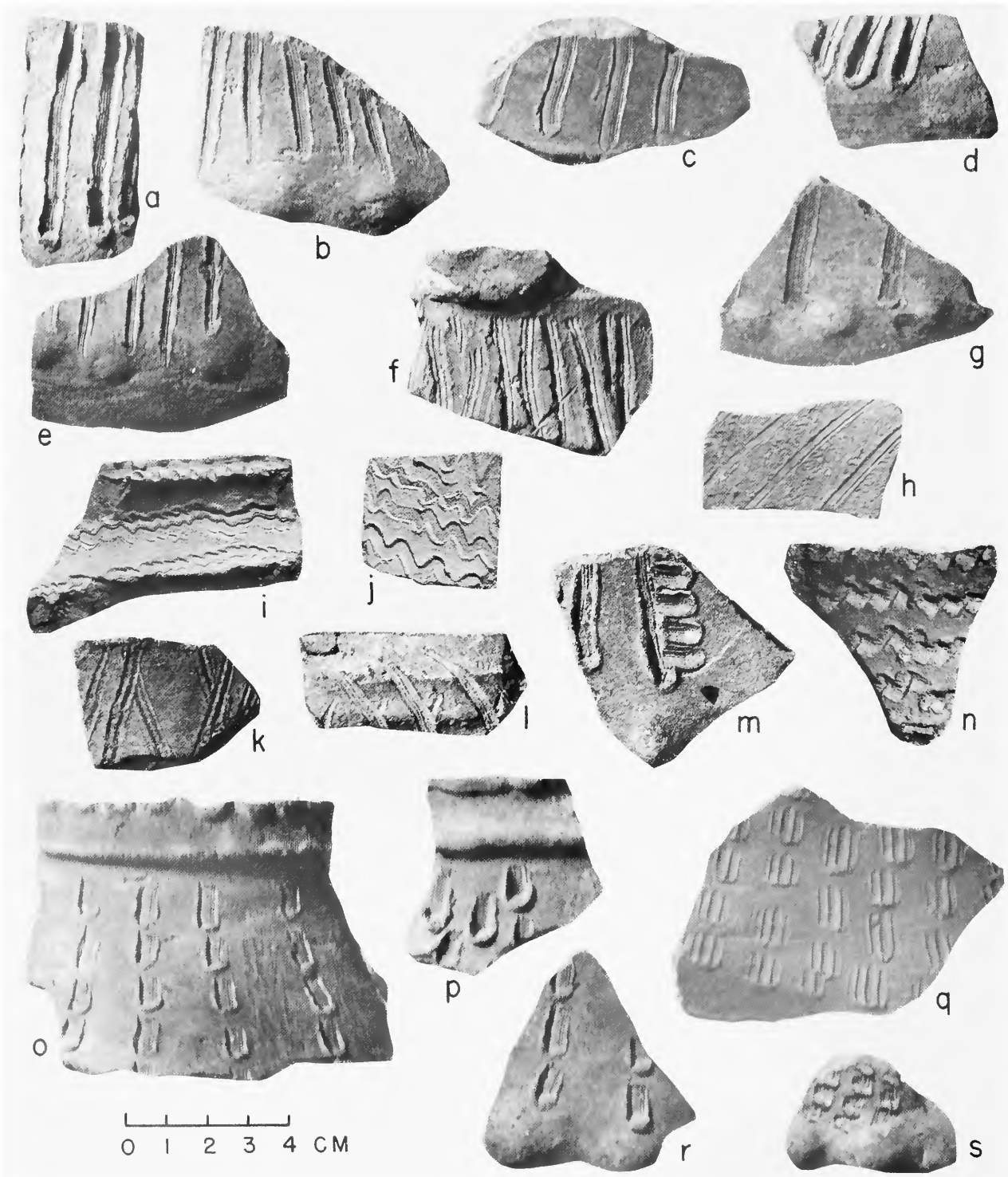

PLATE 50

Type sherds of Valdivia Combed. *a–n*, Technique 2. *o–s*, Technique 3.

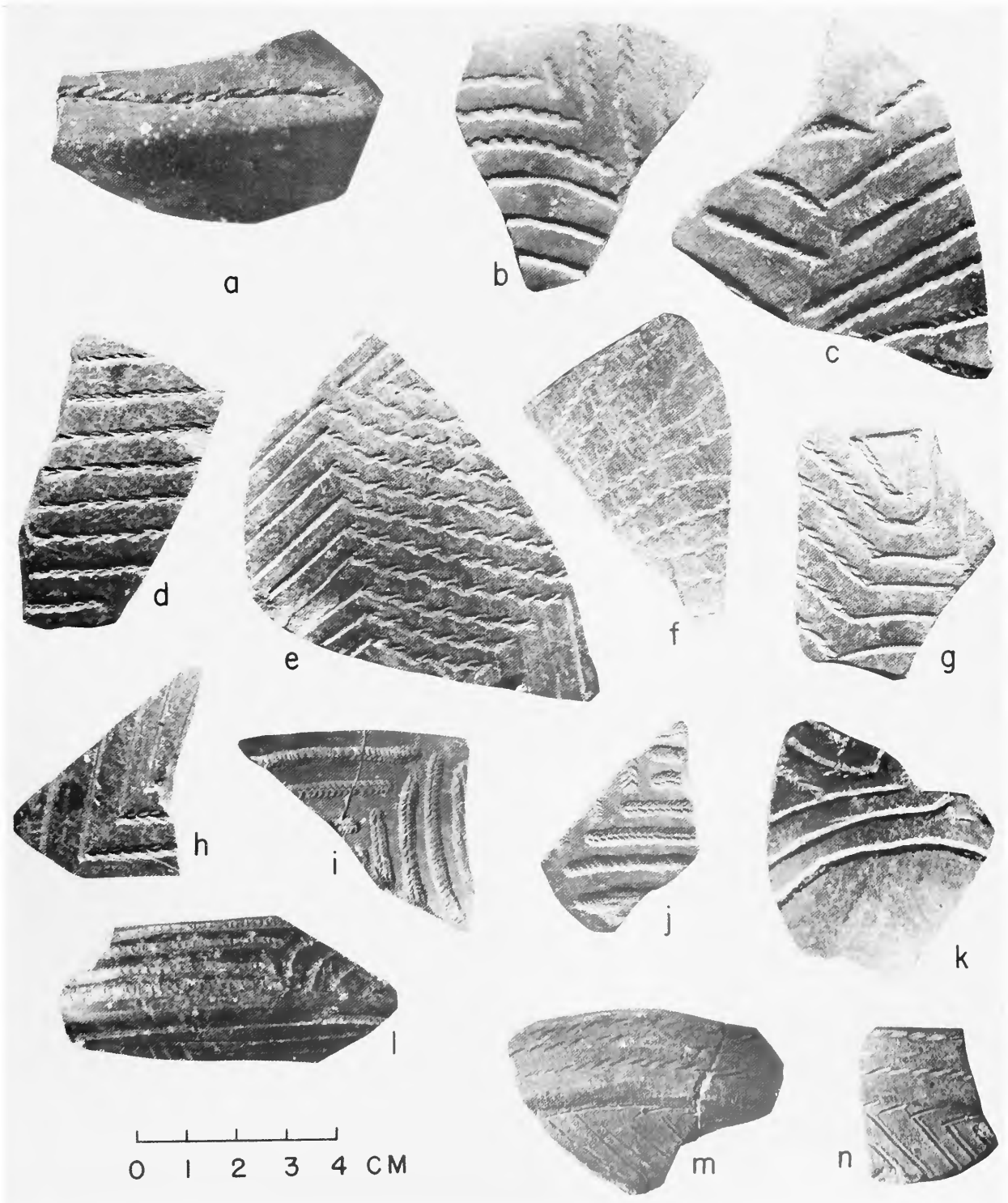

PLATE 51

Type sherds of Valdivia Cord Impressed. *a–l*, Braid impressed. *m–n*, Cord impressed.

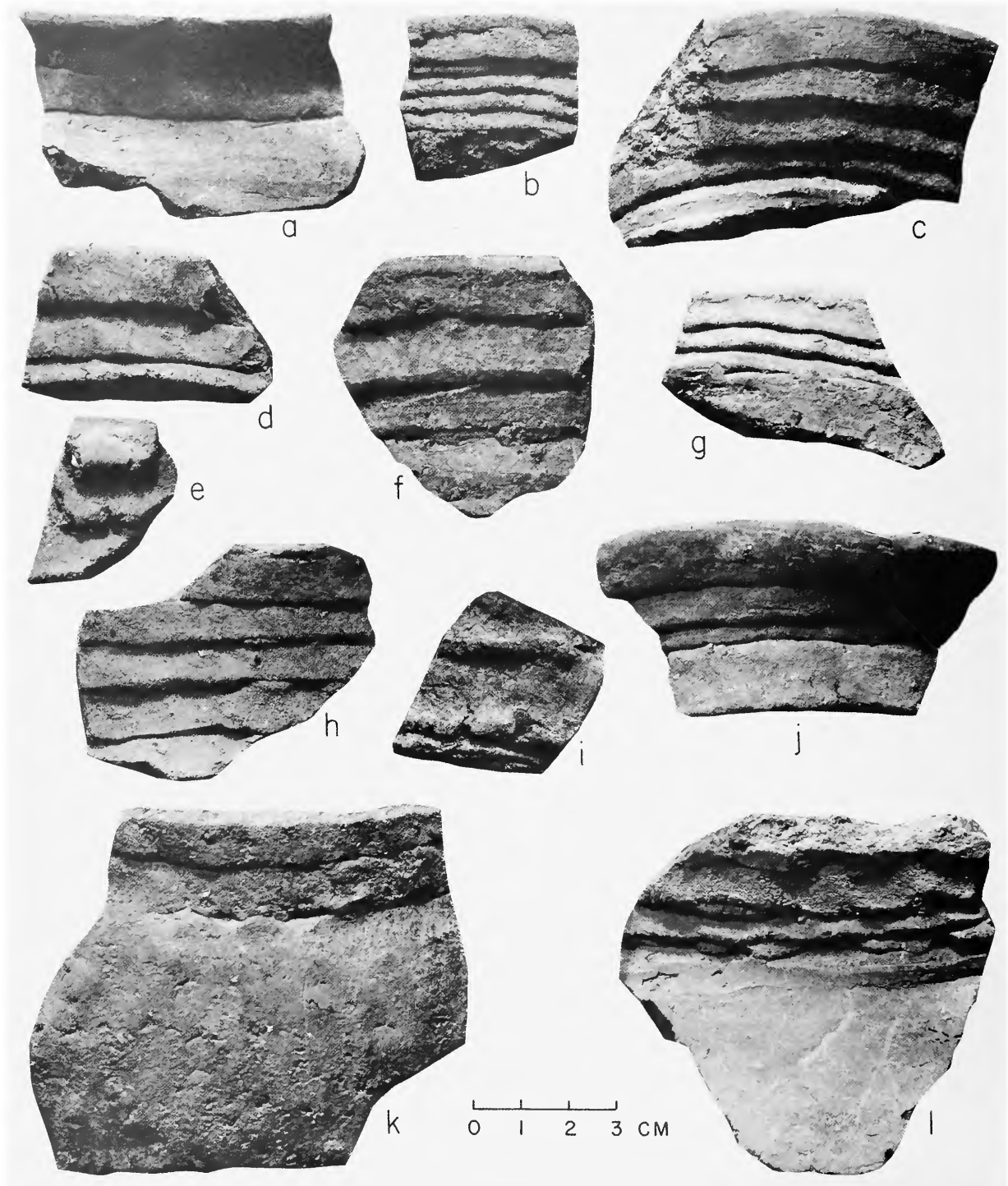

PLATE 52

Type sherds of Valdivia Corrugated.

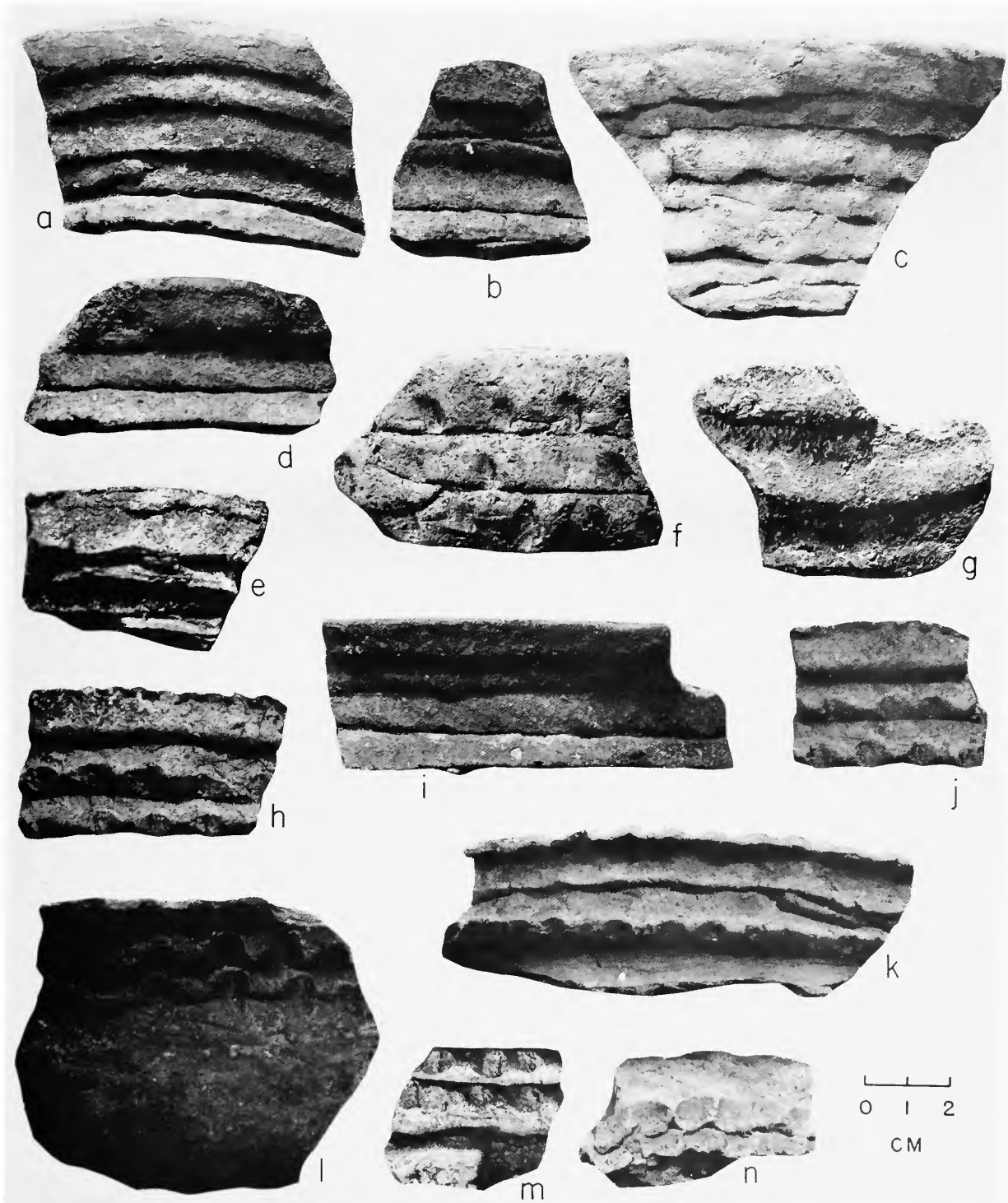

PLATE 53

Type sherds of Valdivia Corrugated. *a–e, g, i,* Plain. *f, h, j–n,* Finger pressed.

PLATE 54

Valdivia Phase decorated types. *a*, Valdivia Corrugated jar. *b–i*, Type sherds of Valdivia Pseudo-Corrugated.

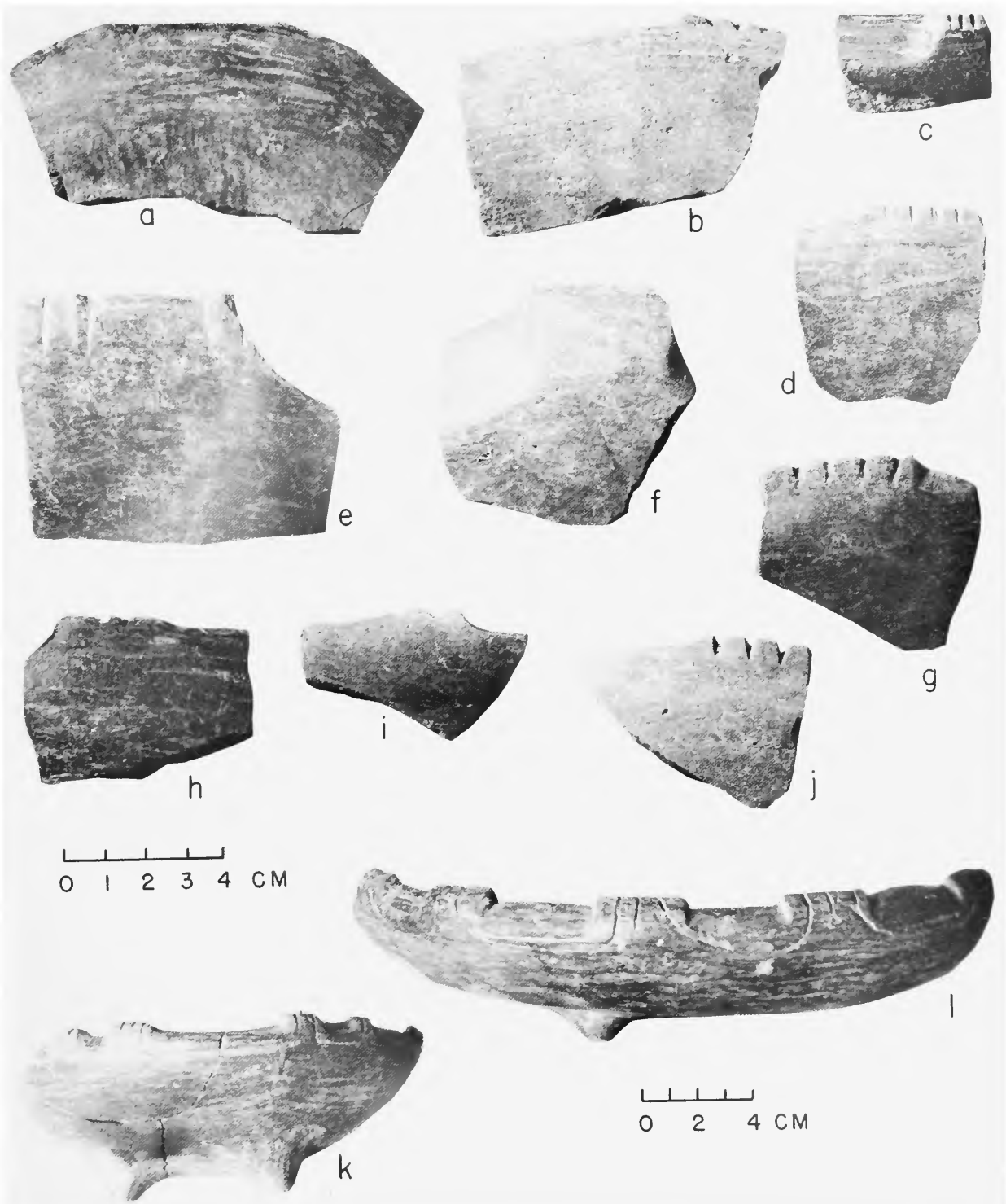

PLATE 55

Type sherds of Valdivia Cut and Beveled Rim. *a–j*, Motif 1. *k–l*, Tetrapod vessels of Motif 2.

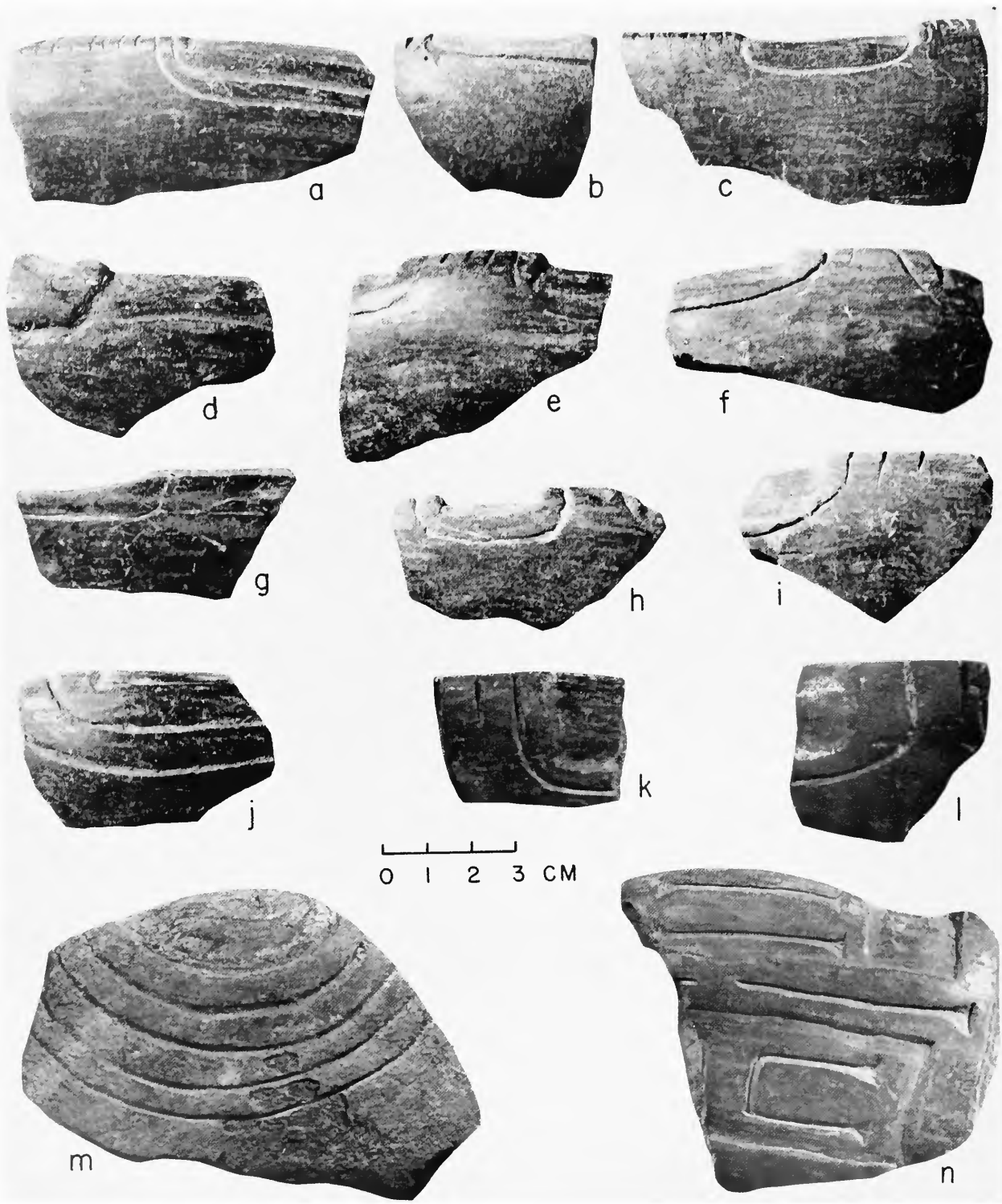

PLATE 56

Type sherds of Valdivia Cut and Beveled Rim. *a–j*, Motif 2. *k–n*, Motif 3.

PLATE 57

Type sherds of Valdivia Embossed.

PLATE 58

Type sherds of Valdivia Excised. *a–m*, Motif 1, anthropomorphic faces. *n–q*, Unclassified motifs.

PLATE 59

Type sherds of Valdivia Excised. *a–c*, Motif 2. *d–g*, Motif 3. *h–l*, Motif 4.

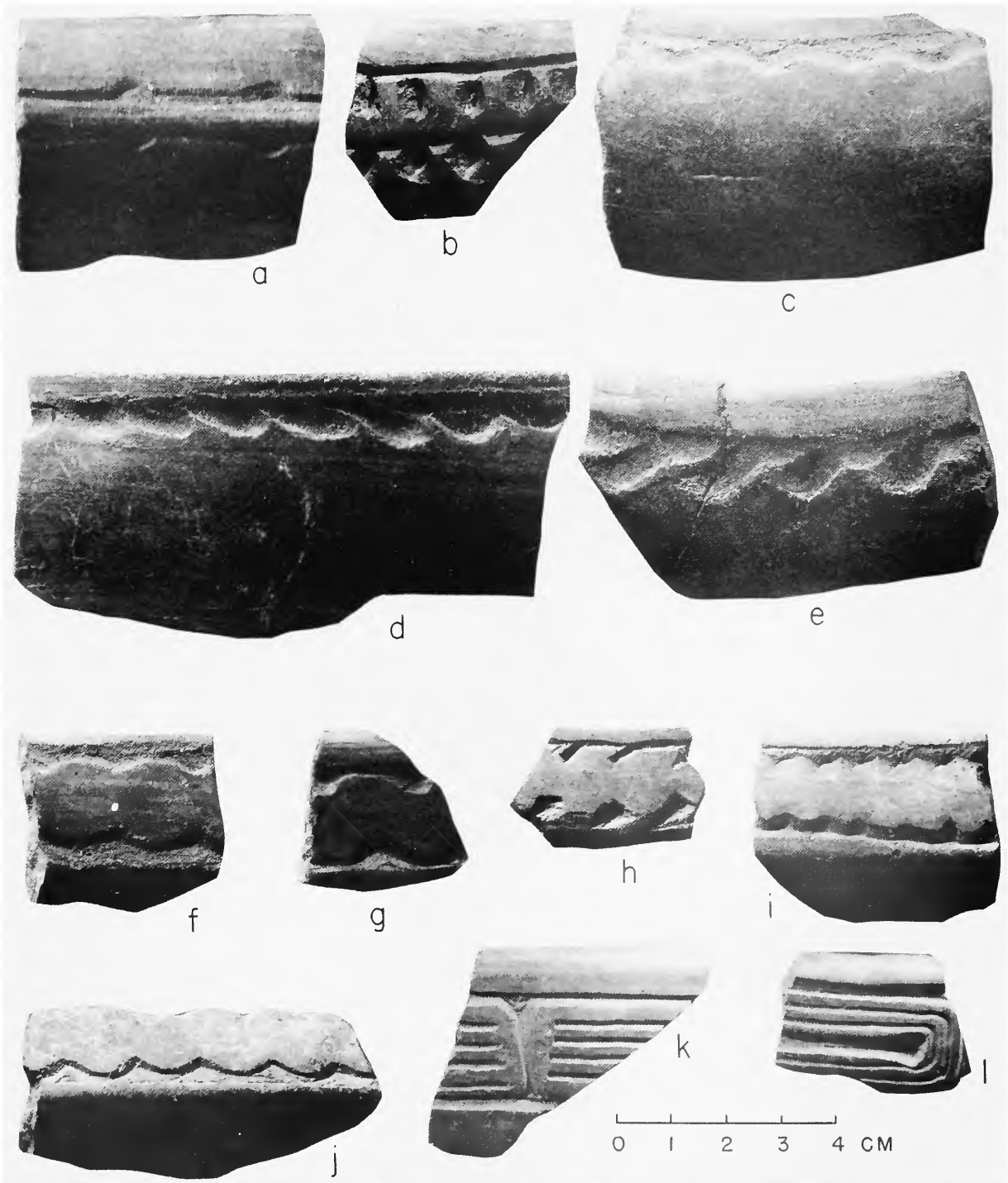

PLATE 60

Type sherds of Valdivia Excised. *a–e*, Motif 5, gouged-out scallops. *f–j*, Motif 6, undulating bands. *k–l*, Motif 7, minor addition to broad-line incised designs.

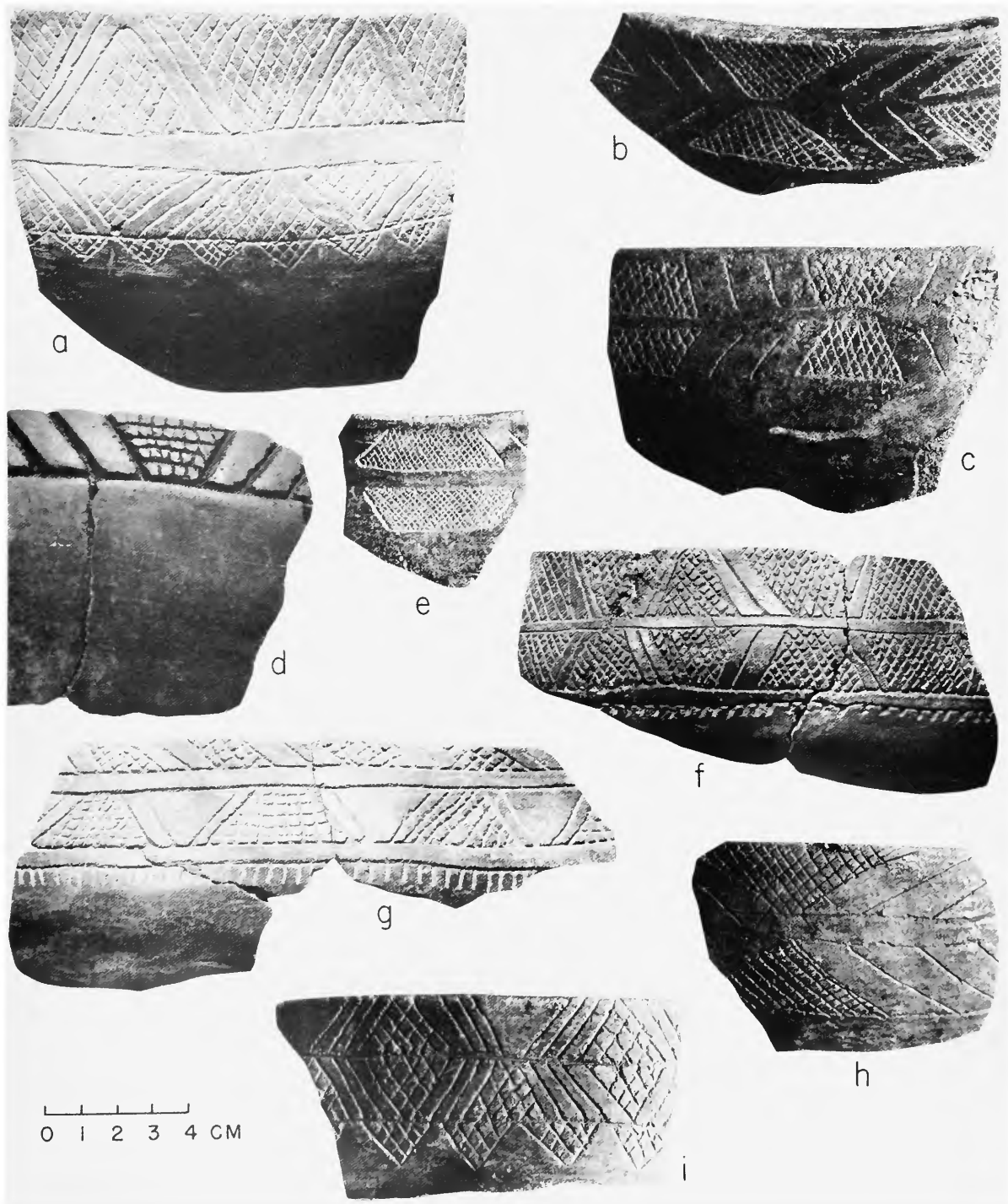

PLATE 61

Type sherds of Valdivia Fine-line Incised, Motif 1.

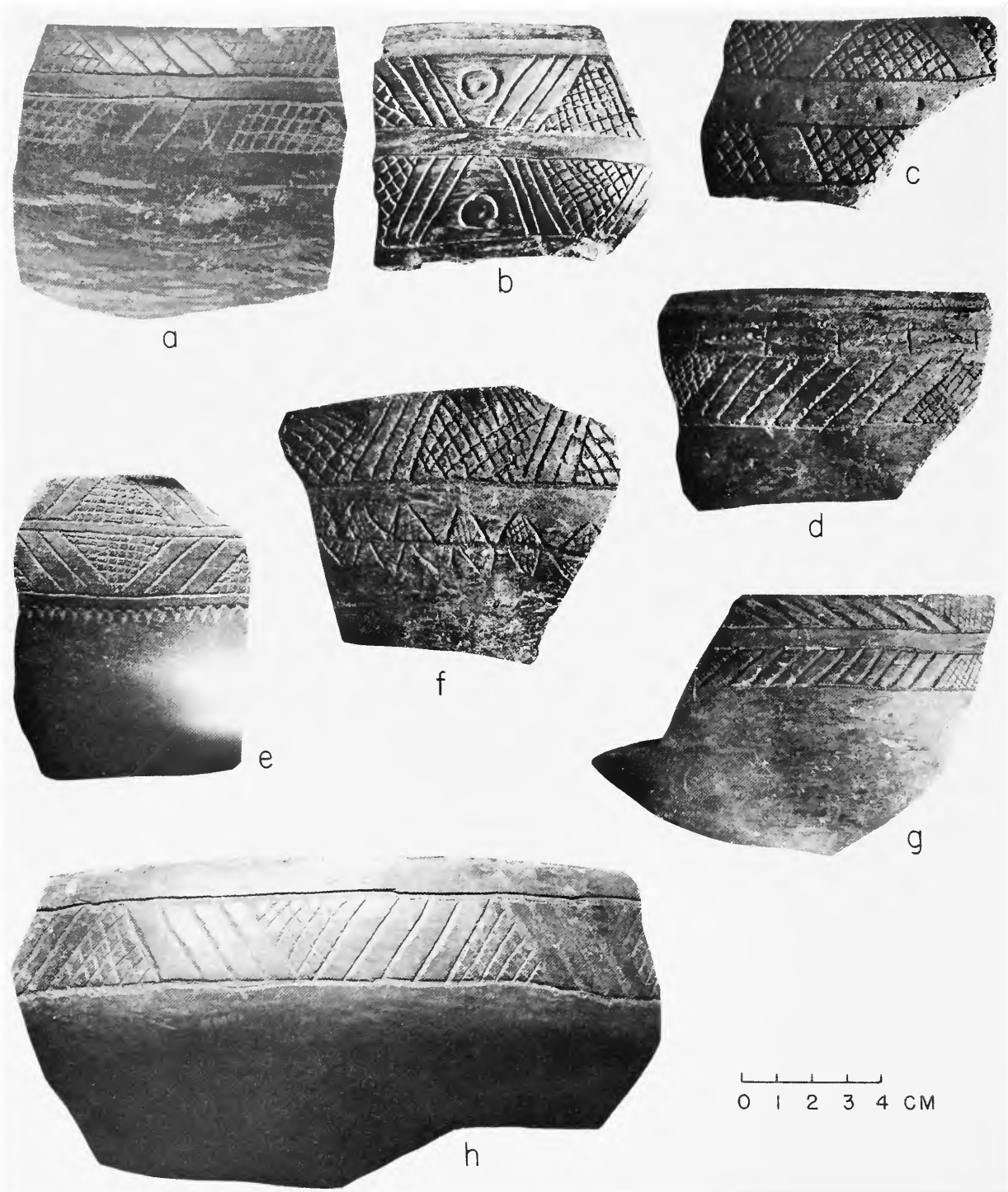

PLATE 62

Type sherds of Valdivia Fine-line Incised, Motif 1.

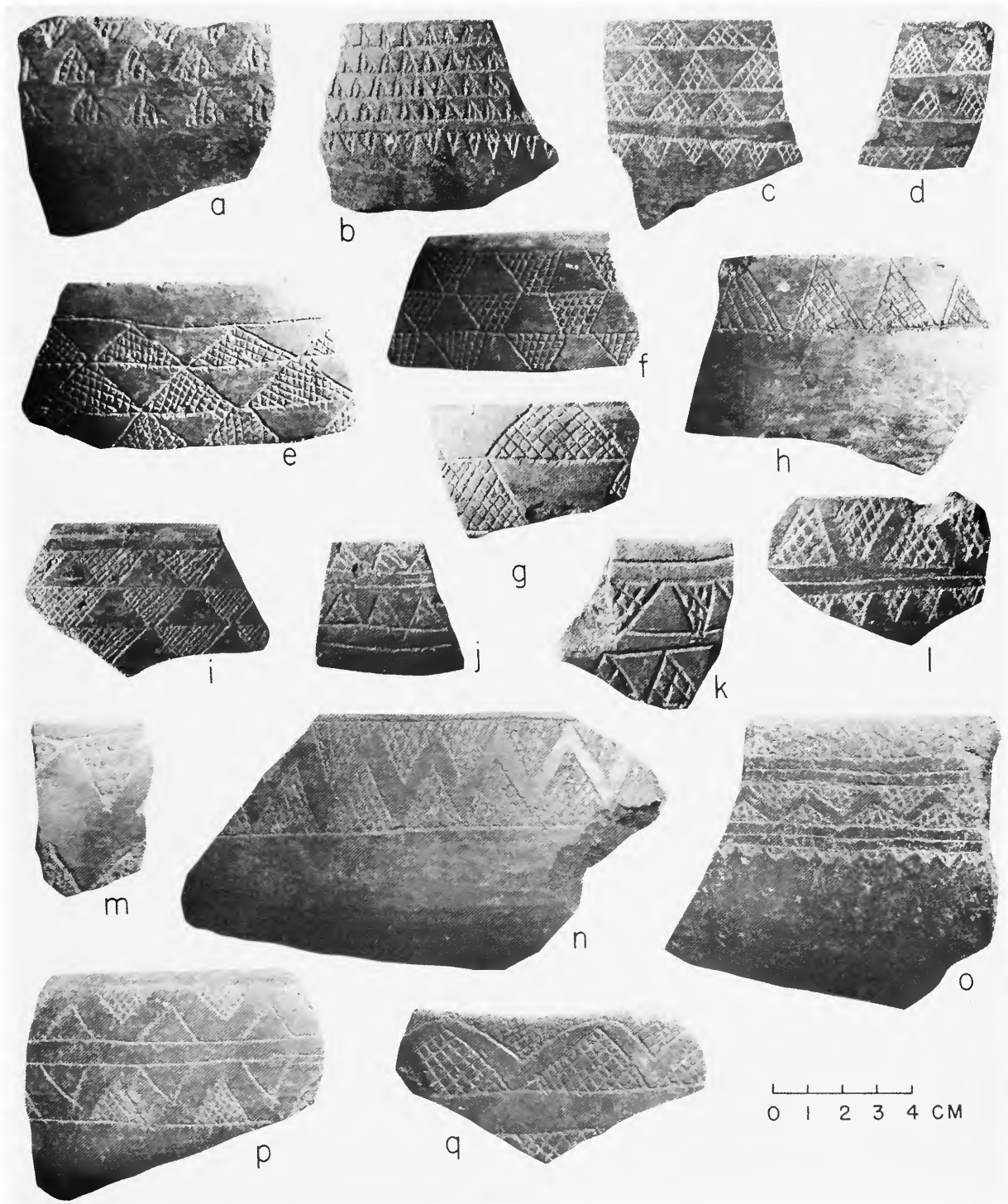

PLATE 63

Type sherds of Valdivia Fine-line Incised. *a–k*, Motif 2. *l–q*, Motif 3.

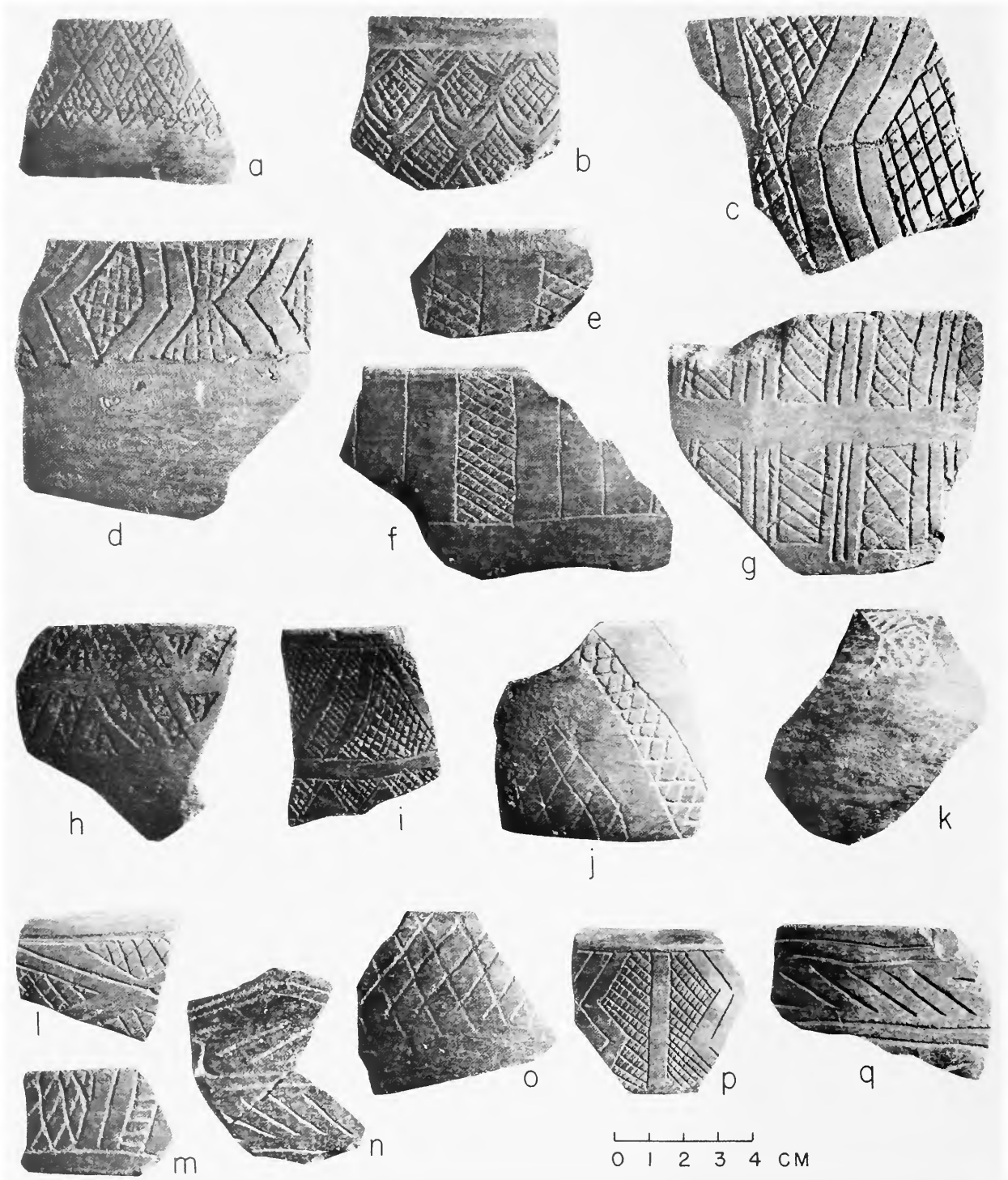

PLATE 64

Type sherds of Valdivia Fine-line Incised. *a–d*, Motif 4. *e–g*, Motif 5. *h–j*, Motif 6. *k–q*, Unclassified motifs.

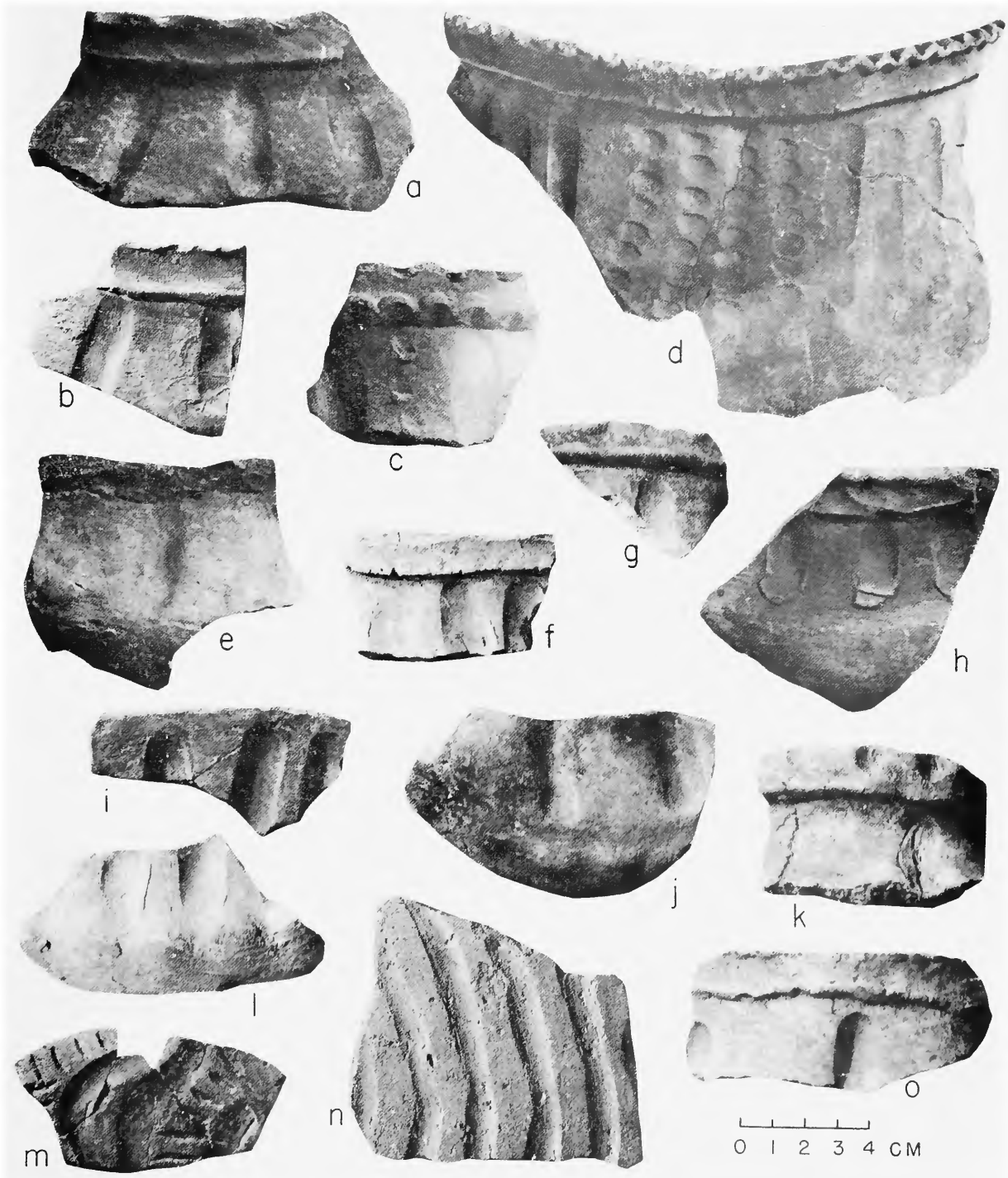

PLATE 65

Type sherds of Valdivia Finger Grooved. *a, b, e–i, n–o,* Plain grooving. *c–d, m,* Additional decoration by fingertip or fingernail punctate. *j–l,* Additional decoration in Valdivia Modeled technique.

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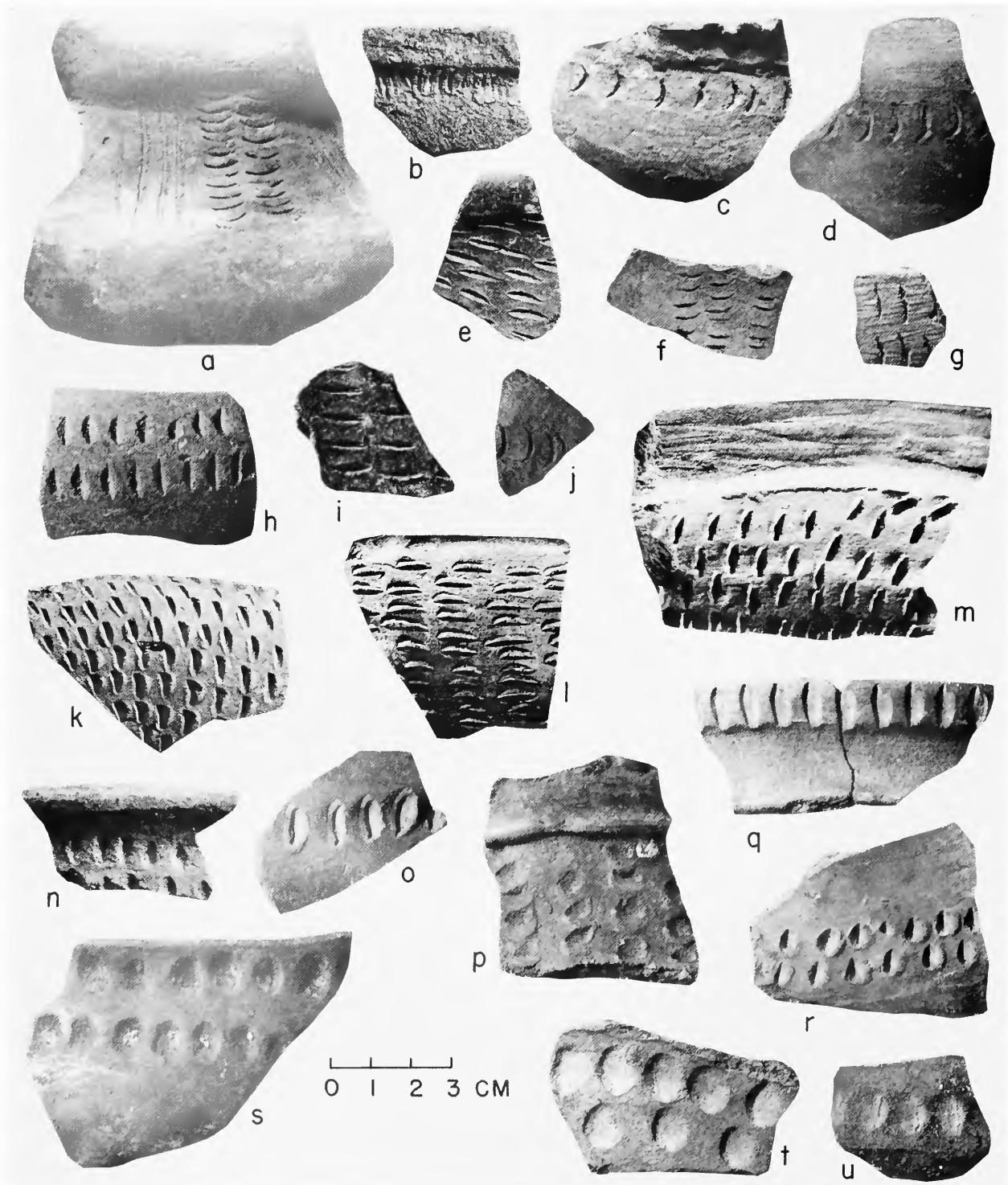

PLATE 66

Type sherds of Valdivia Fingernail Decorated. *a–m*, Technique 1, fingernail. *n–u*, Technique 2, fingertip.

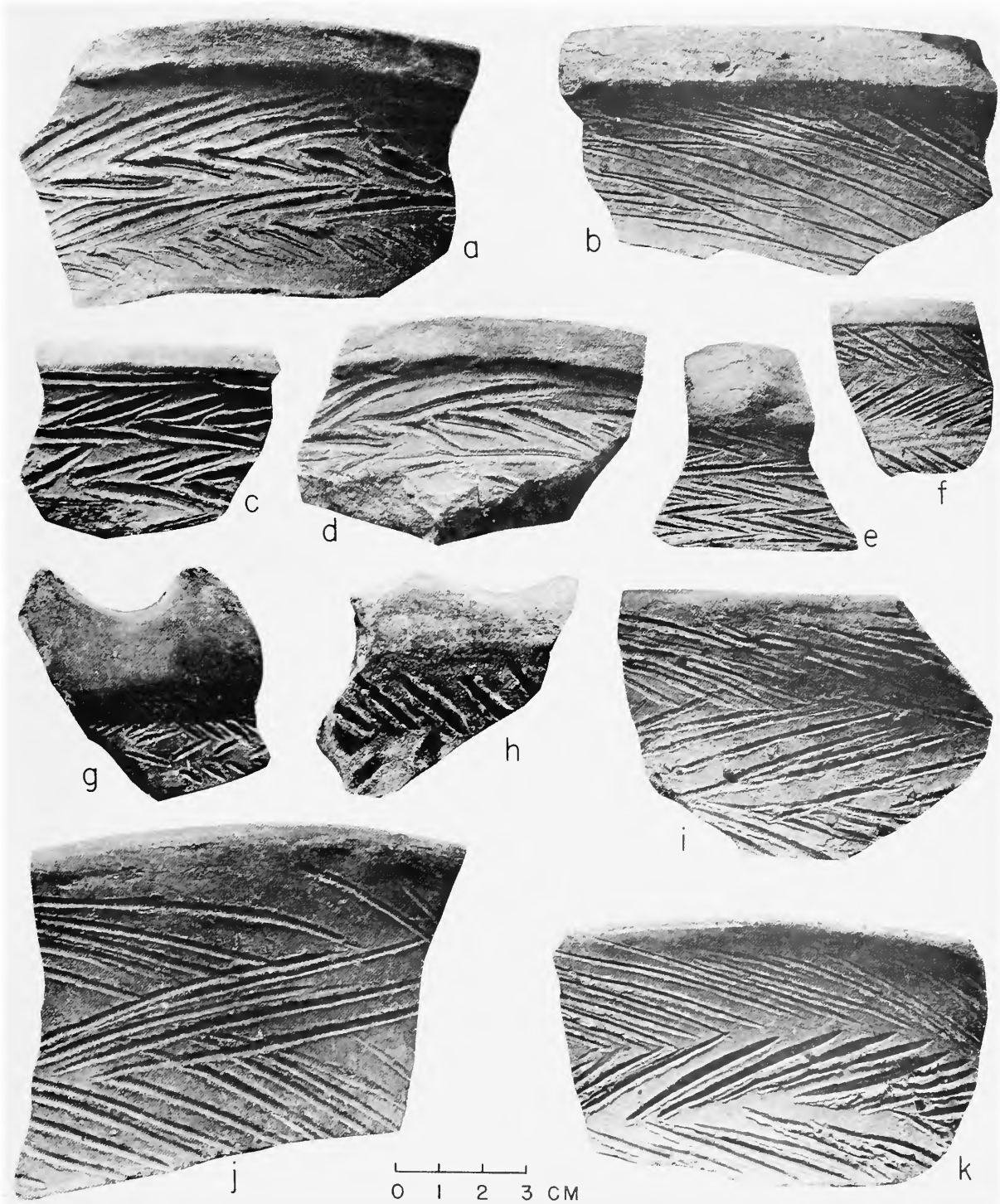

PLATE 67

Type sherds of Valdivia Incised, Motif 1, zigzag. *a*, Rim of Form 1. *b–d*, Rims of Form 2. *e*, Rim of Form 6. *f–h*, Rims of Form 3. *i–k*, Rims of Form 4.

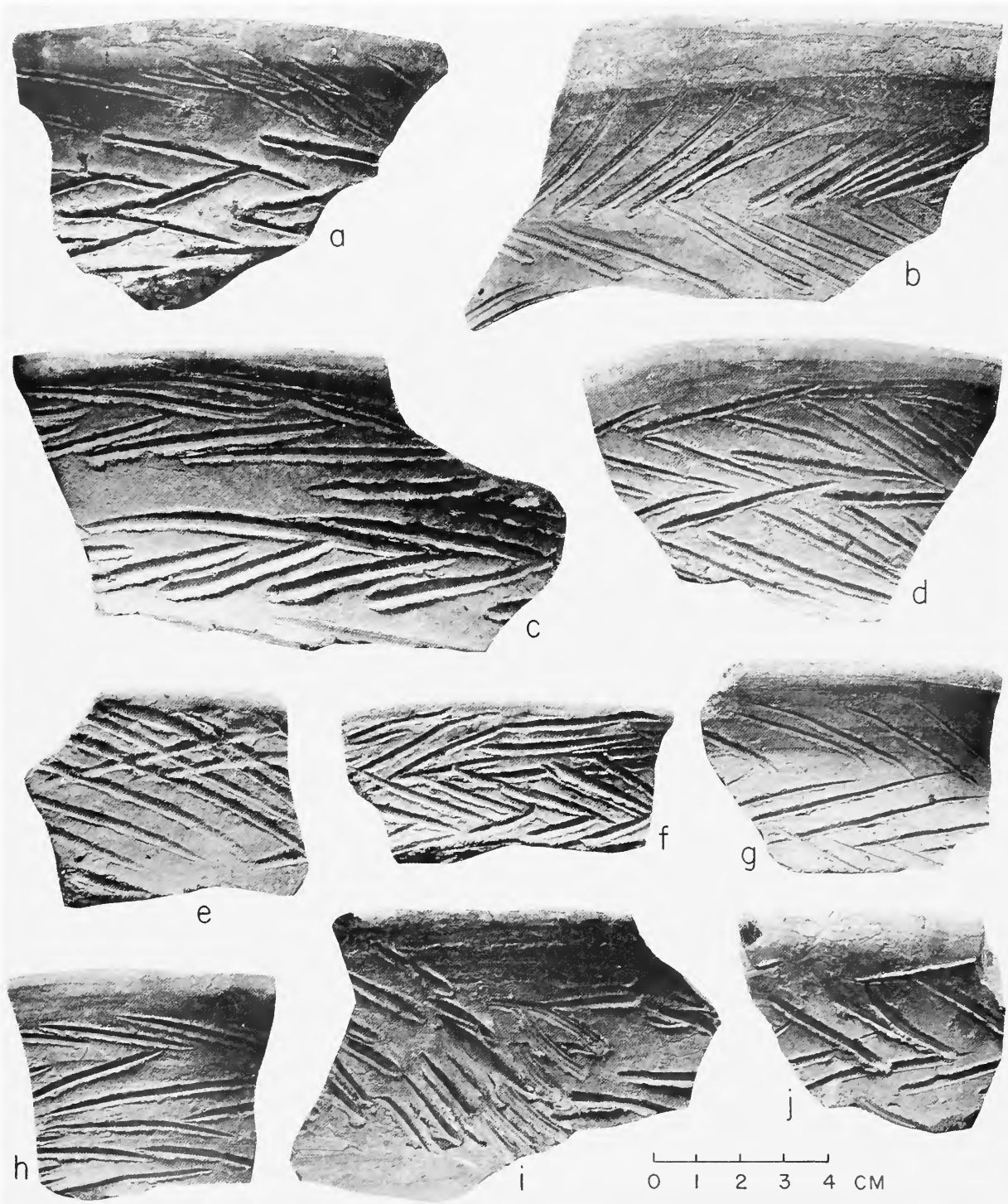

PLATE 68

Type sherds of Valdivia Incised, Motif 1, zigzag.

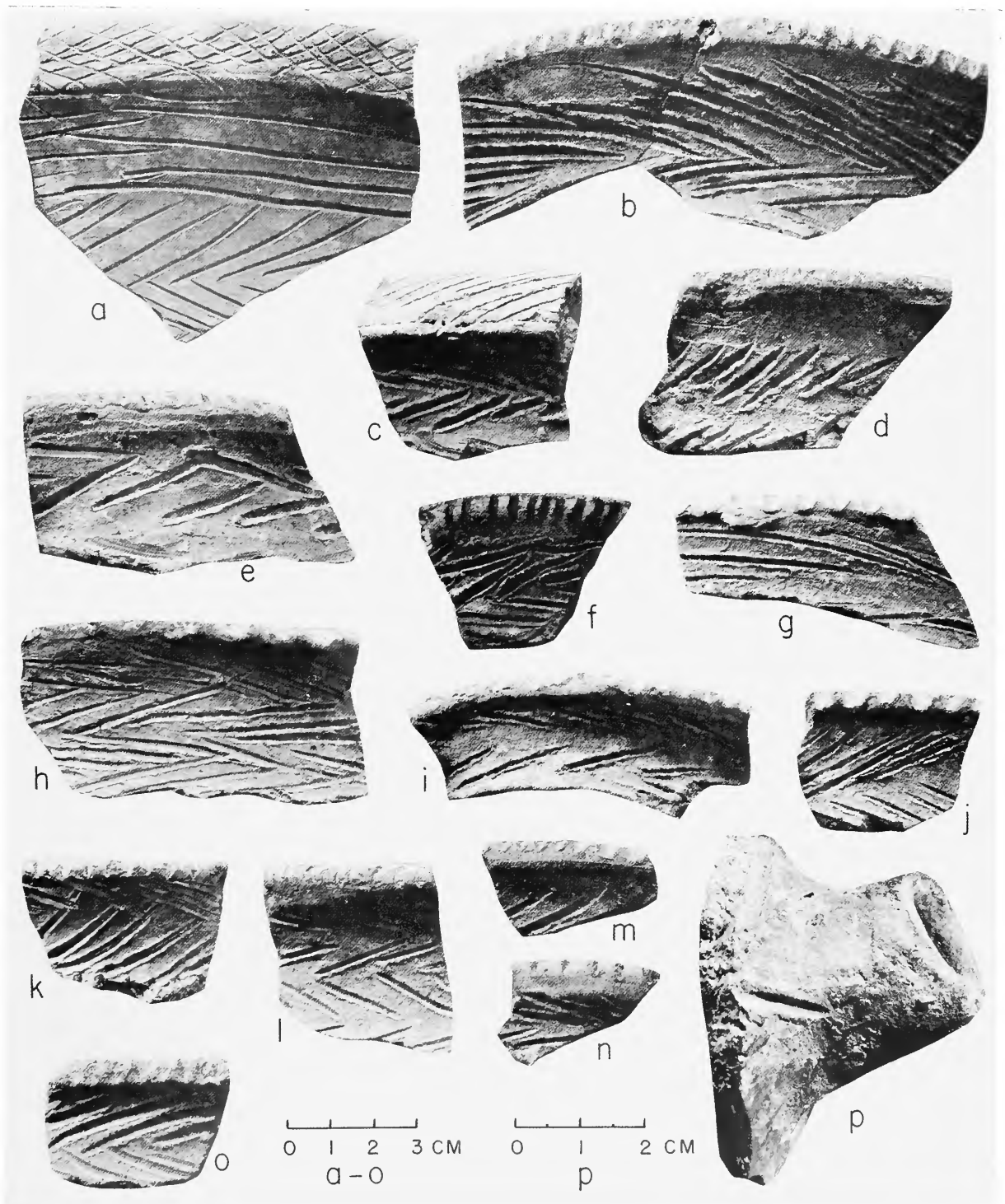

PLATE 69

Type sherds of Valdivia Incised, Motif 1, zigzag. *a, c,* Rims of Form 2 with incision continuing onto exterior thickening. *b, d–o,* Rims of Form 4 with nicked or finger-pressed lip. *p,* Spout.

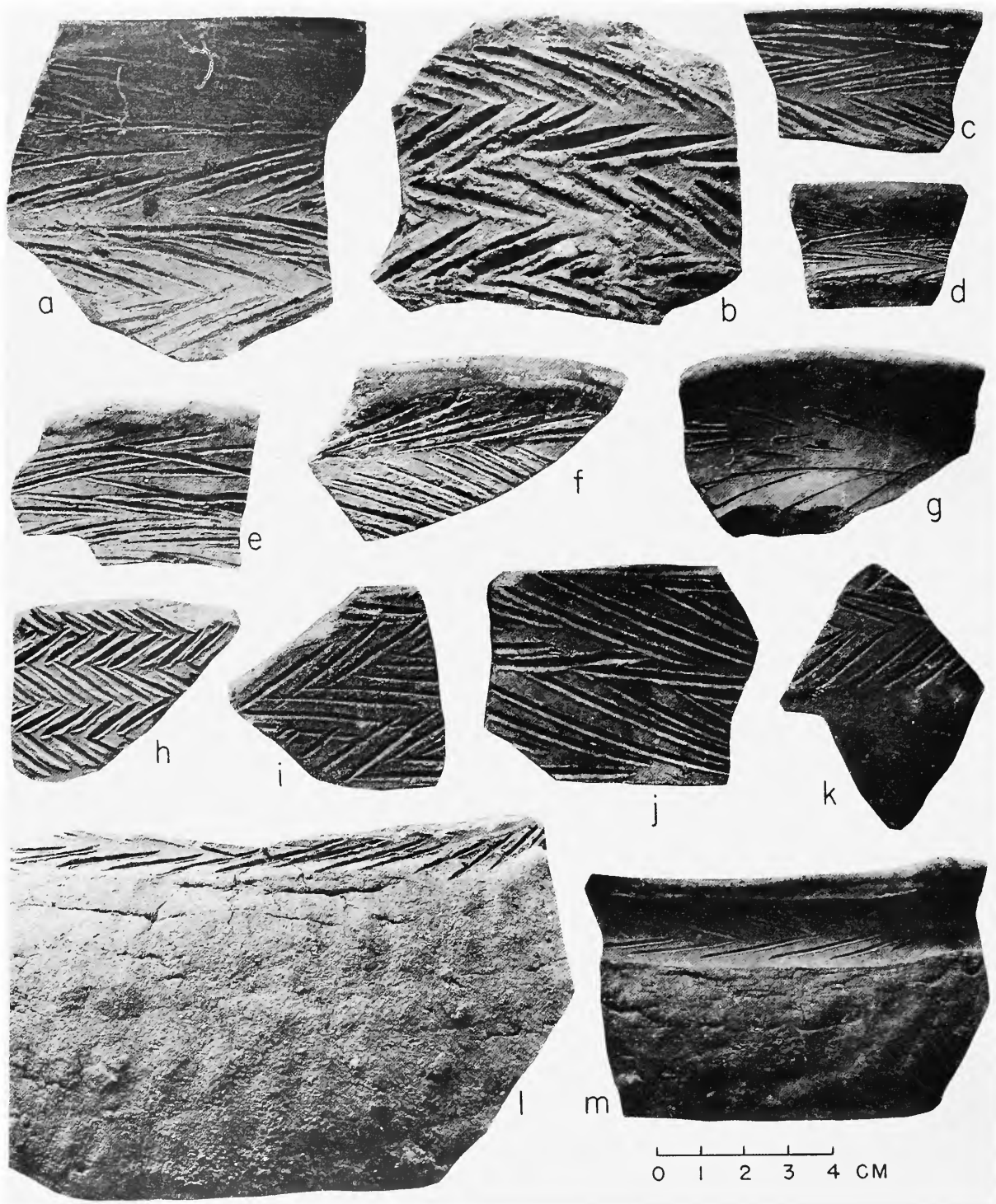

PLATE 70

Type sherds of Valdivia Incised, Motif 1, zigzag.

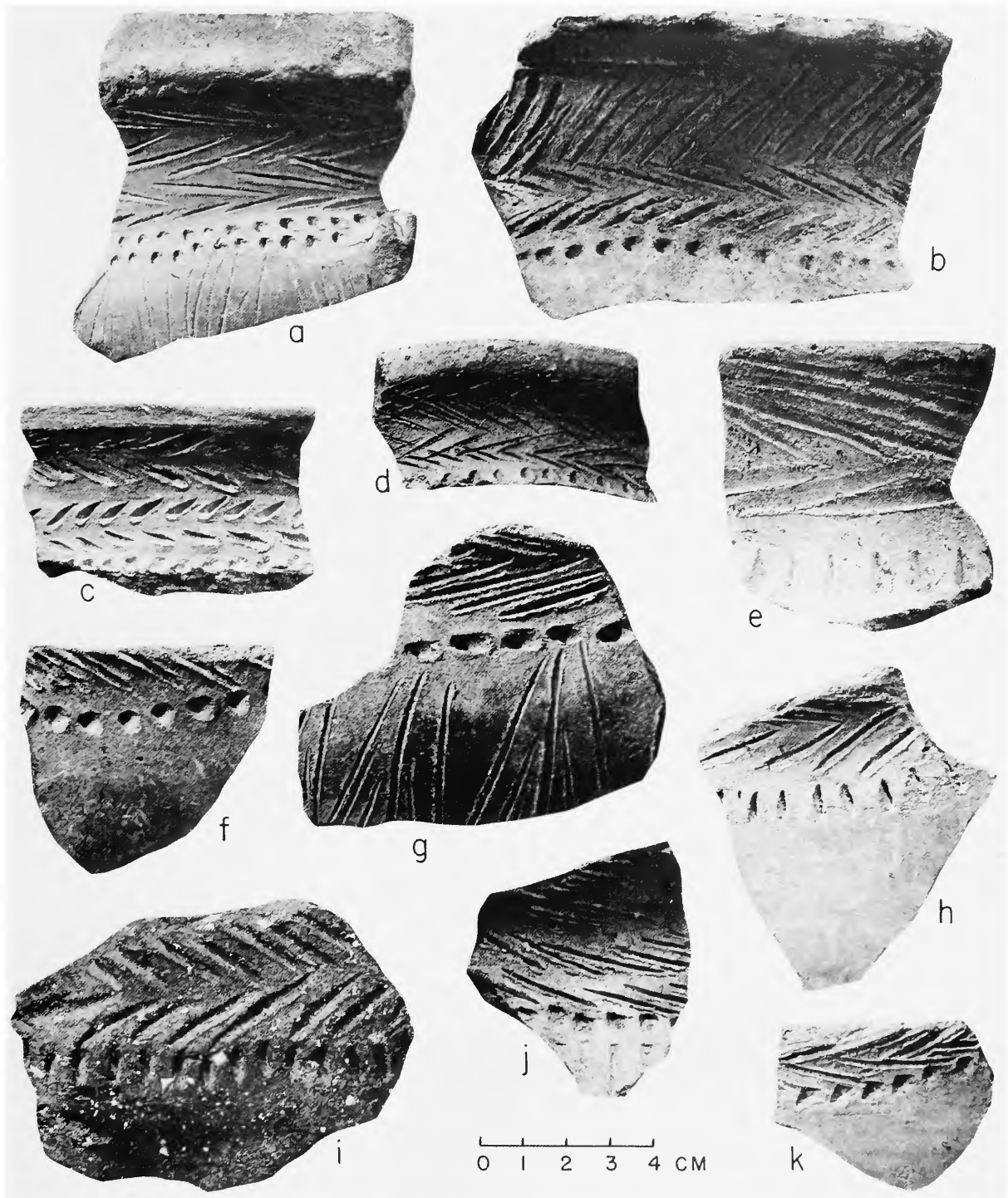

PLATE 71

Type sherds of Valdivia Incised, Motif 1, zigzag with row of punctation at base of neck.

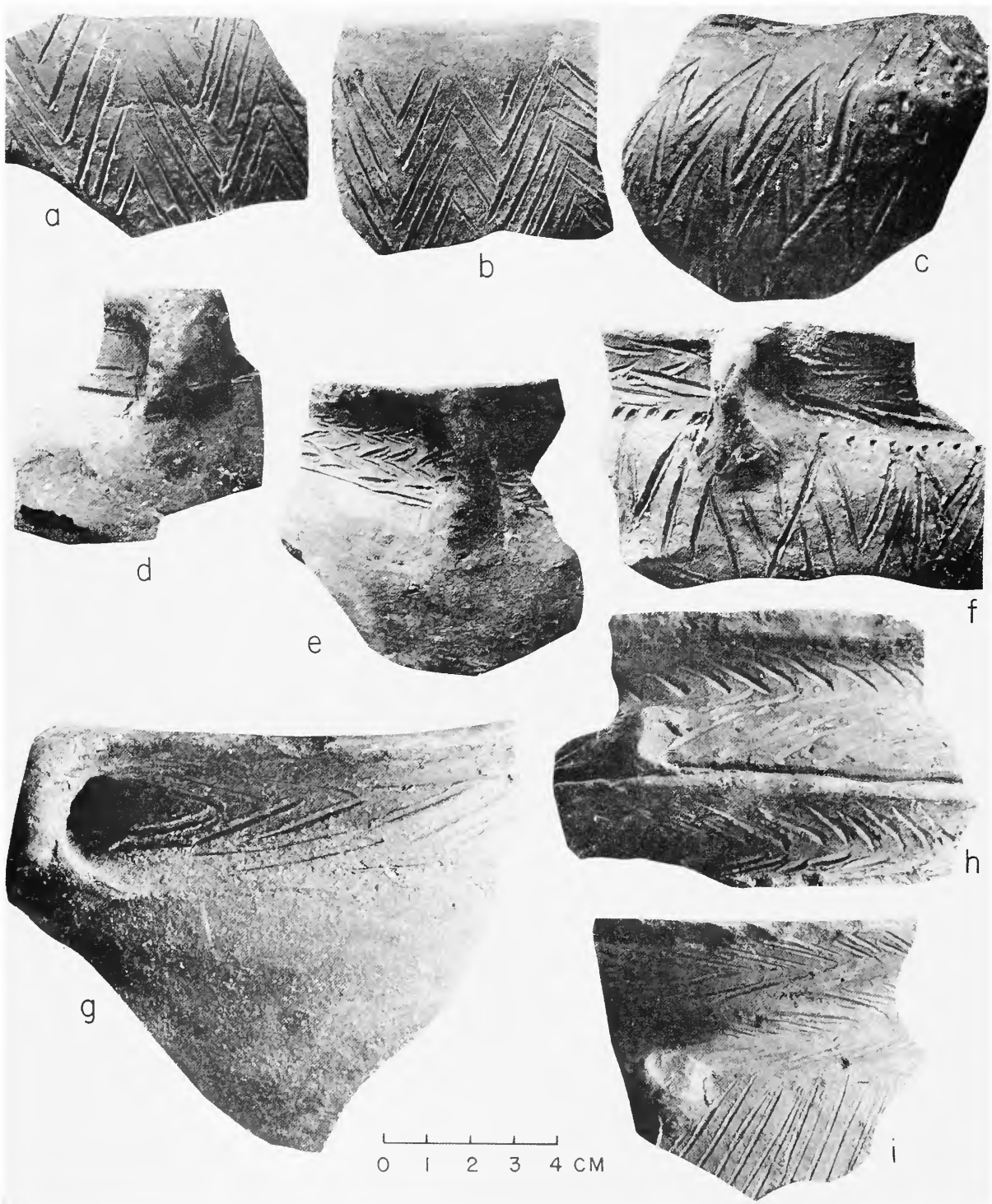

PLATE 72

Type sherds of Valdivia Incised. *a–c*, Motif 1, zigzag, vertical variants. *d–g*, Rare vessel Form 2 with small vertical handle. *h*, Rare vessel Form 1, superimposed jars.

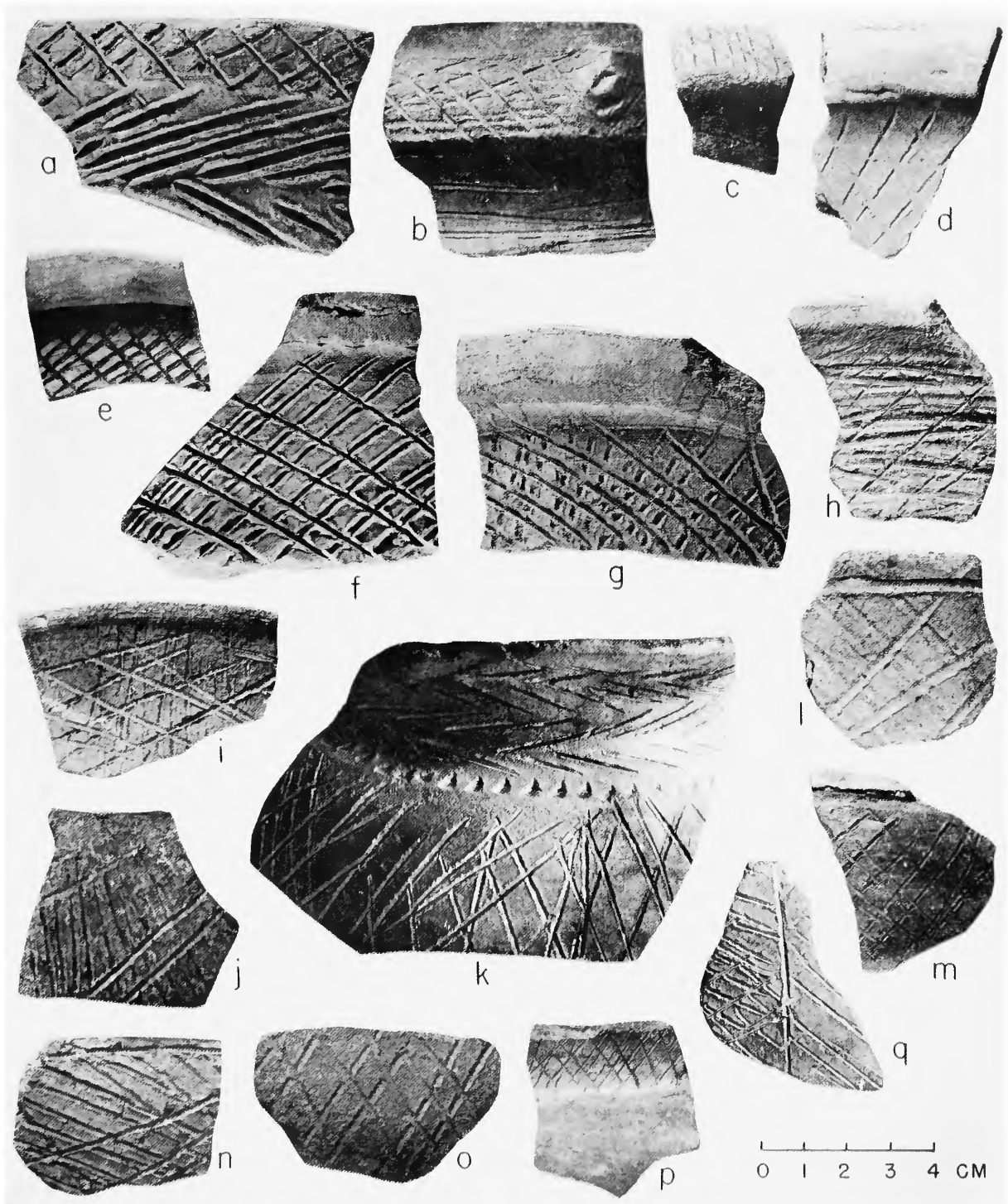

PLATE 73

Type sherds of Valdivia Incised, Motif 2, crosshatch.

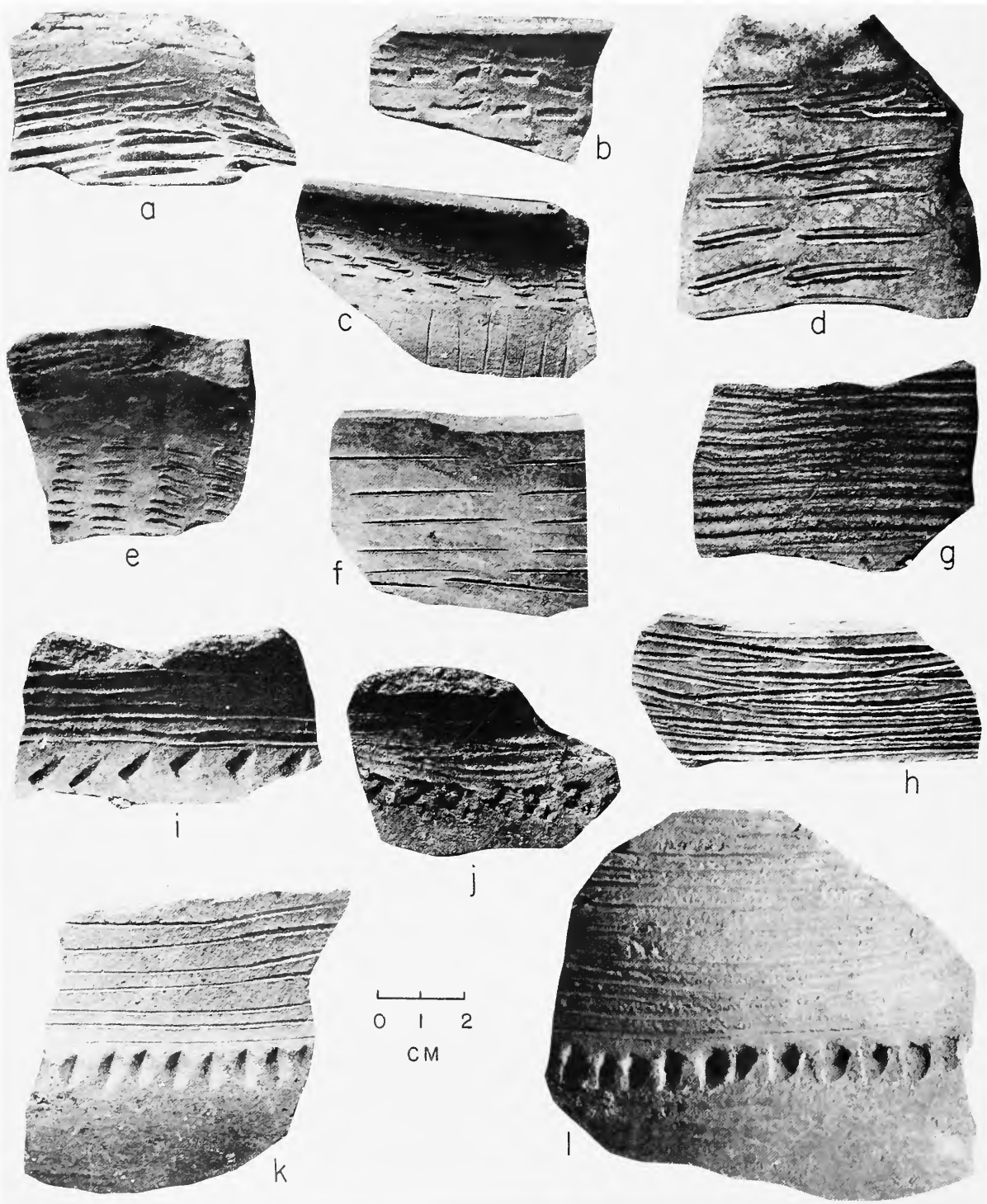

PLATE 74

Type sherds of Valdivia Incised, Motif 3, horizontal parallel lines.

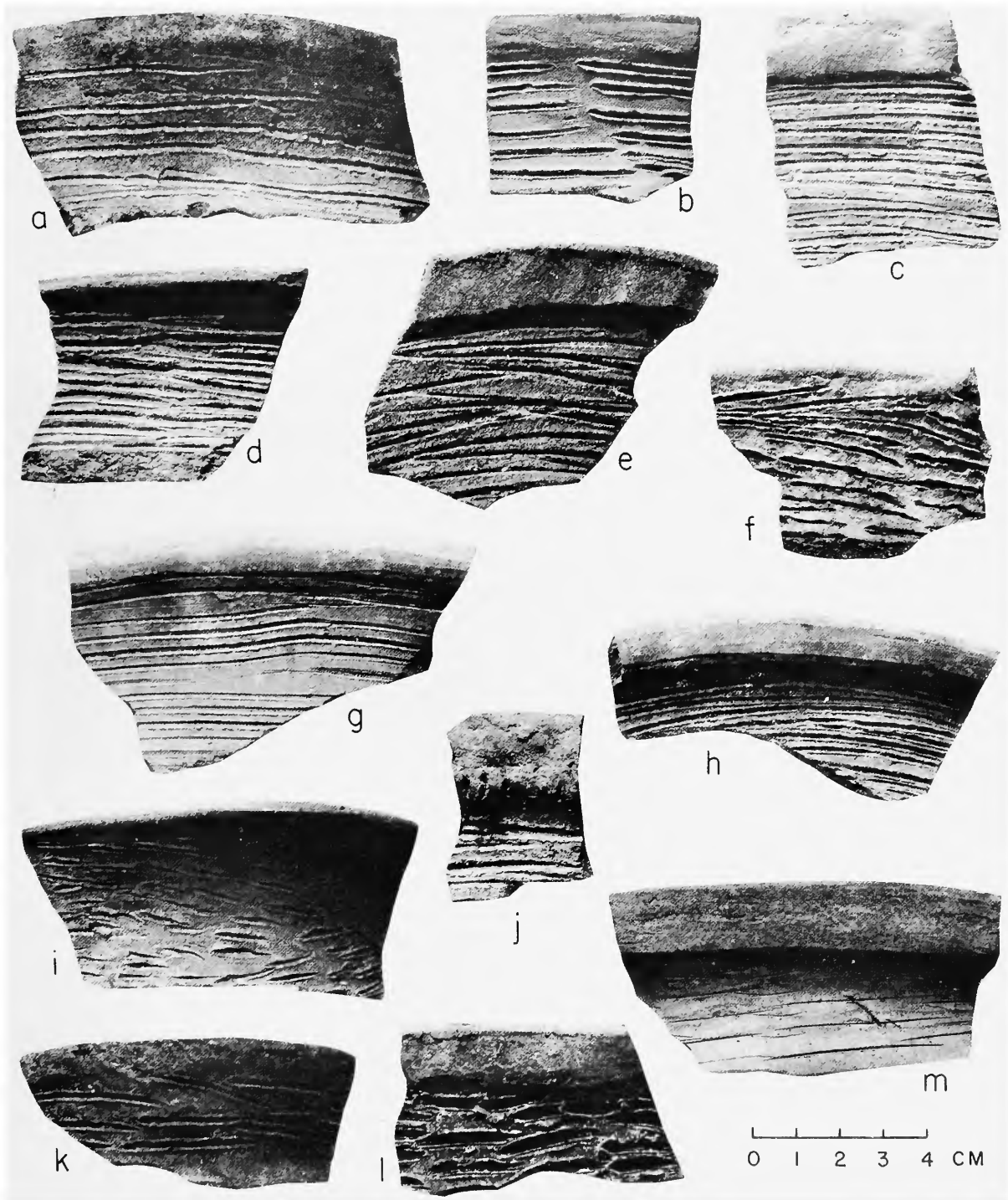

PLATE 75

Type sherds of Valdivia Incised, Motif 3, horizontal parallel lines.

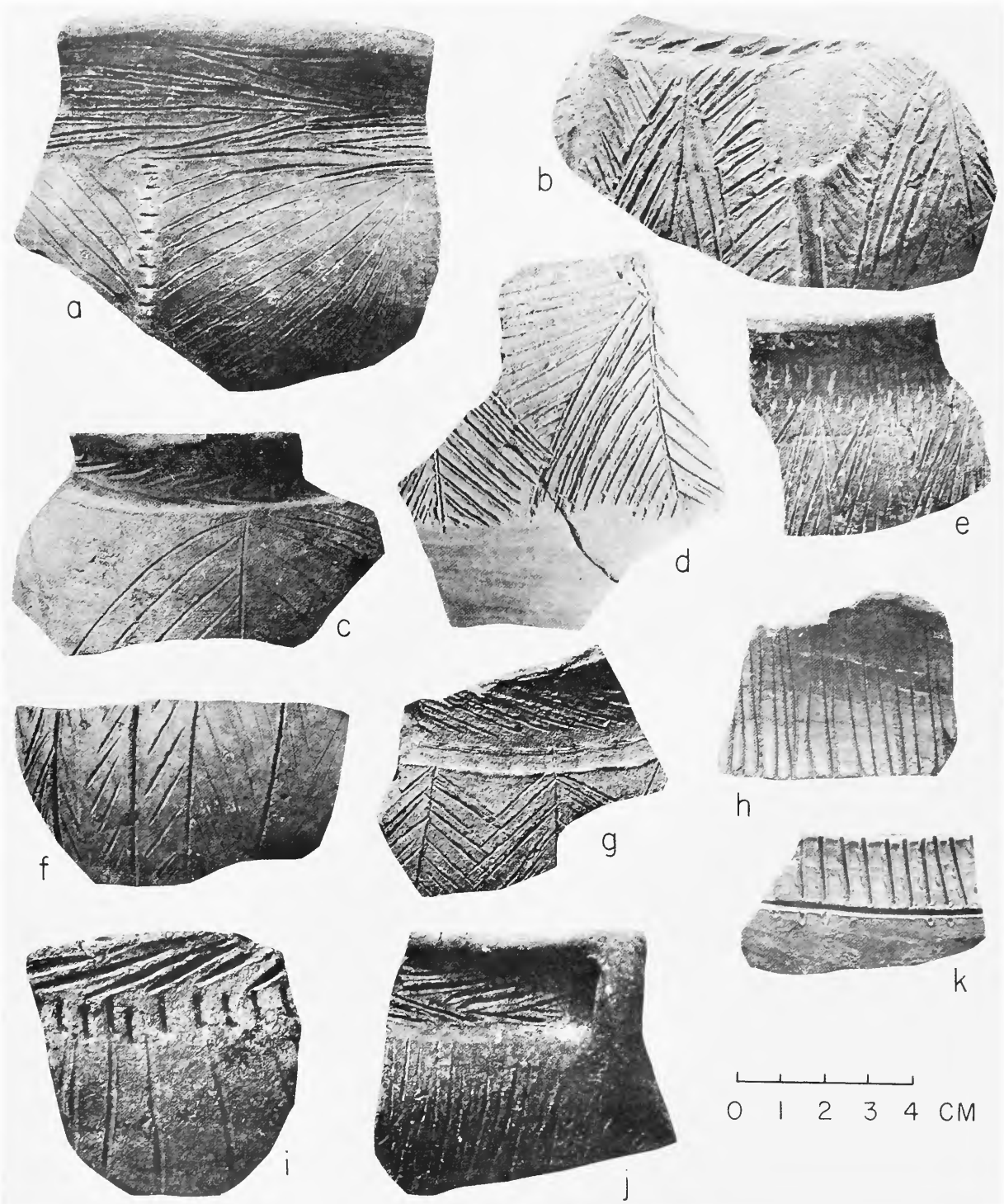

PLATE 76

Type sherds of Valdivia Incised. *a–g*, Motif 4, branched lines. *h–k*, Motif 5, vertical parallel lines.

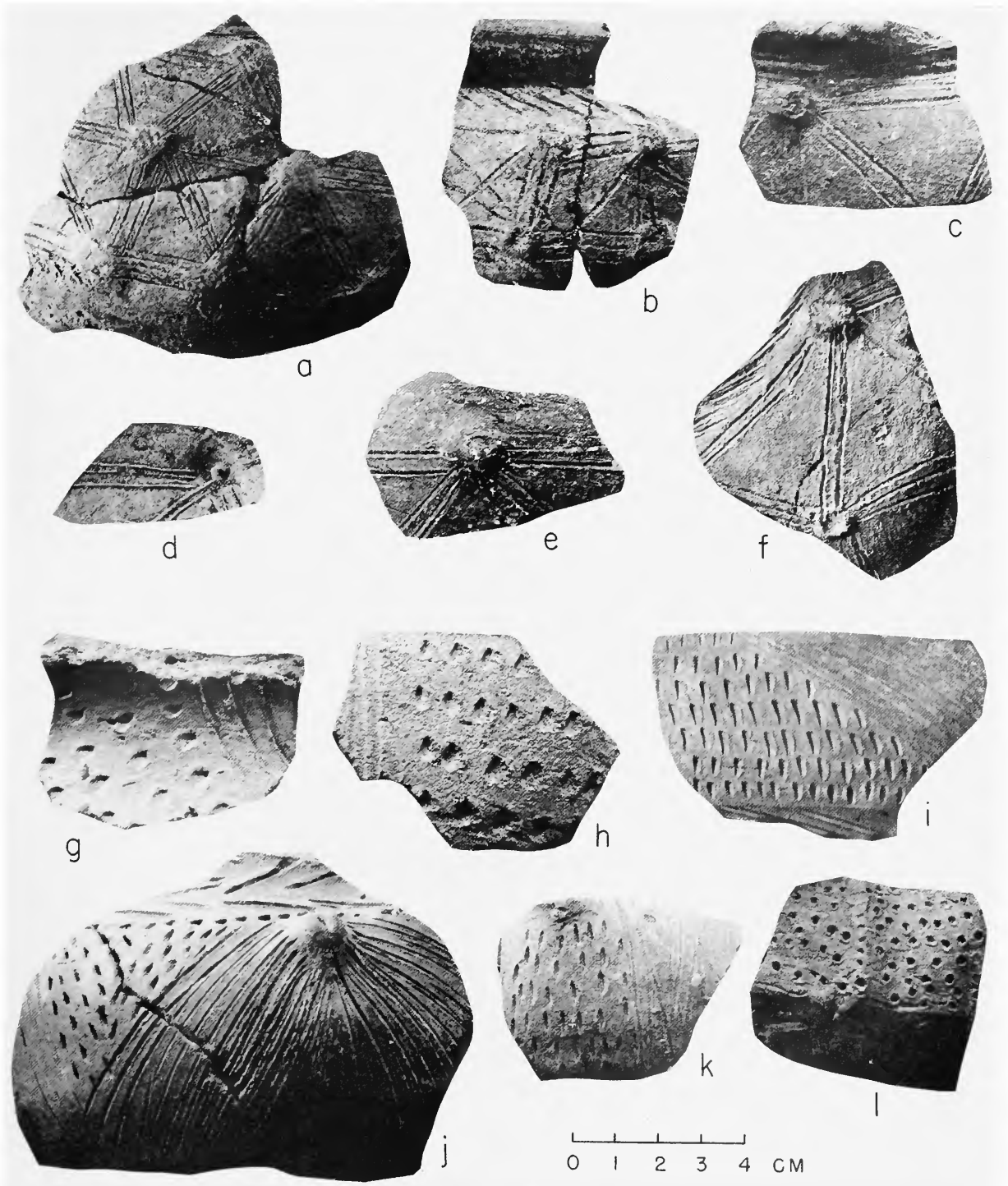

PLATE 77

Type sherds of Valdivia Incised. *a–f*, Motif 6, network. *g–l*, Motif 7, zoned punctate.

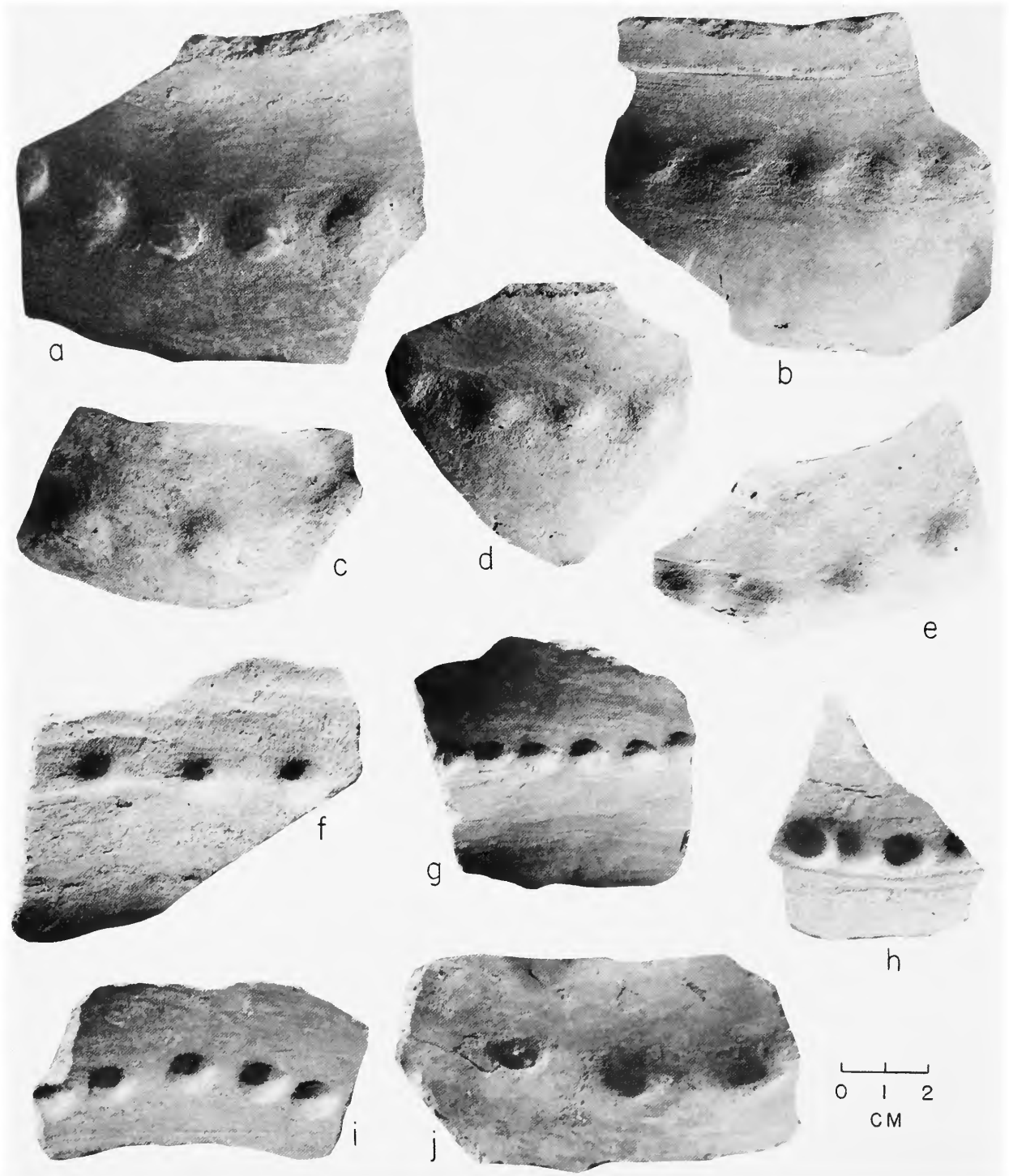

PLATE 78

Type sherds of Valdivia Modeled. *a–e*, Exterior. *f–j*, Interior.

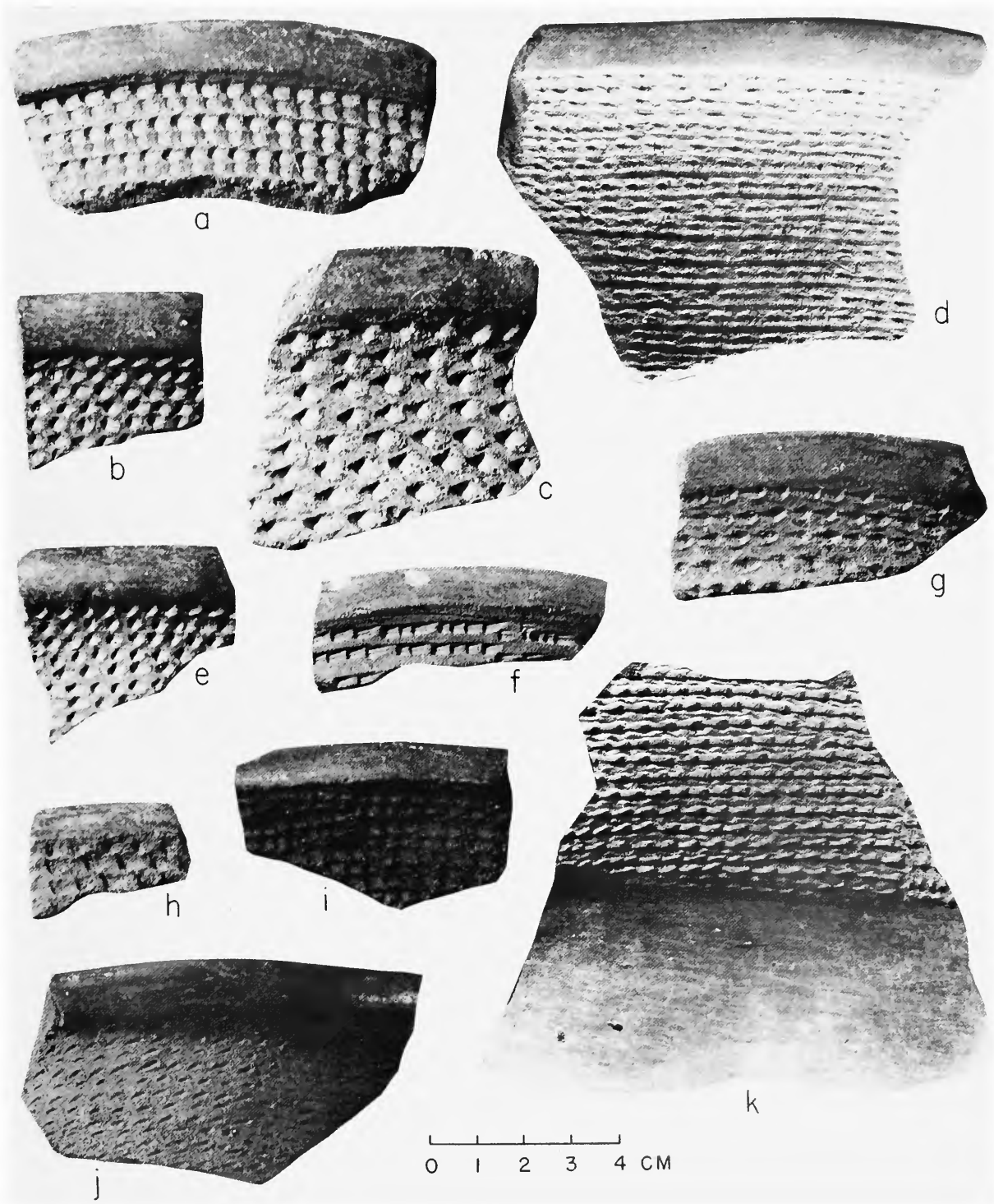

PLATE 79

Type sherds of Valdivia Multiple Drag-and-Jab Punctate.

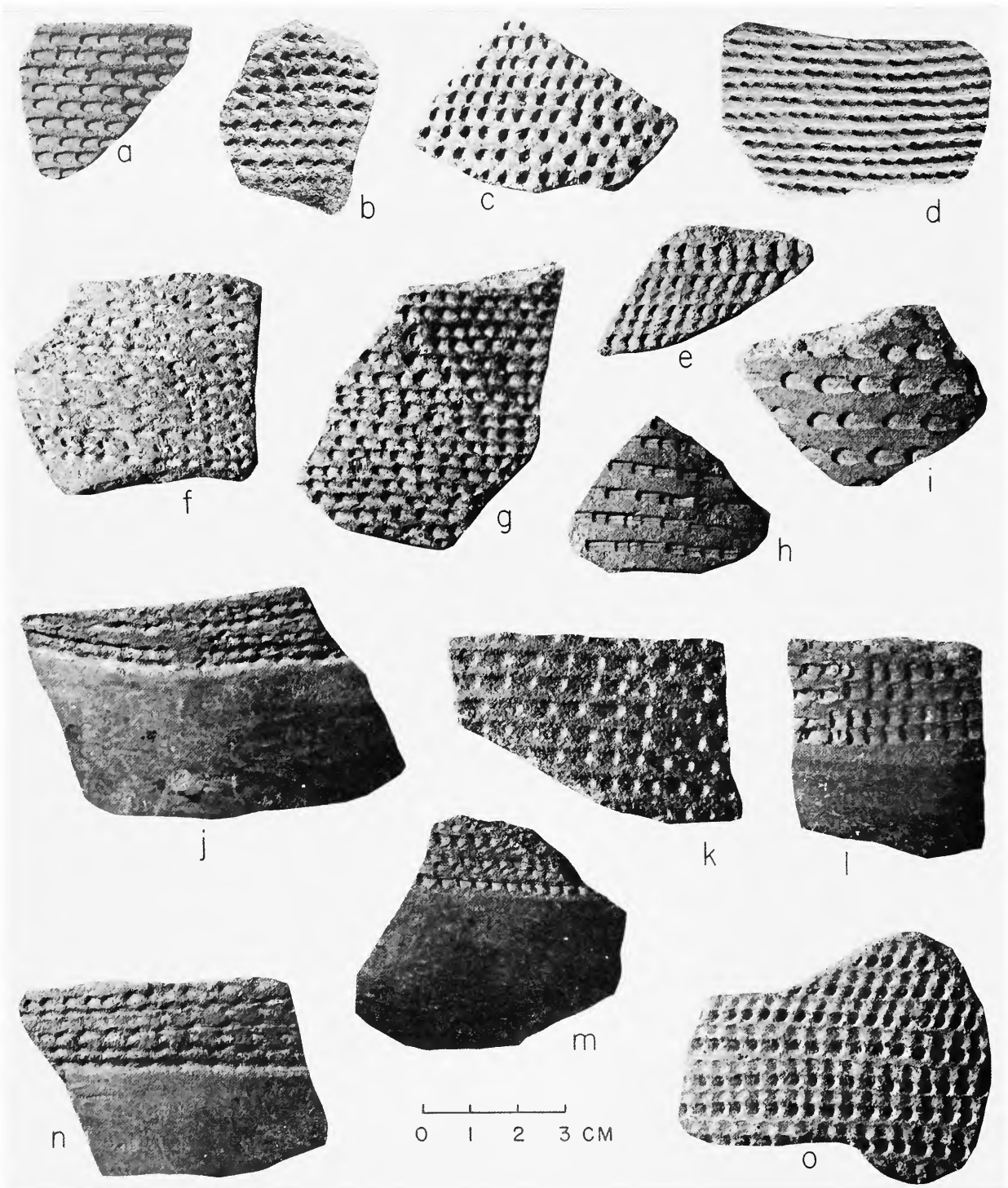

PLATE 80

Type sherds of Valdivia Multiple Drag-and-Jab Punctate.

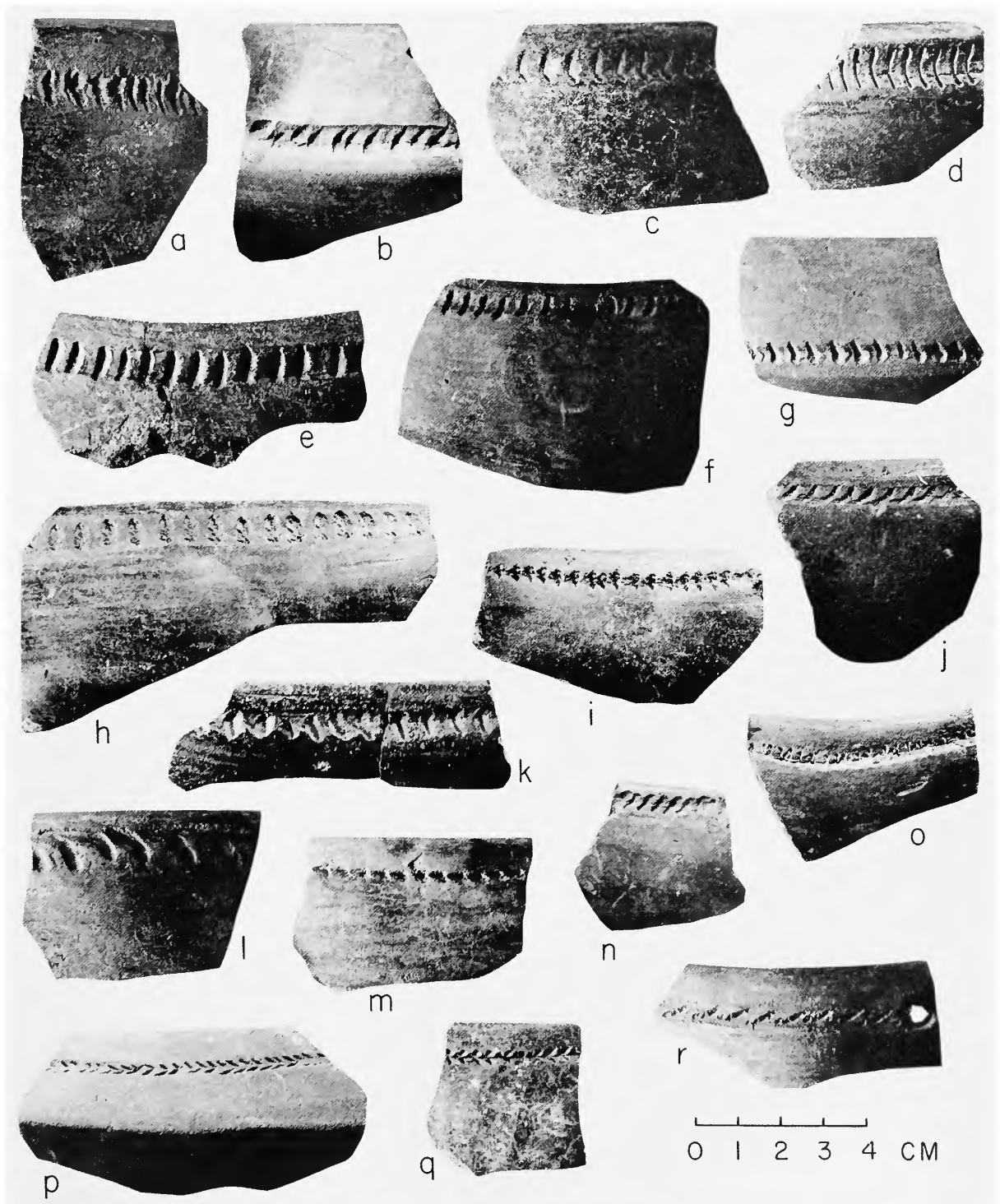

PLATE 81

Type sherds of Valdivia Nicked Broad-line Incised, single line on exterior adjacent to rim or carination.

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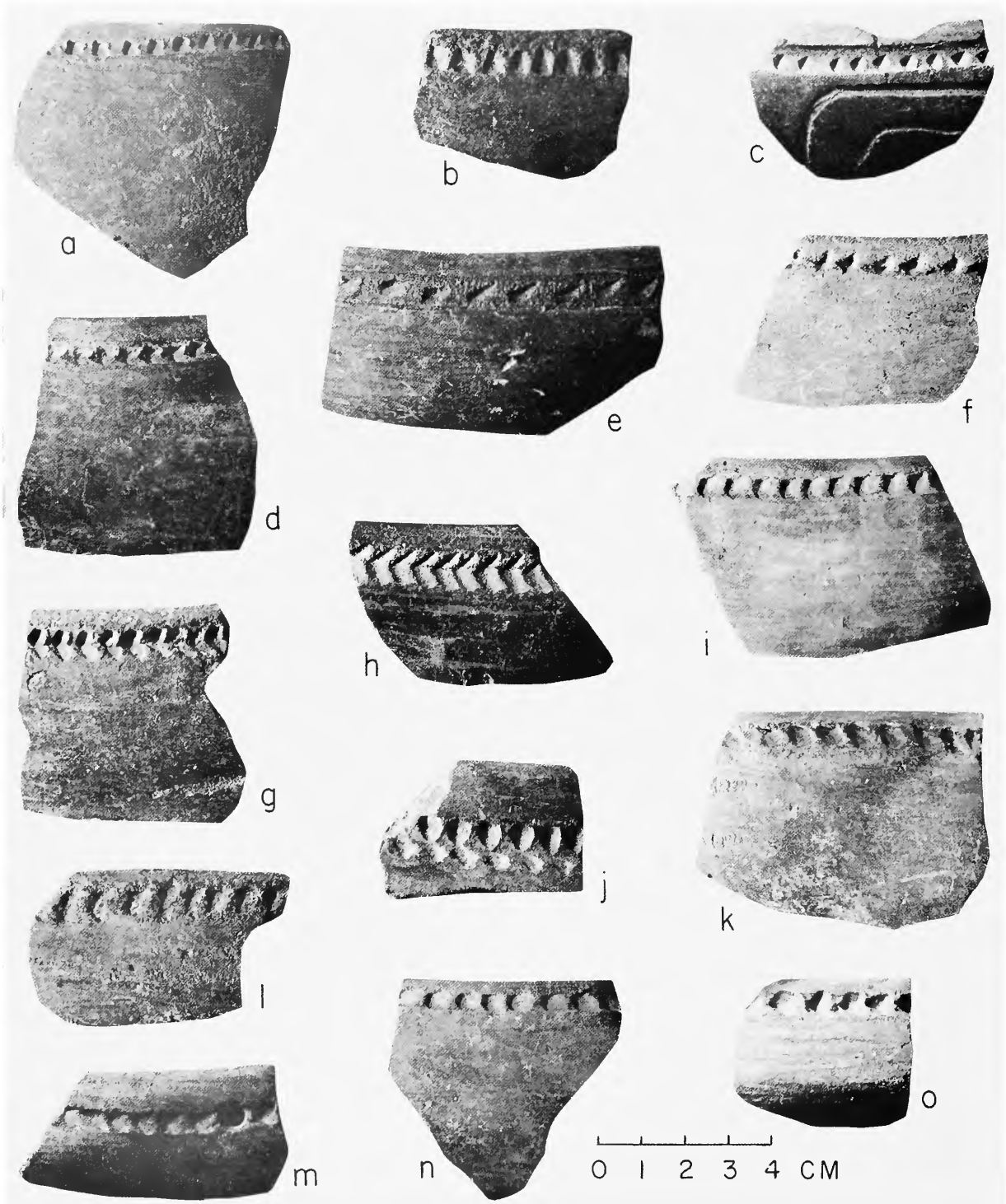

PLATE 82

Type sherds of Valdivia Nicked Broad-line Incised, single line on exterior adjacent to rim.

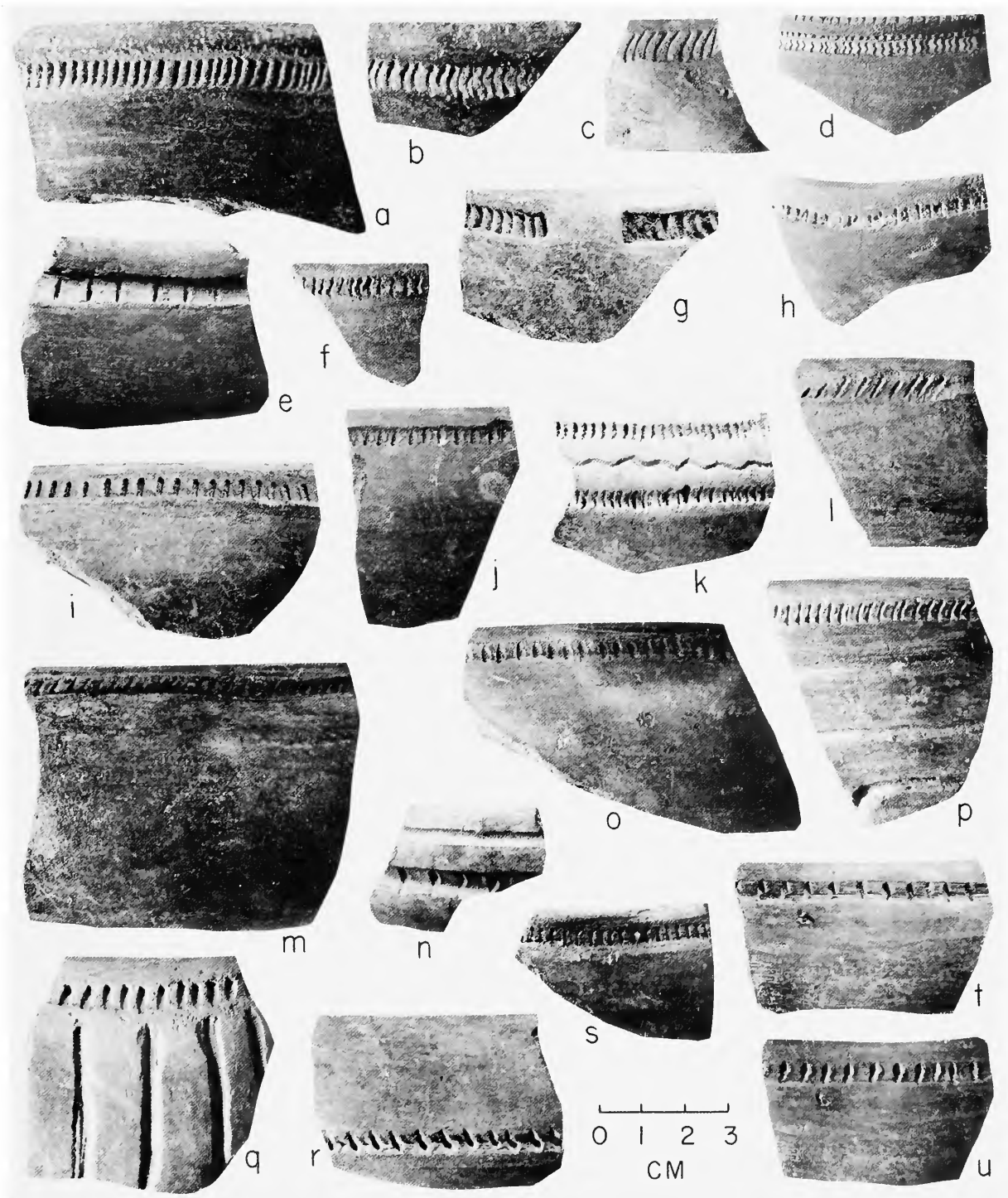

PLATE 83

Type sherds of Valdivia Nicked Broad-line Incised, *a–j*, *l–m*, *o*, *r–u*, Single line adjacent to rim or shoulder. *k*, *n*, *p–q*, Associated with broad-line incision.

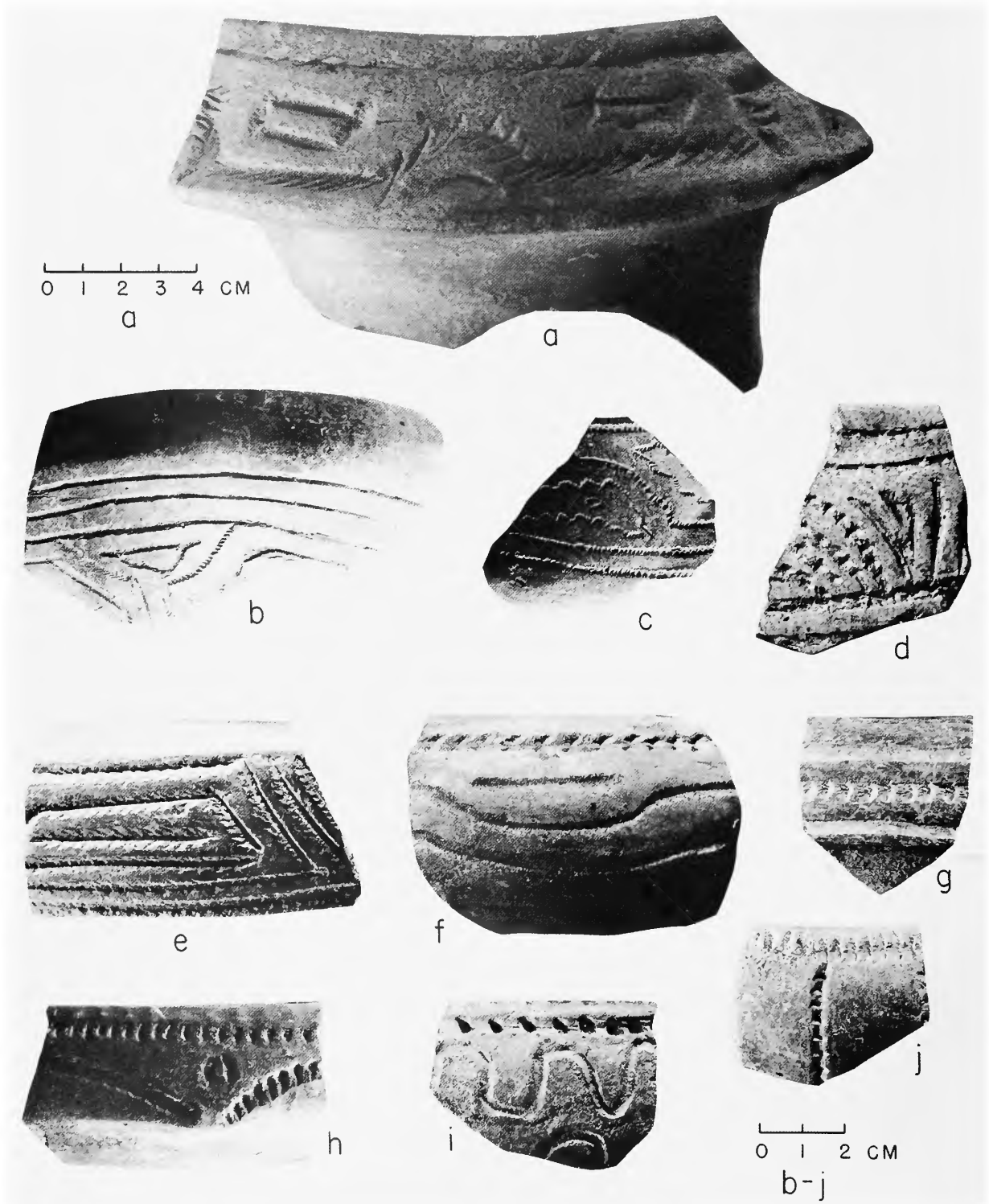

PLATE 84

Type sherds of Valdivia Nicked Broad-line Incised. *a–b, d,* Integration of plain and nicked incisions to form the design. *c, e, h, j,* Multiple nicked incisions. *f–g, i,* Single nicked incision in broad-line incised design.

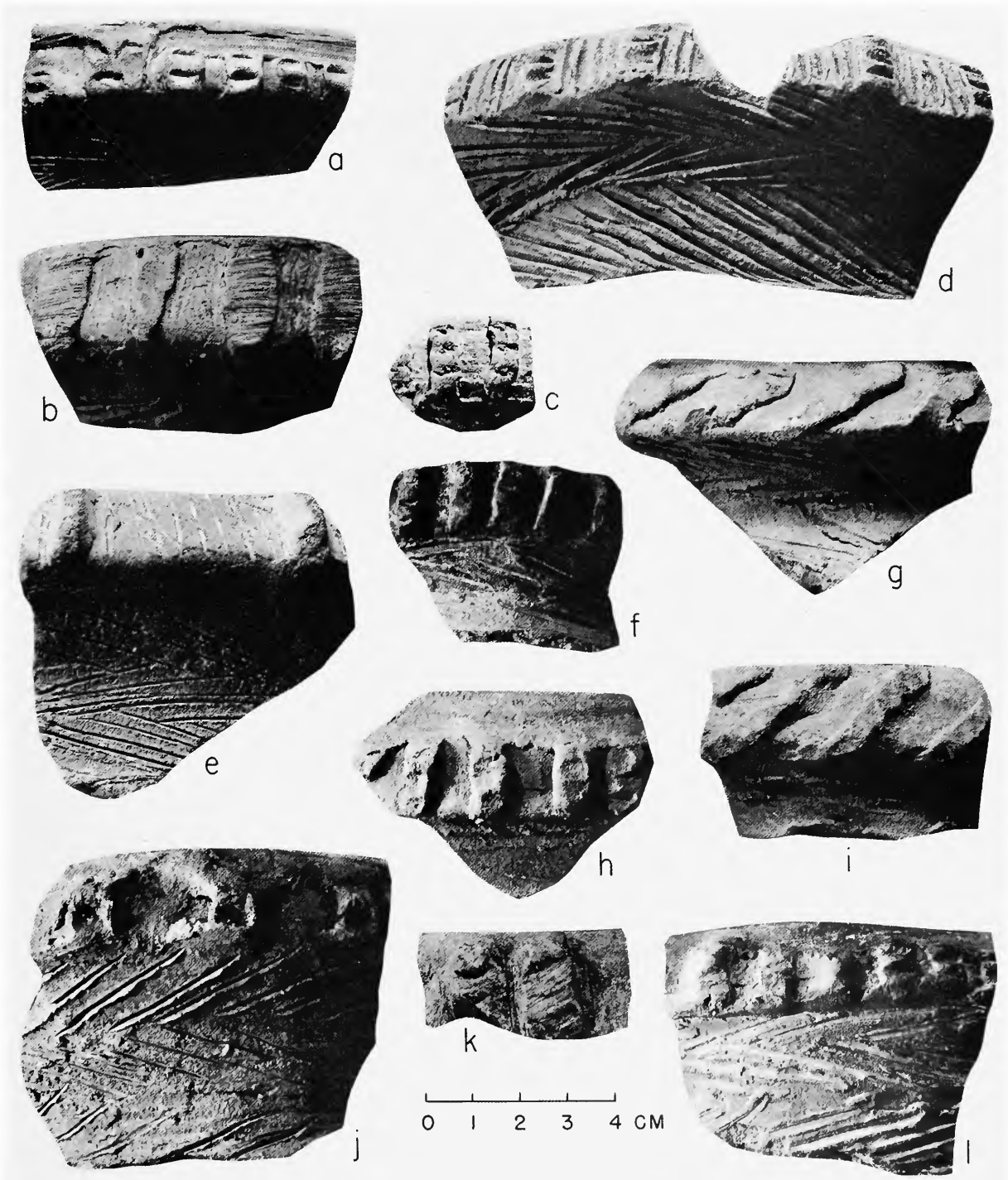

PLATE 85

Type sherds of Valdivia Nicked Rib or Nubbin, rims of Form 1.

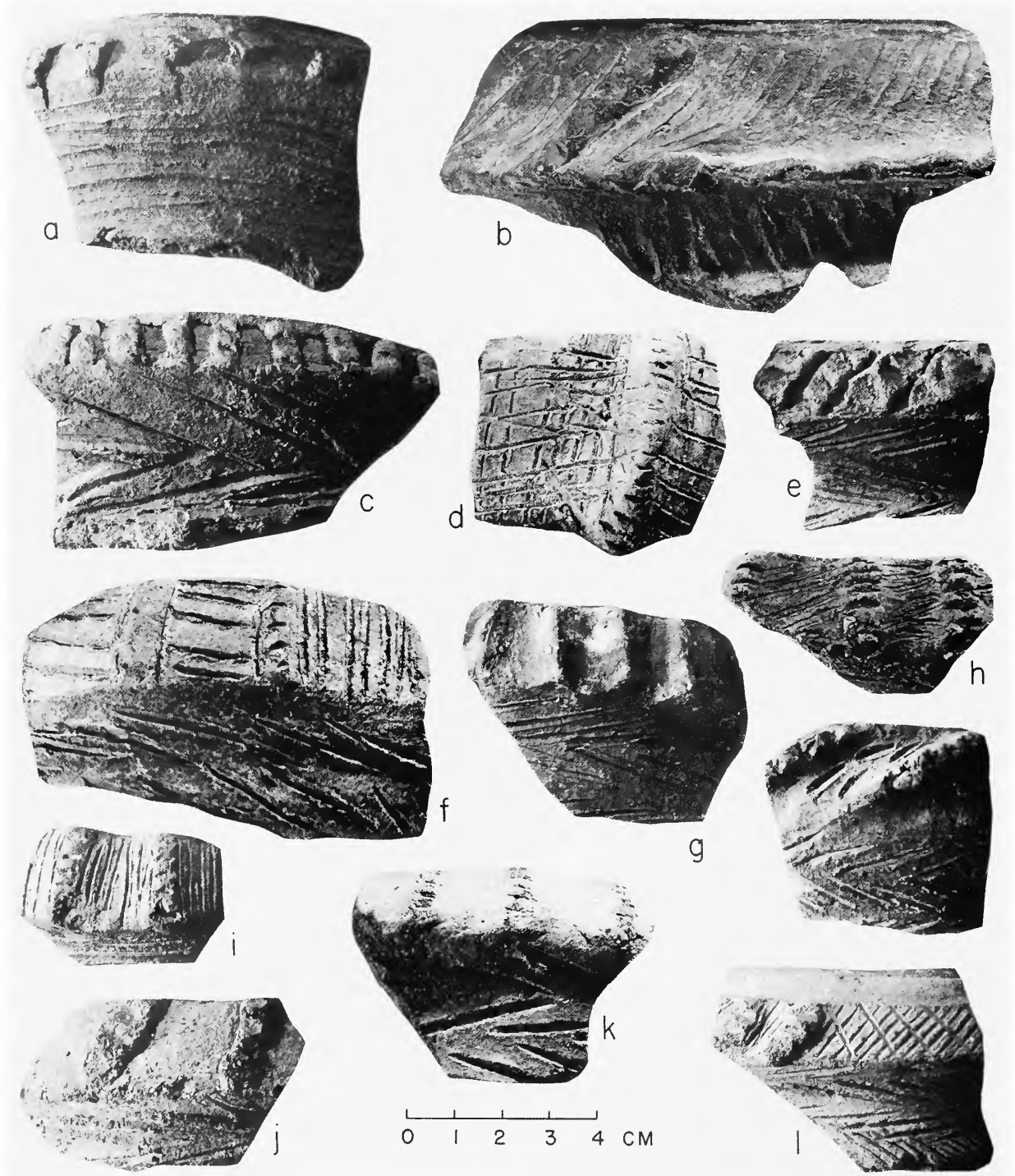

PLATE 86

Type sherds of Valdivia Nicked Rib or Nubbin, rims of Form 1.

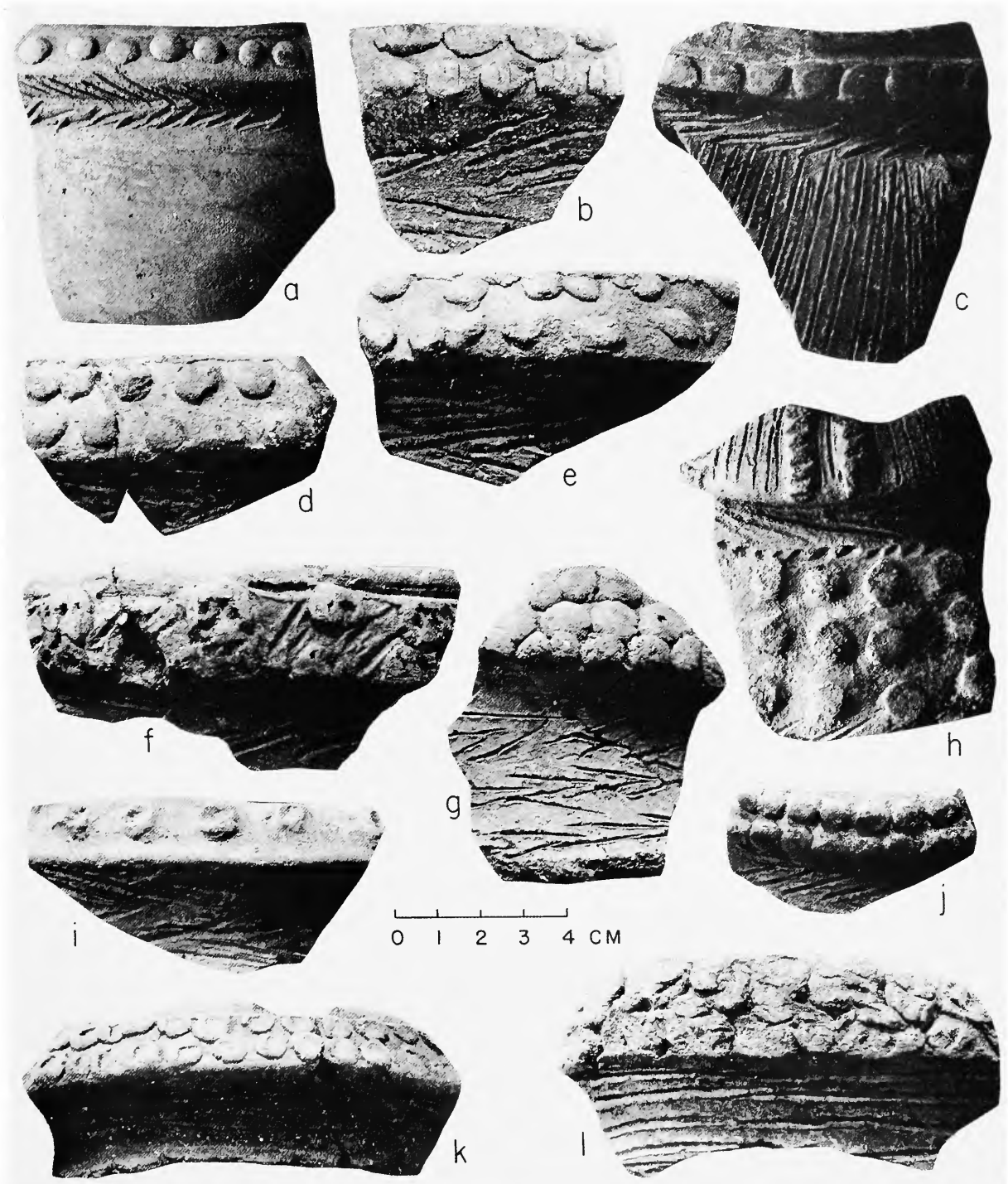

PLATE 87

Type sherds of Valdivia Nicked Rib or Nubbin, rims with nubbins. *a–c*, Form 2. *d–l*, Form 1.

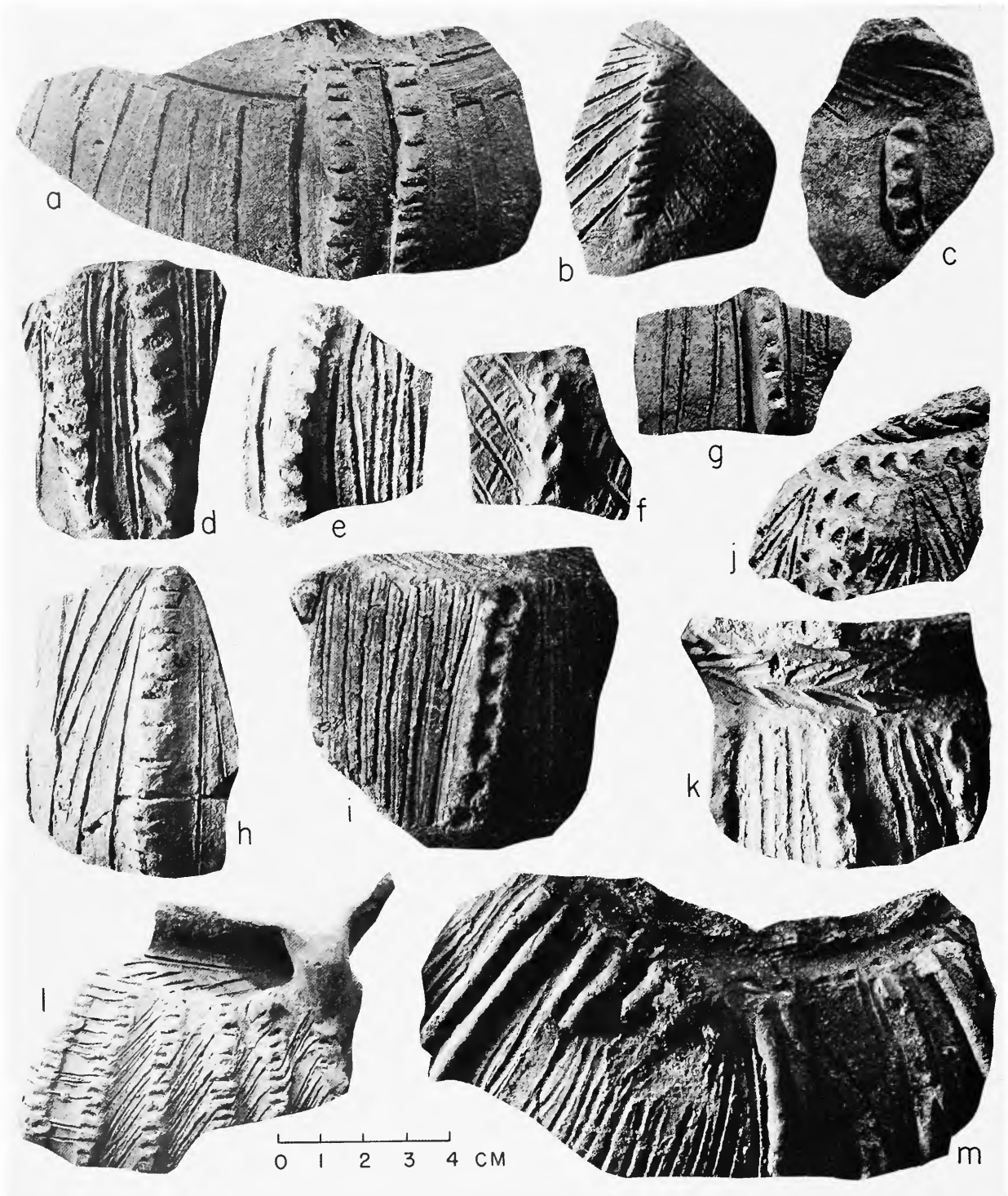

PLATE 88

Type sherds of Valdivia Nicked Rib or Nubbin, body sherds with vertical ribs.

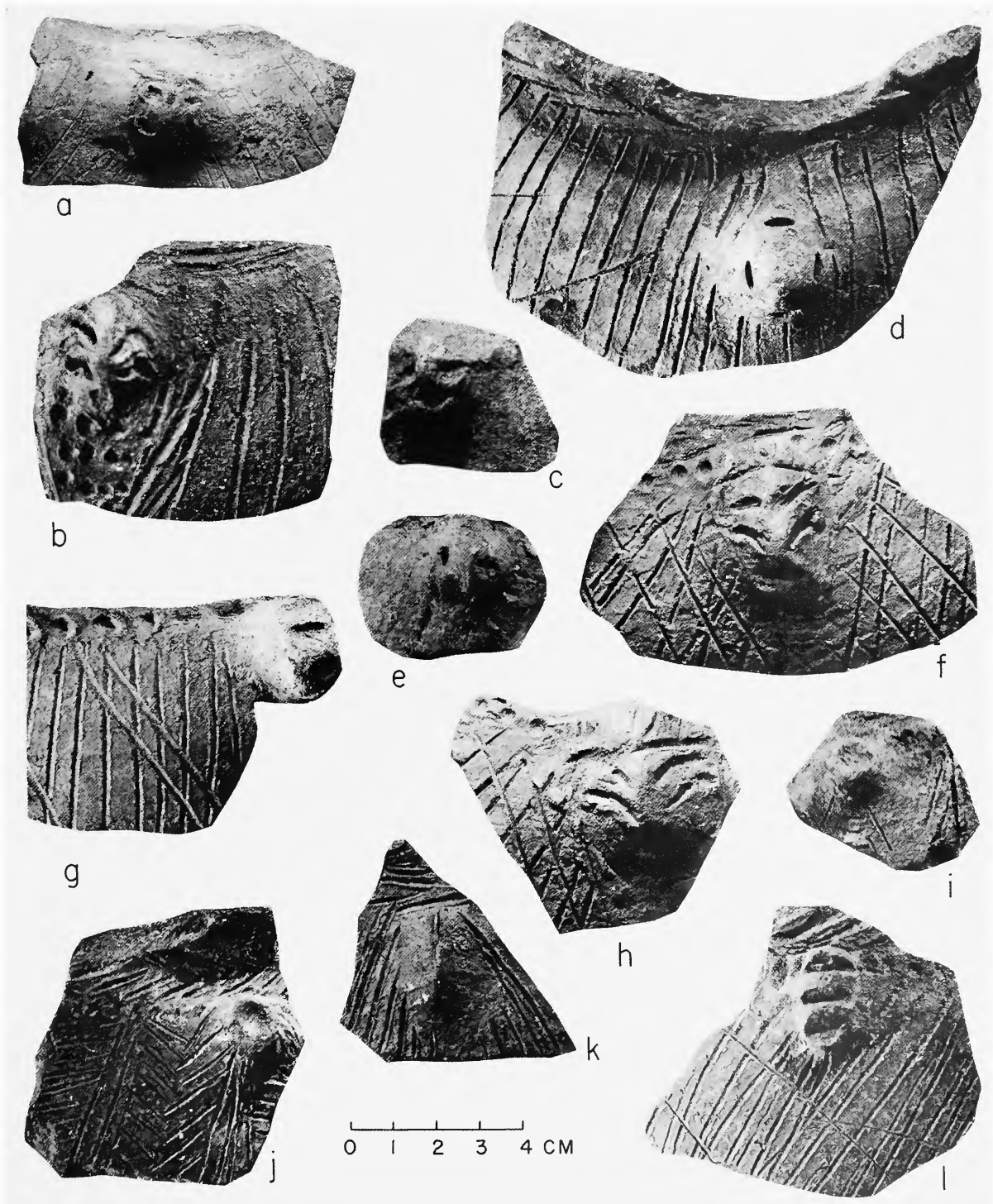

PLATE 89

Type sherds of Valdivia Nicked Rib or Nubbin, shoulder of Form 1 with nubbins.

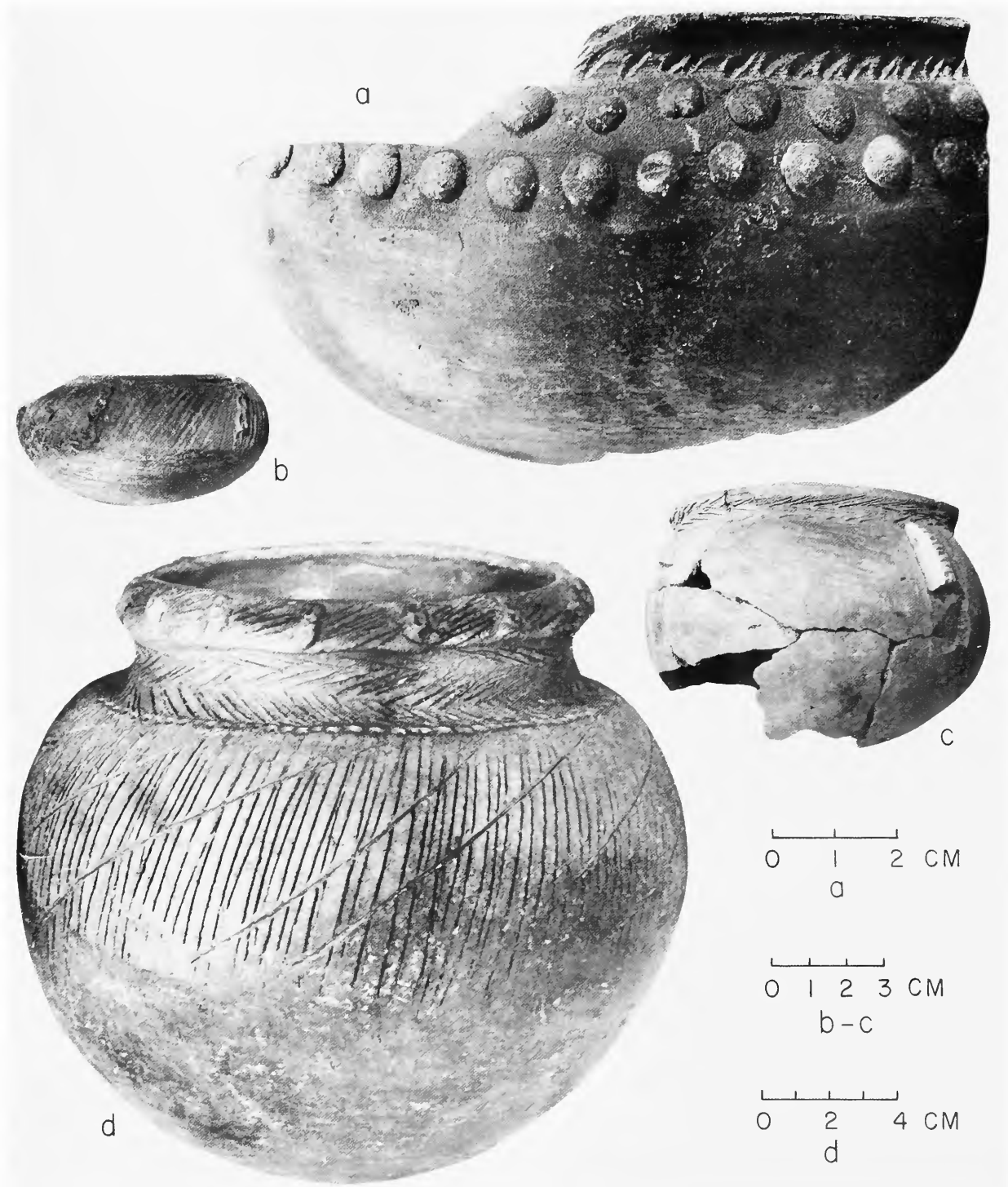

PLATE 90

Complete vessels of Valdivia Nicked Rib or Nubbin. *a*, Rare Form 1, with nubbins above shoulder. *b*, Rare Form 2, with ribs above shoulder. *c*, Rare Form 1, with ribs above shoulder. *d*, Form 1, with ribs on exterior rim camber.

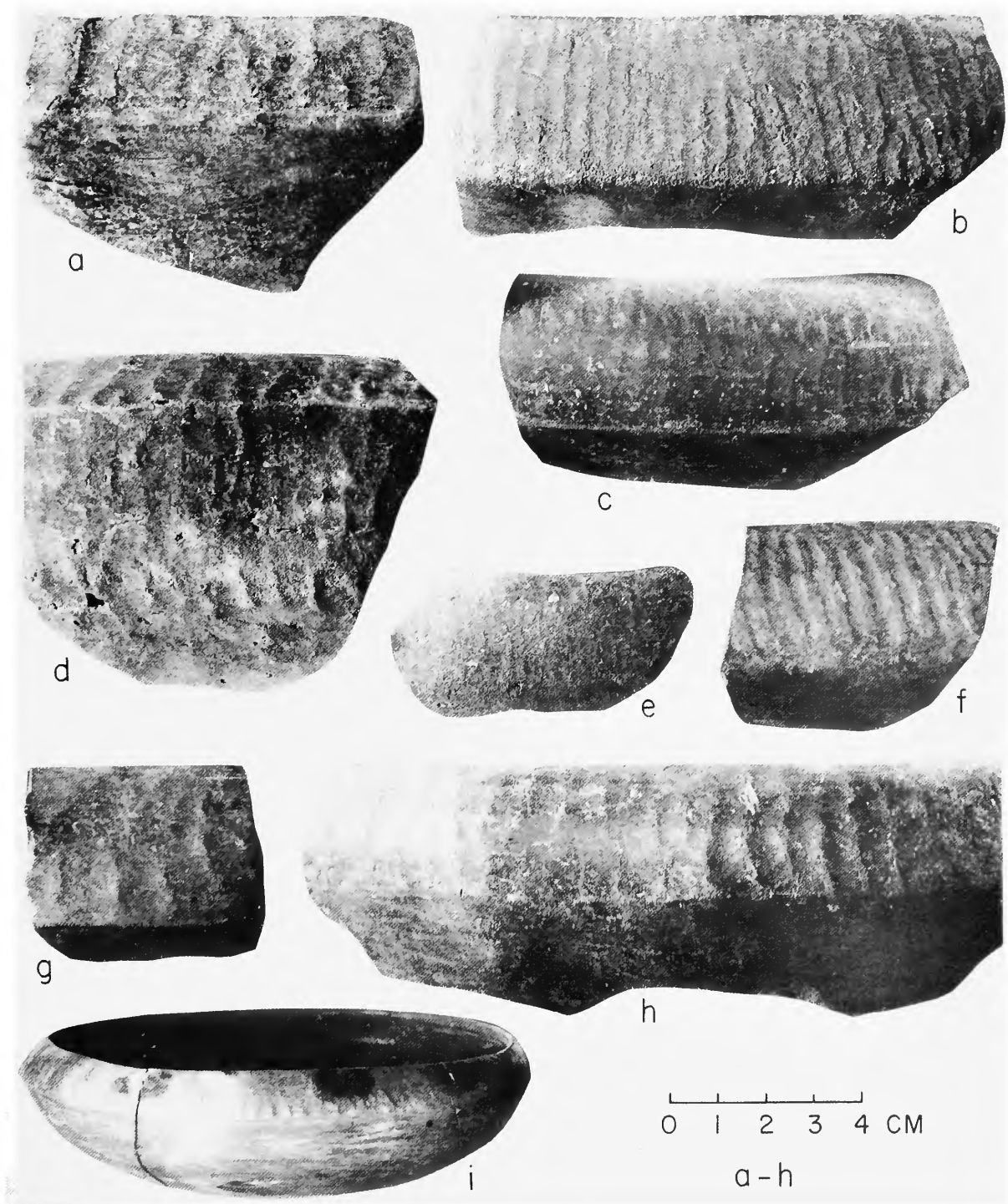

PLATE 91

Type sherds and a complete vessel of Valdivia Pebble Polished, Variant A. *a–h*, Rims of Form 5–7. *i*, Complete bowl.

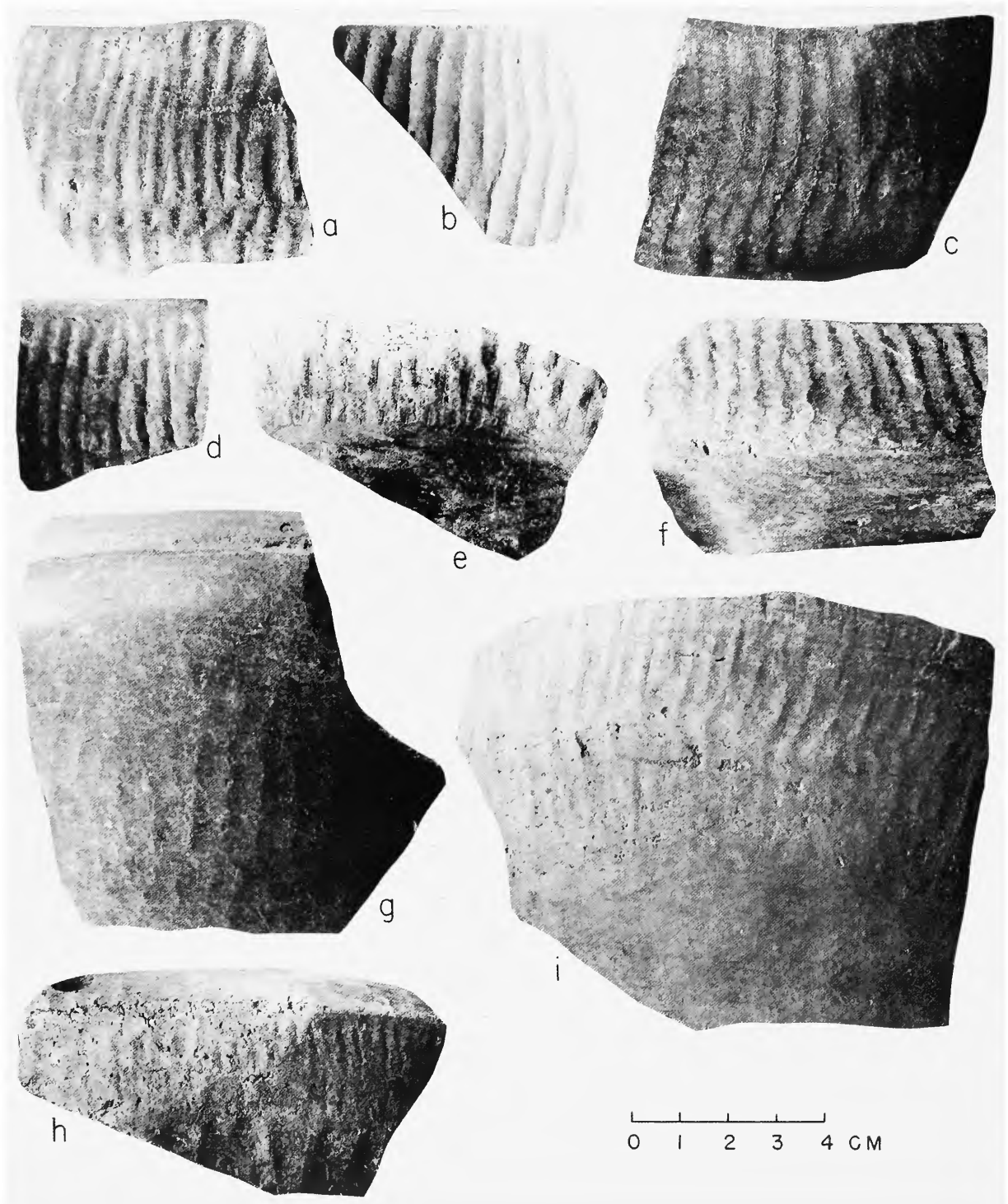

PLATE 92

Type sherds of Valdivia Pebble Polished, Variant A.

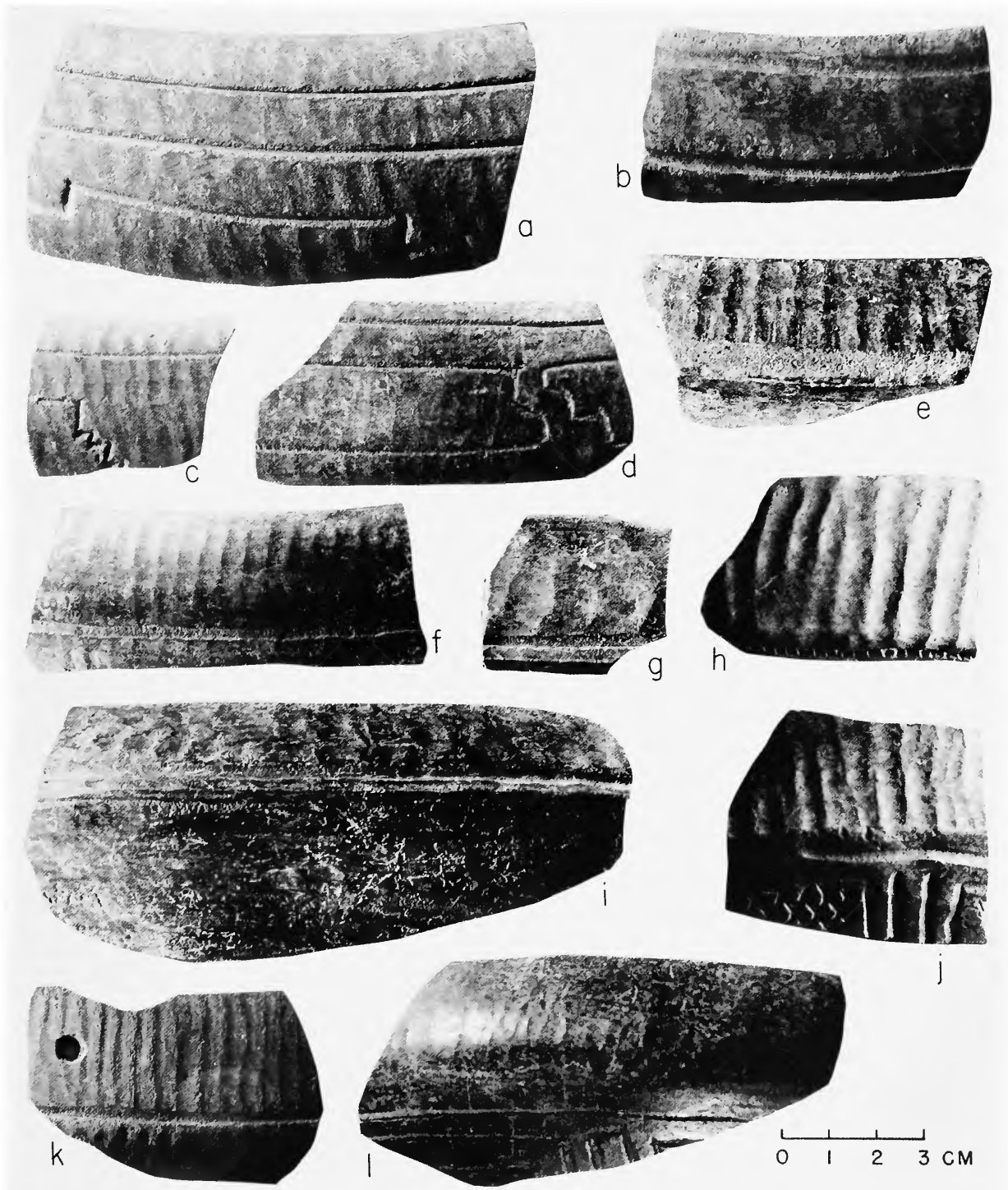

PLATE 93

Type sherds of Valdivia Pebble Polished, Variant A, with supplementary decoration by broad-line incision, or nicked broad-line incision.

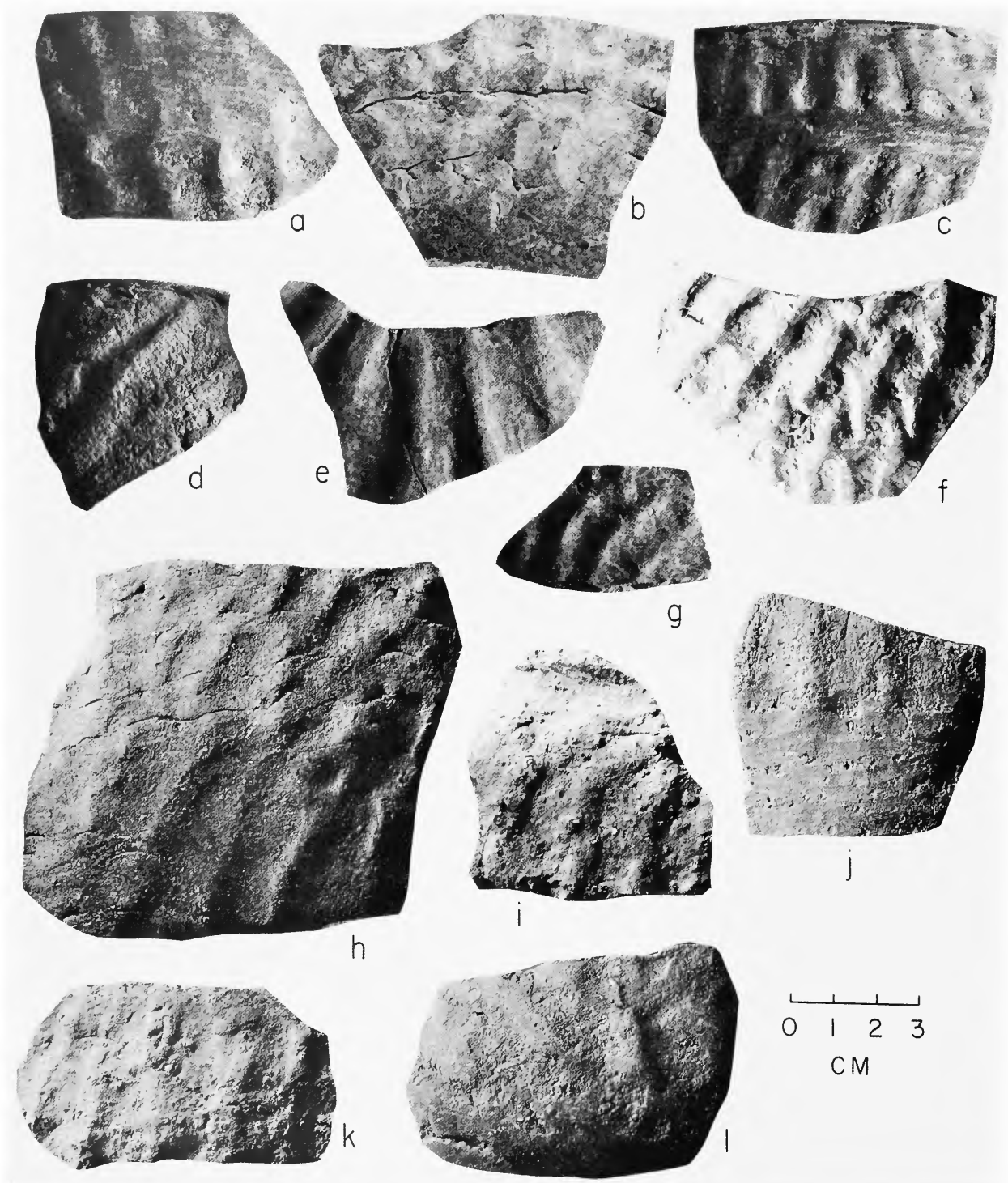

PLATE 94

Type sherds of Valdivia Pebble Polished, Variant B.

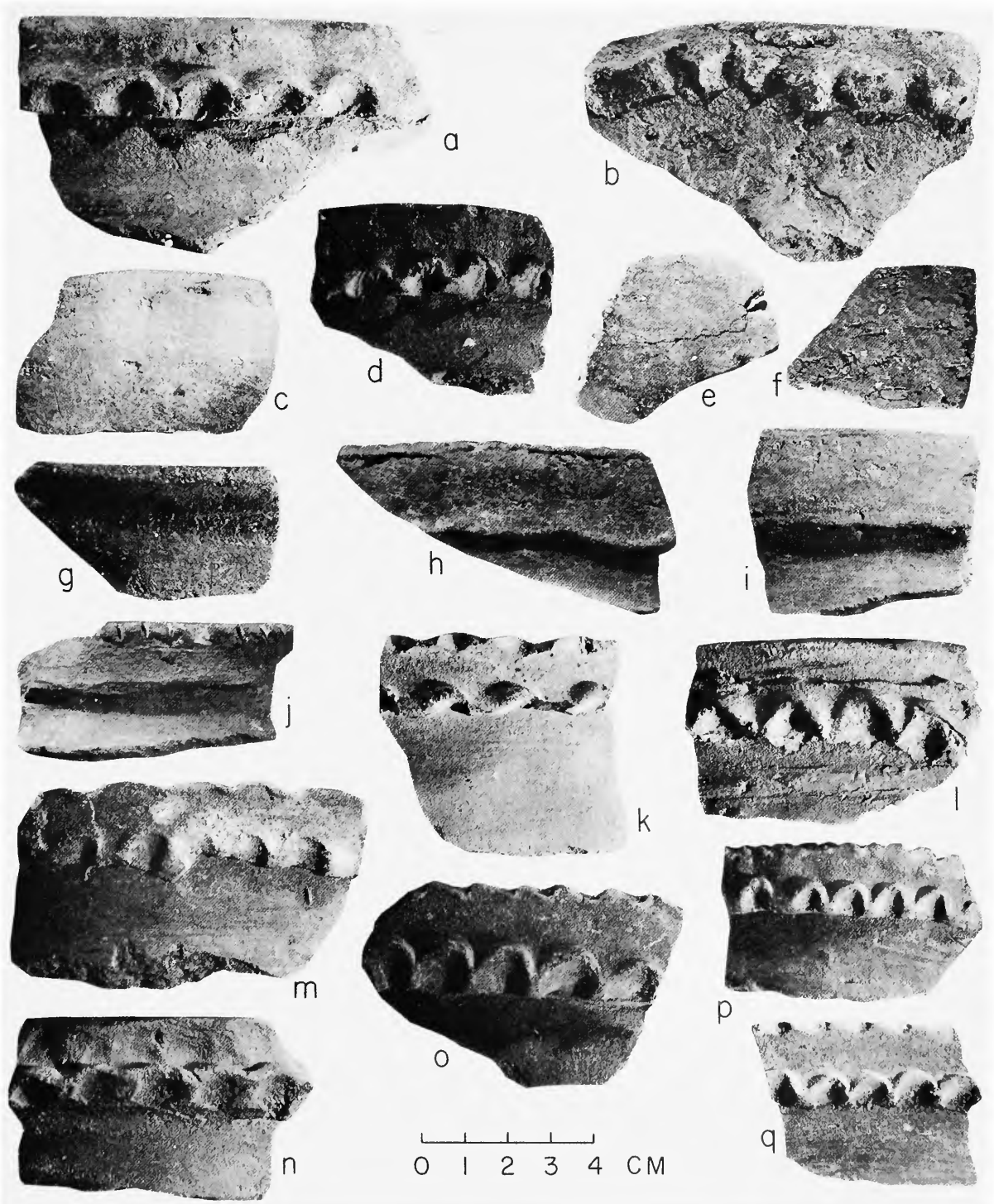

PLATE 95

Type sherds of Valdivia Phase unpolished plain types. *a–g*, San Pablo Plain. *h–q*, Valdivia Plain.

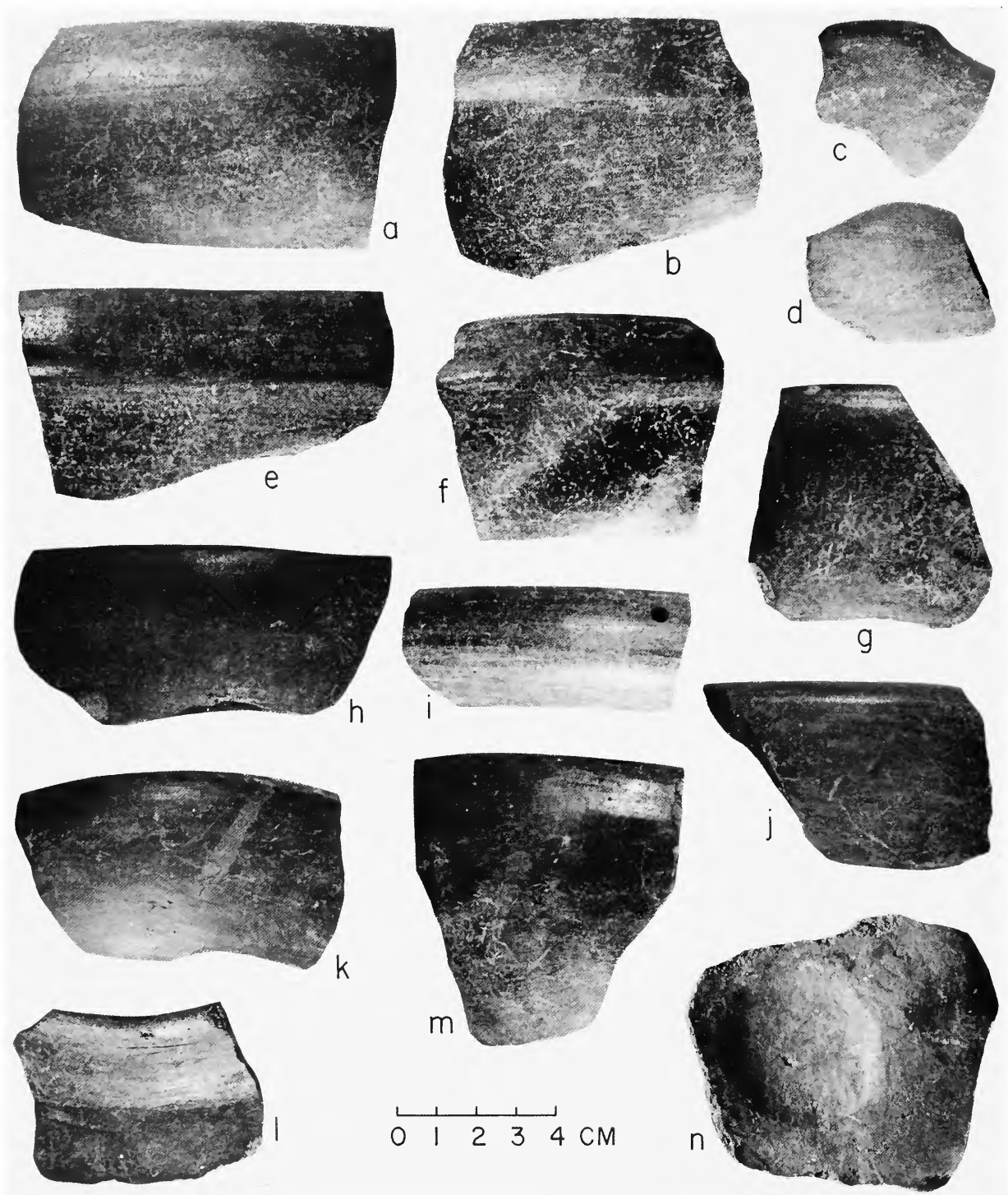

PLATE 96

Type sherds of Valdivia Polished Plain. *a–k*, *m*, Bowl rims. *l*, Jar rim. *n*, Concave base.

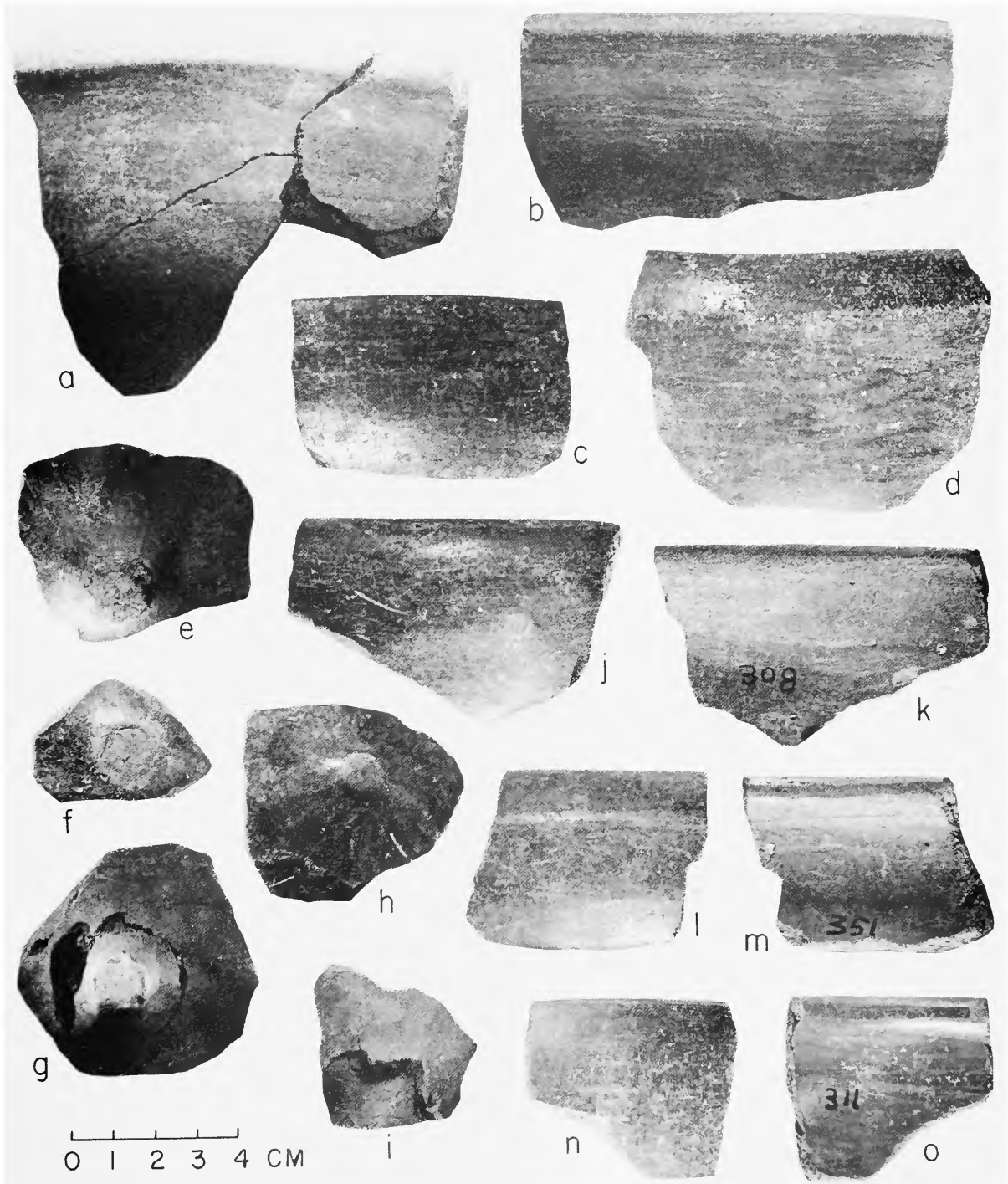

PLATE 97

Type sherds of Valdivia Polished Red. *a–b*, Poorly polished Period A variety. *c–d, j, l, n*, Polished red bowl exteriors. *e–i*, Tetrapod feet. *k, m, o*, polished or striated polished bowl interiors.

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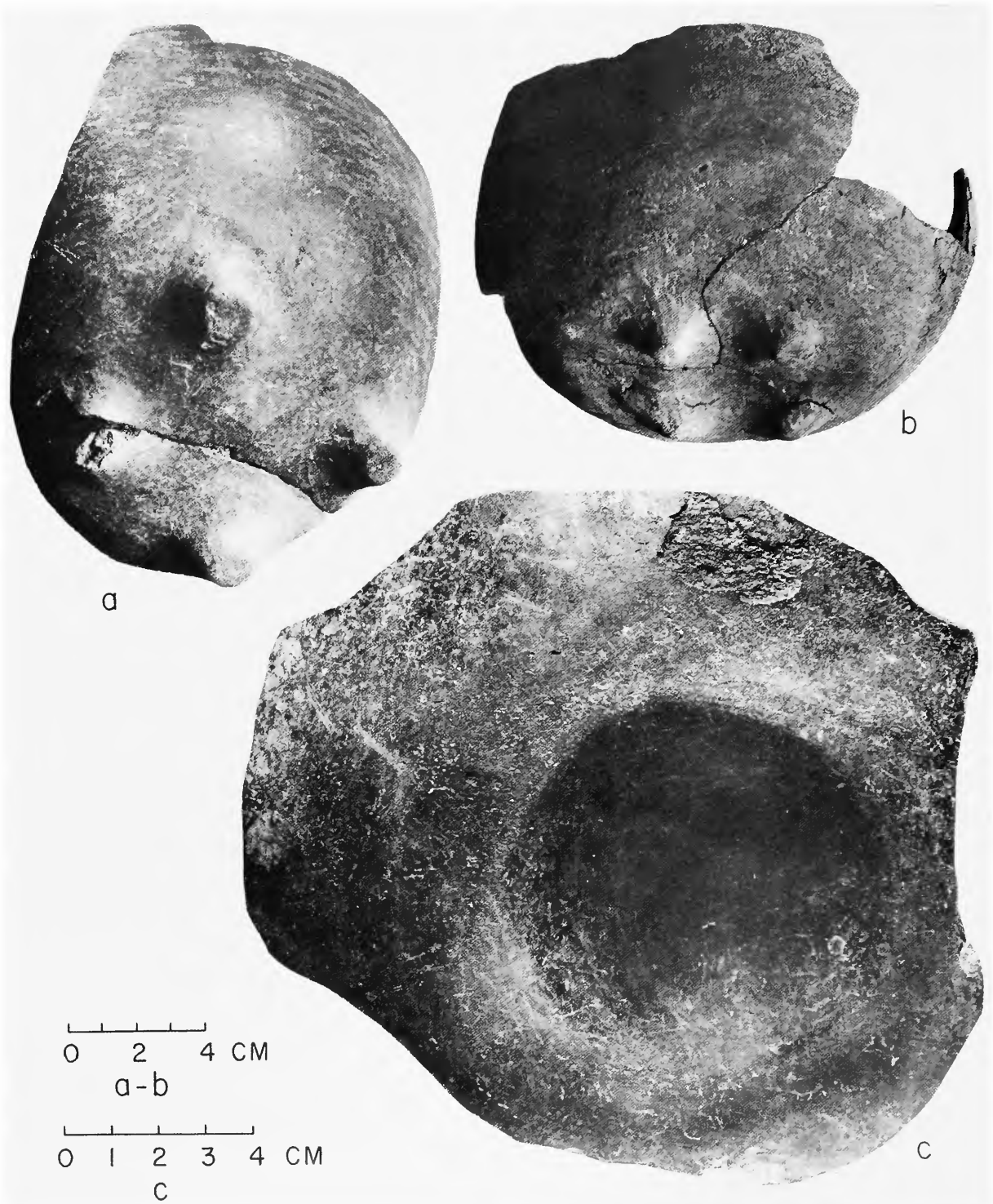

PLATE 98

Typical bases of Valdivia Polished Red. *a–b*, Tetrapod. *c*, Concave.

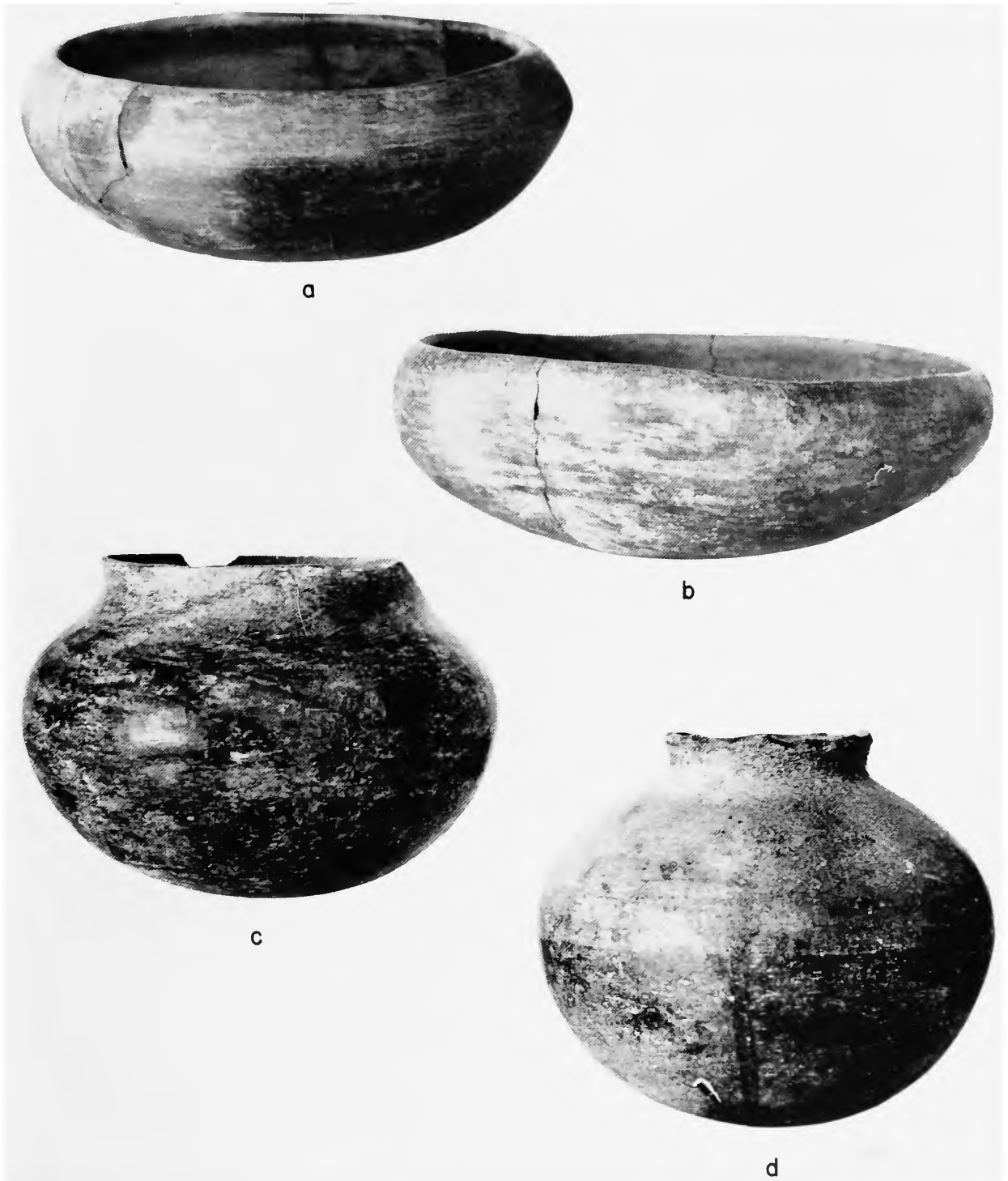

PLATE 99

Complete vessels of Valdivia Phase plain pottery types. *a*, Valdivia Polished Red, Form 8. *b*, Valdivia Polished Red, Form 6. *c*, Valdivia Polished Red, Form 11. *d*, Valdivia Striated Polished Plain, Form 4.

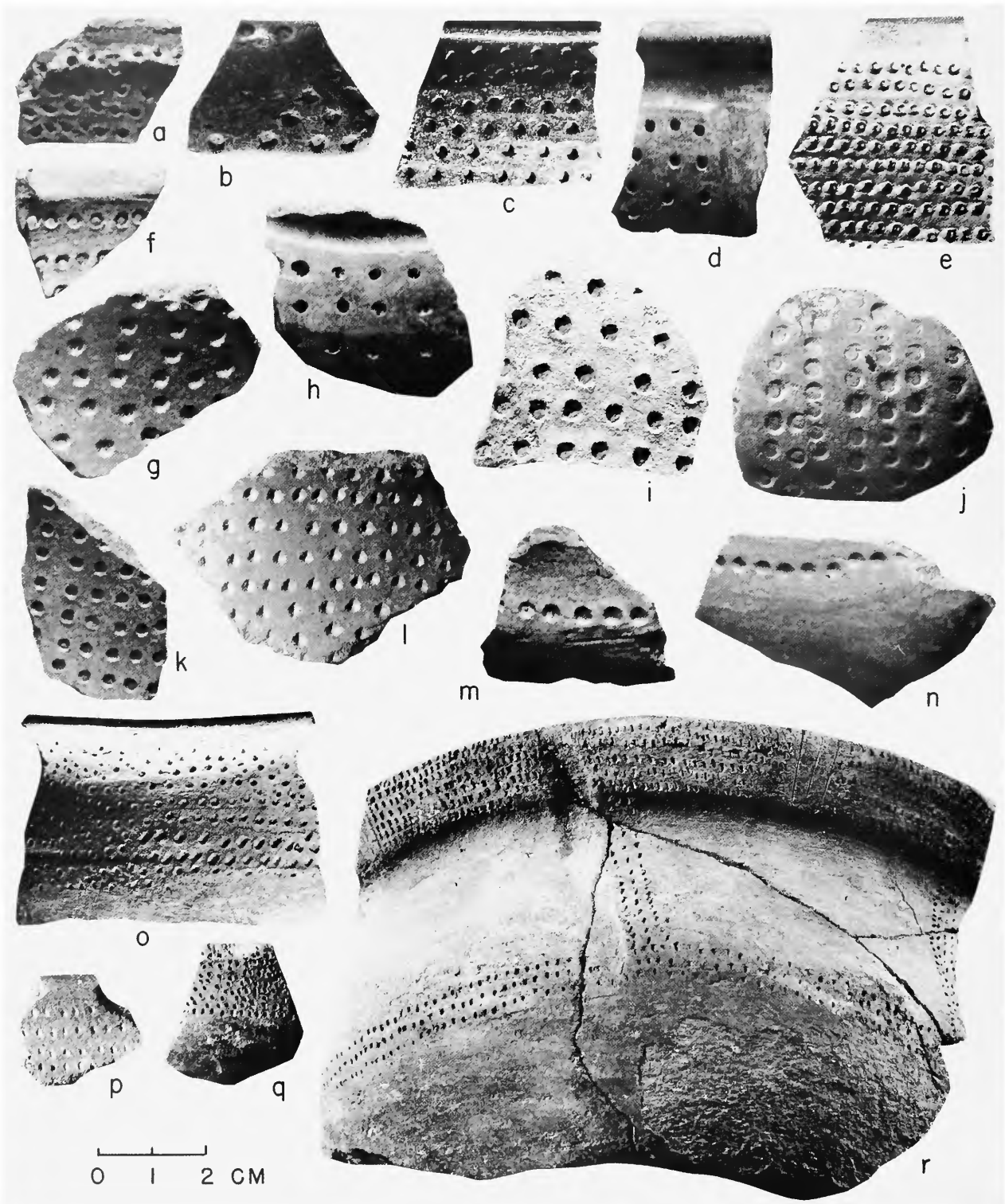

PLATE 100

Type sherds of Valdivia Punctate. *a–n*, Technique 1, circular. *o–r*, Technique 6, "pinpoint."

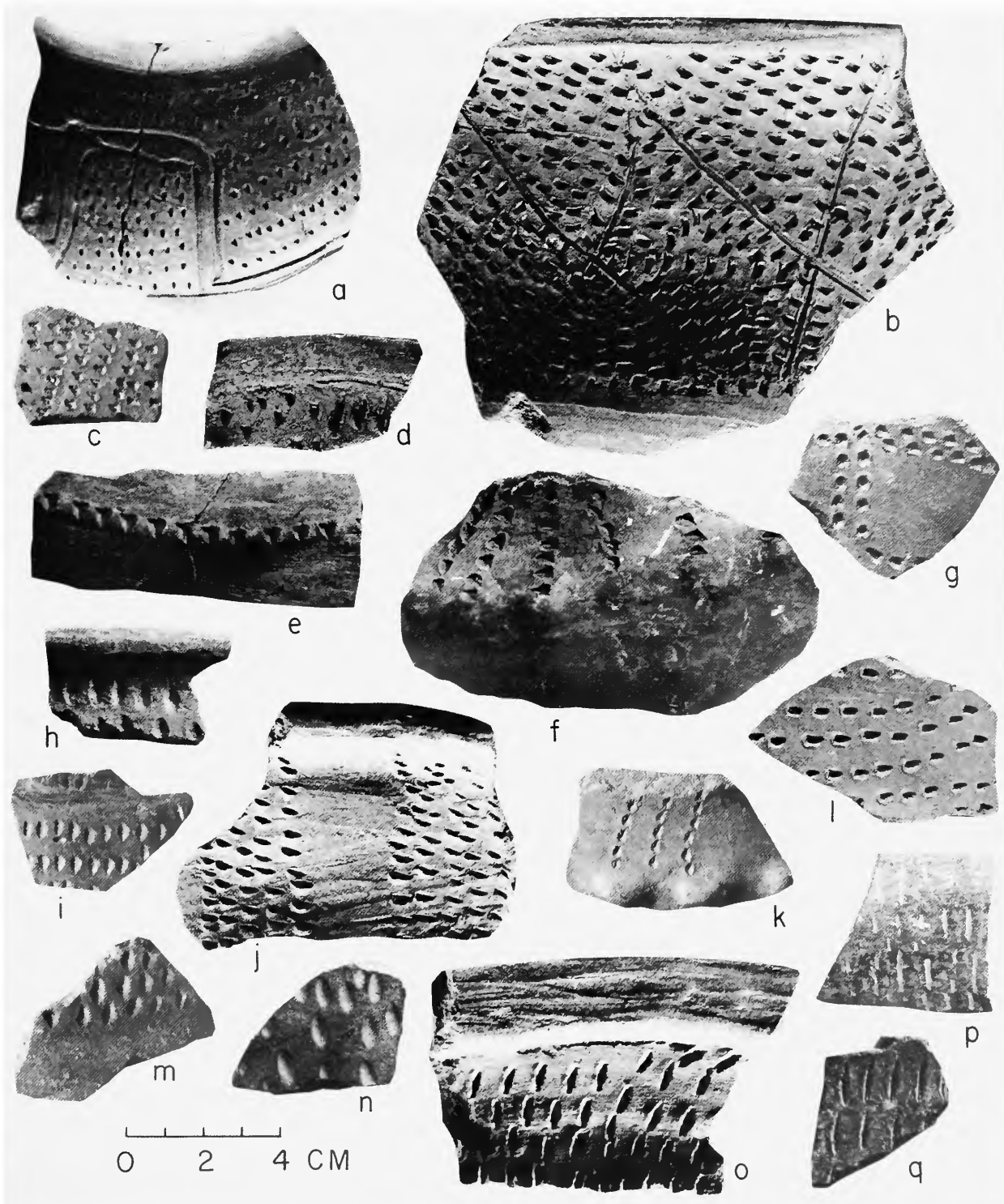

PLATE 101

Type sherds of Valdivia Punctate. *a*, *c–f*, Technique 2, trianguloid. *b*, *l*, Technique 3, rectanguloid. *g–k*, *m–n*, Technique 4, ovoid. *o–q*, Technique 5, cuts.

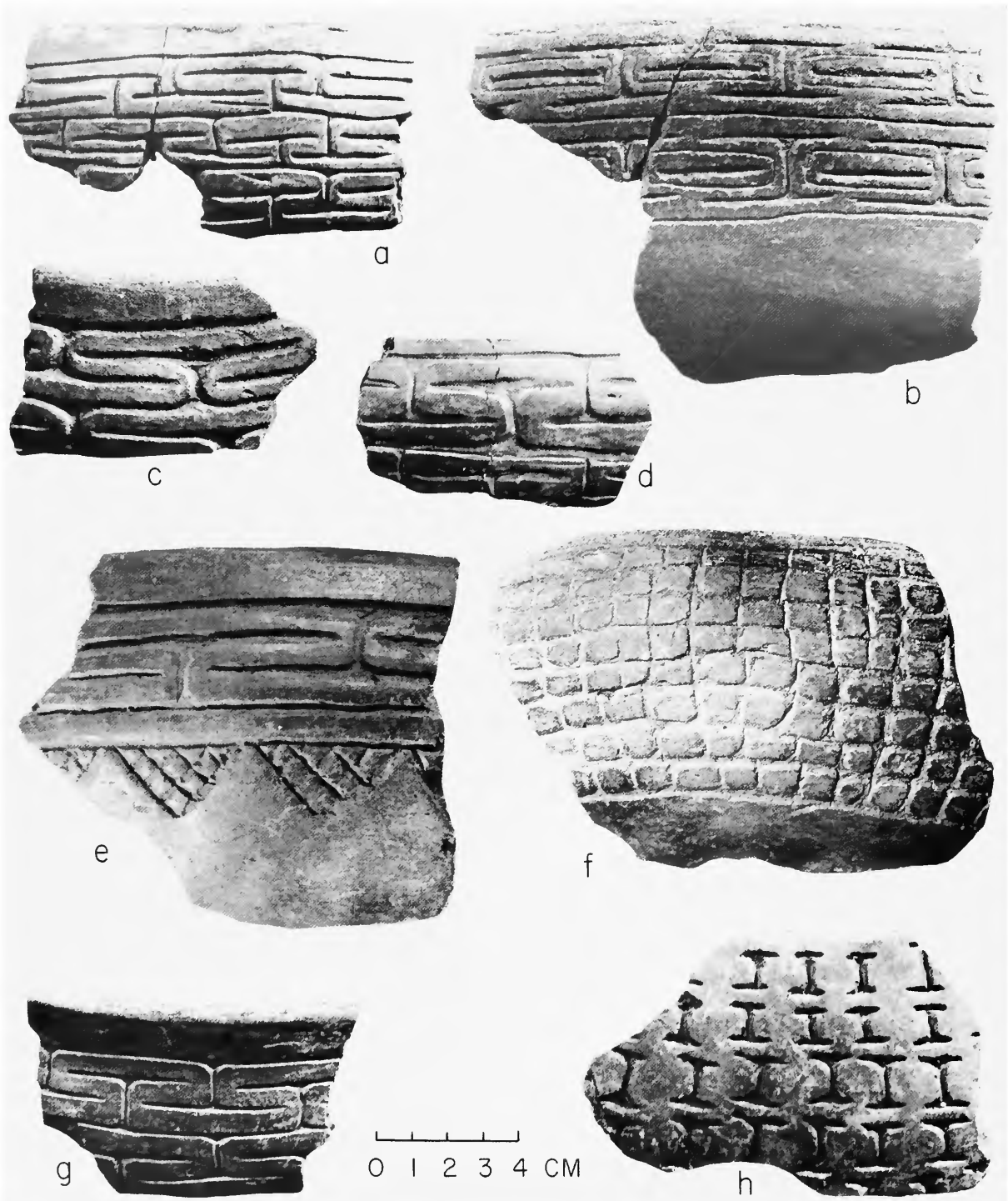

PLATE 102

Type sherds of Valdivia Red Incised.

PLATE 103

Valdivia Red Incised. *a–b*, Vessel fragments with castellated rim. *c*, Tetrapod bowl.

PLATE 104

Type sherds of Valdivia Red Incised.

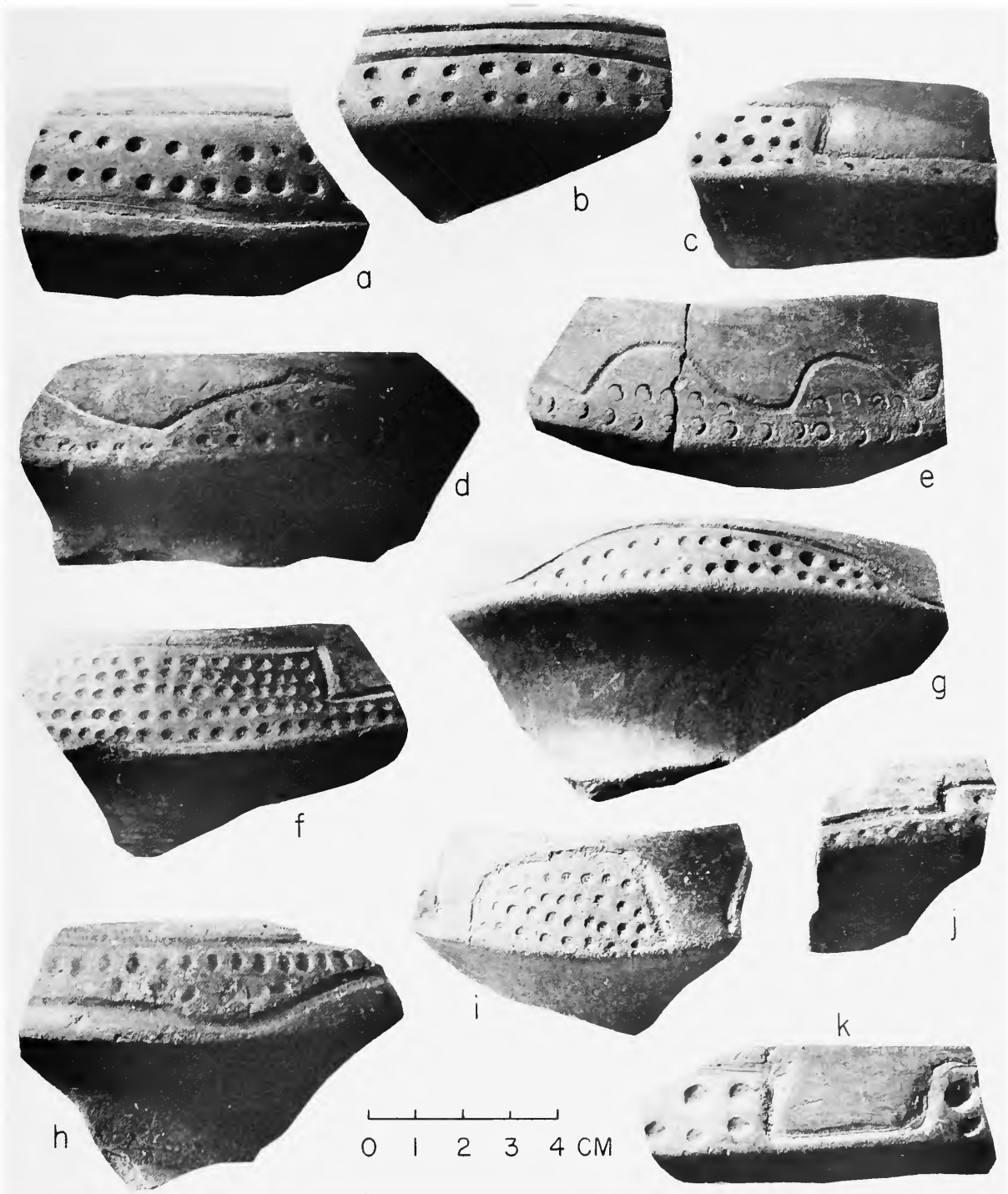

PLATE 105

Type sherds of Valdivia Red Zoned Punctate, rims of Form 1.

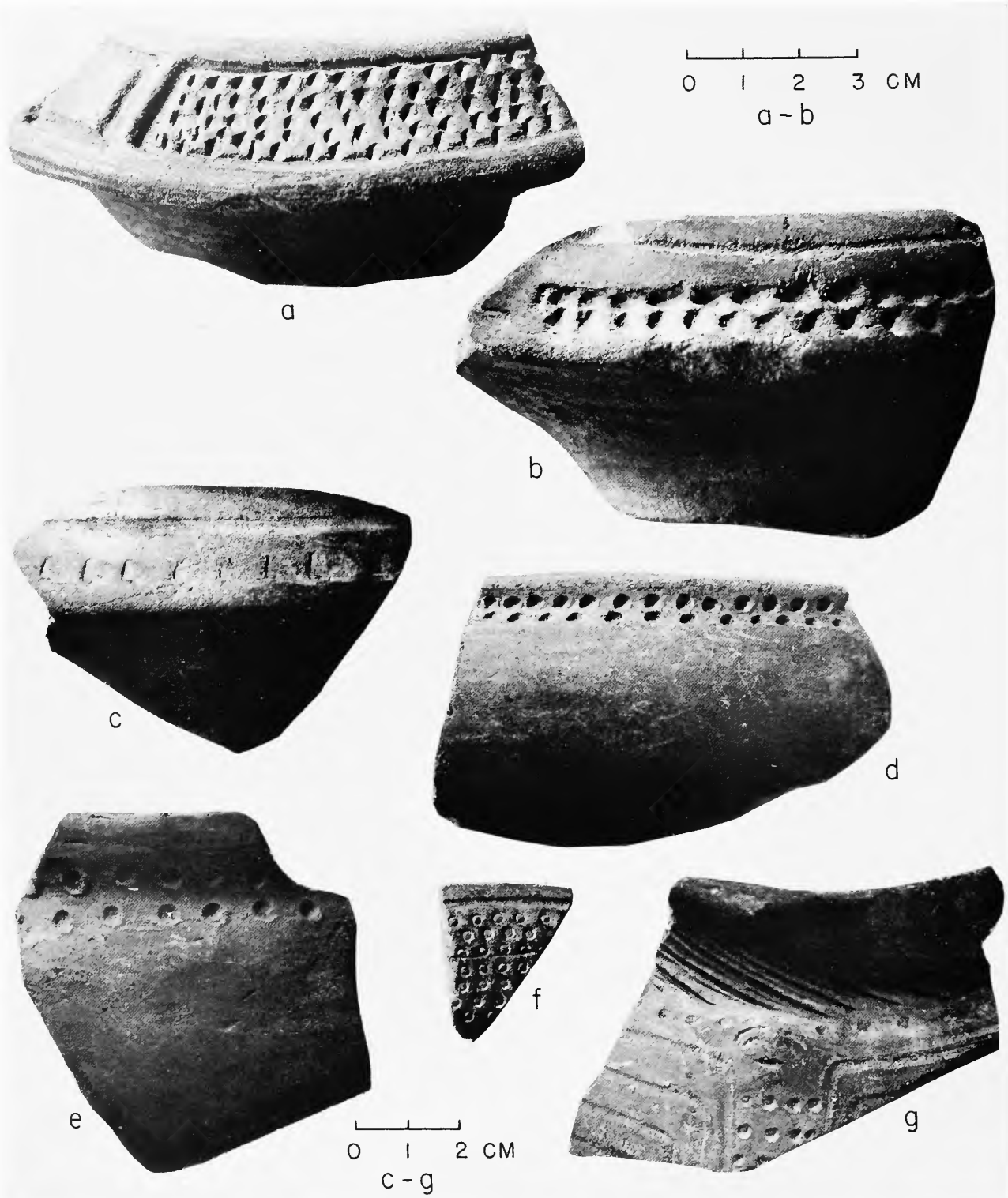

PLATE 106

Type sherds of Valdivia Red Zoned Punctate. *a–c*, Rims of Form 1. *d–g*, Rims of Form 2.

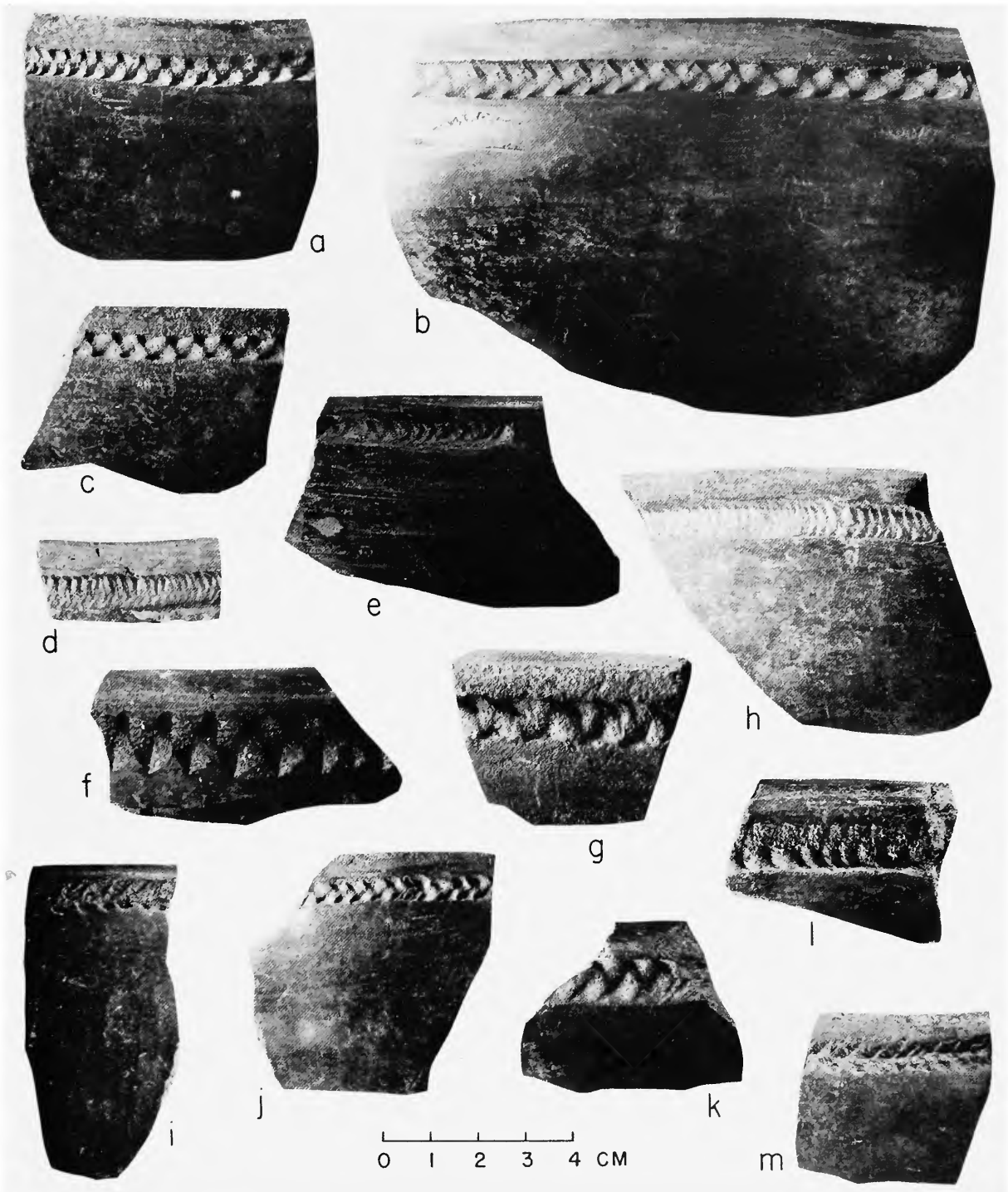

PLATE 107

Type sherds of Valdivia Rocker Stamped. Single row applied adjacent to the rim on the exterior of bowls of Form 1 and 2.

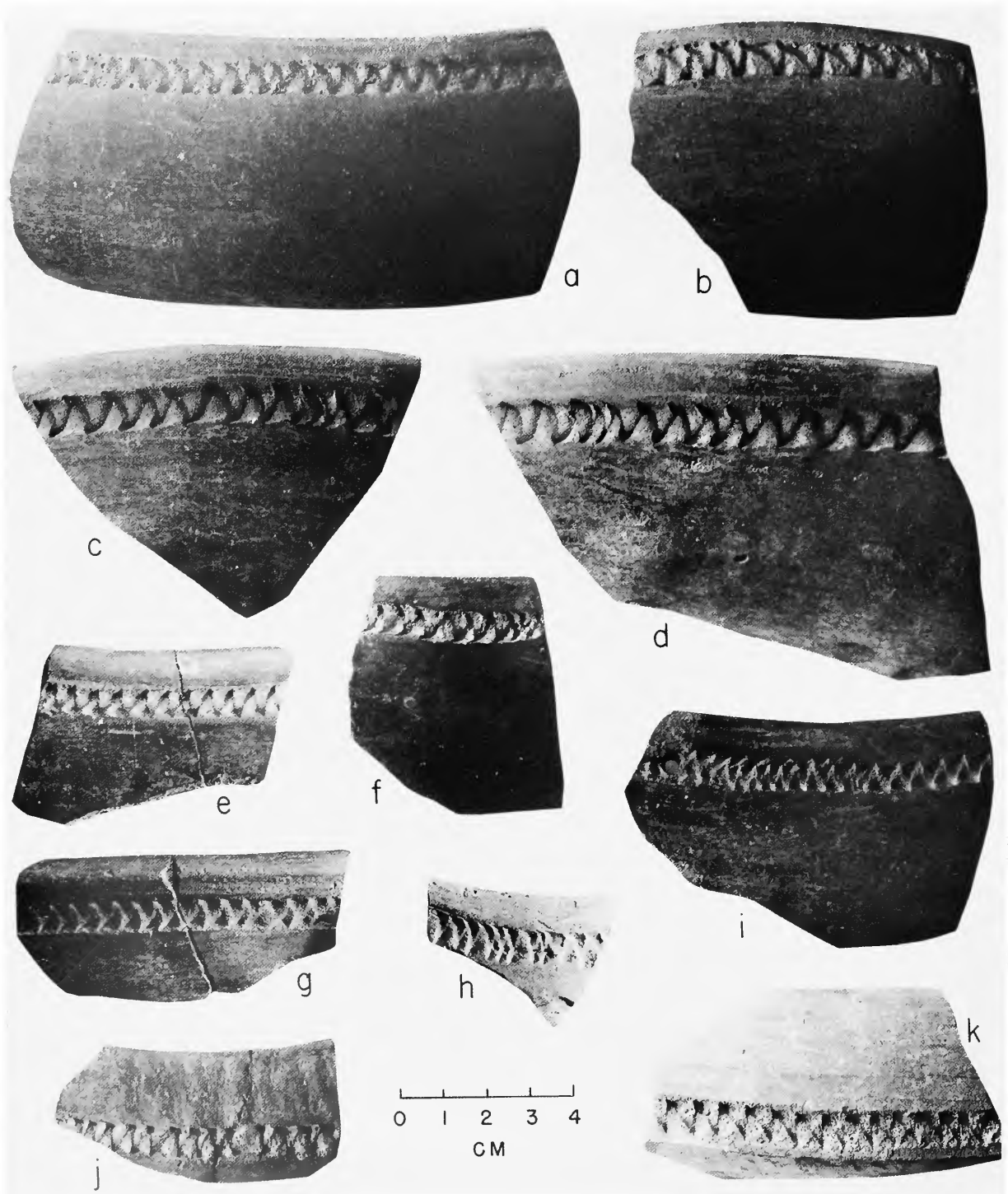

PLATE 108

Type sherds of Valdivia Rocker Stamped. Single row applied adjacent to the rim on the exterior of bowls of Form 1 and 2.

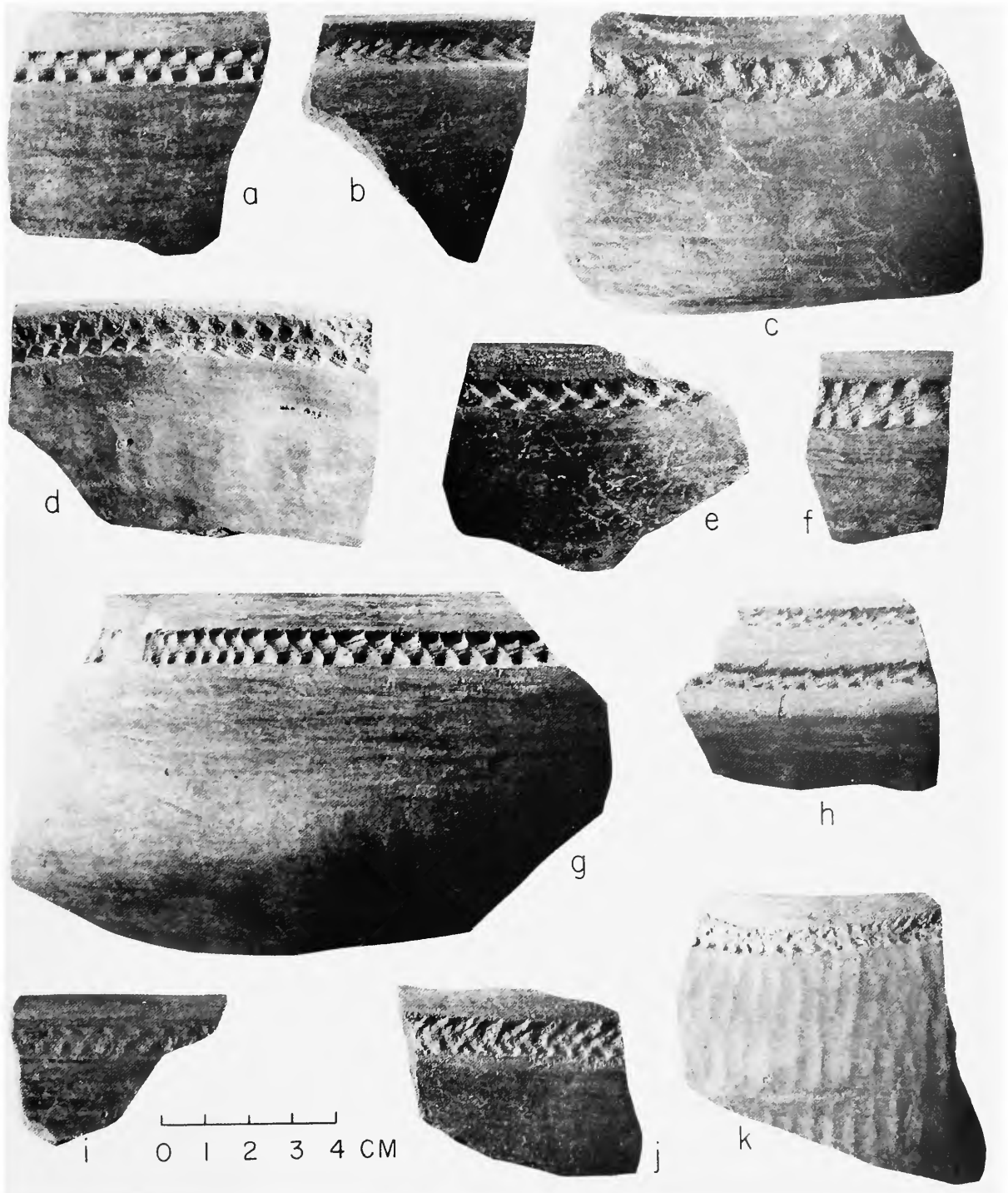

PLATE 109

Type sherds of Valdivia Rocker Stamped. *a–h, i–k,* Single row applied adjacent to the rim on the exterior of bowls of Form 1 and 2. *h,* Double row above the carination on Form 3.

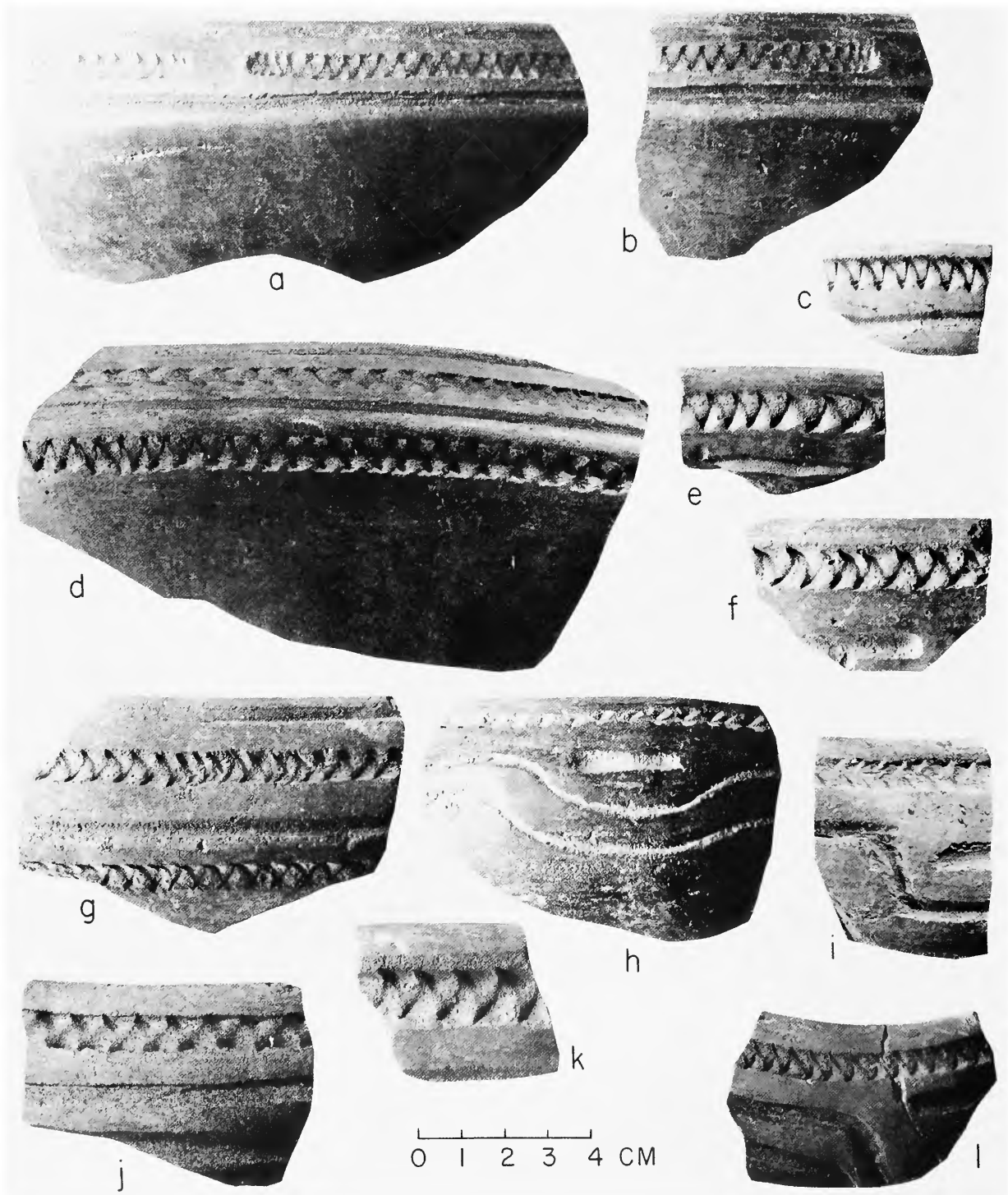

PLATE 110

Type sherds of Valdivia Rocker Stamped. Supplementary decoration is made by broad-line incisions.

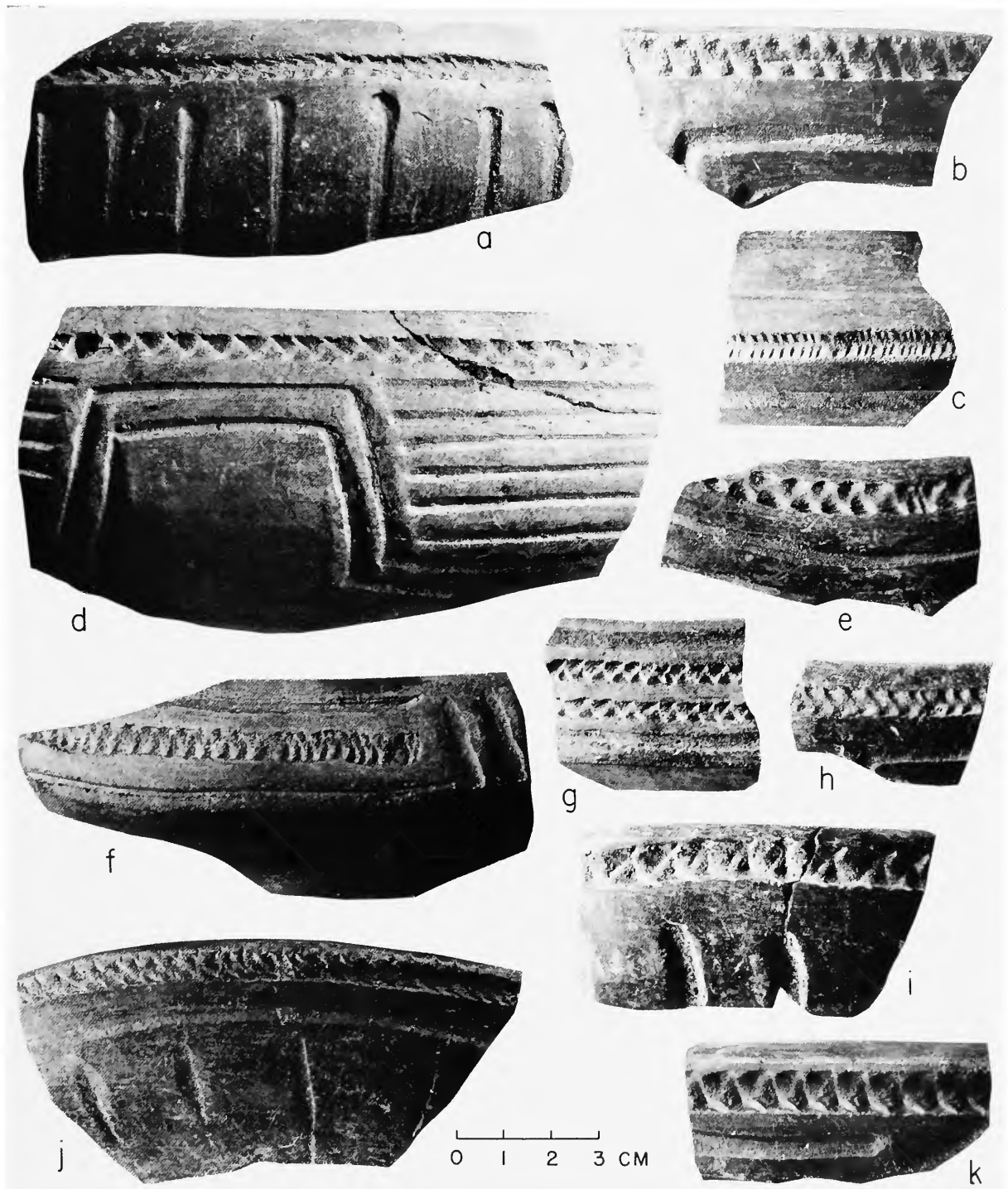

PLATE 111

Type sherds of Valdivia Rocker Stamped. Bowls of Form 1–3, with additional decoration by broad-line incision.

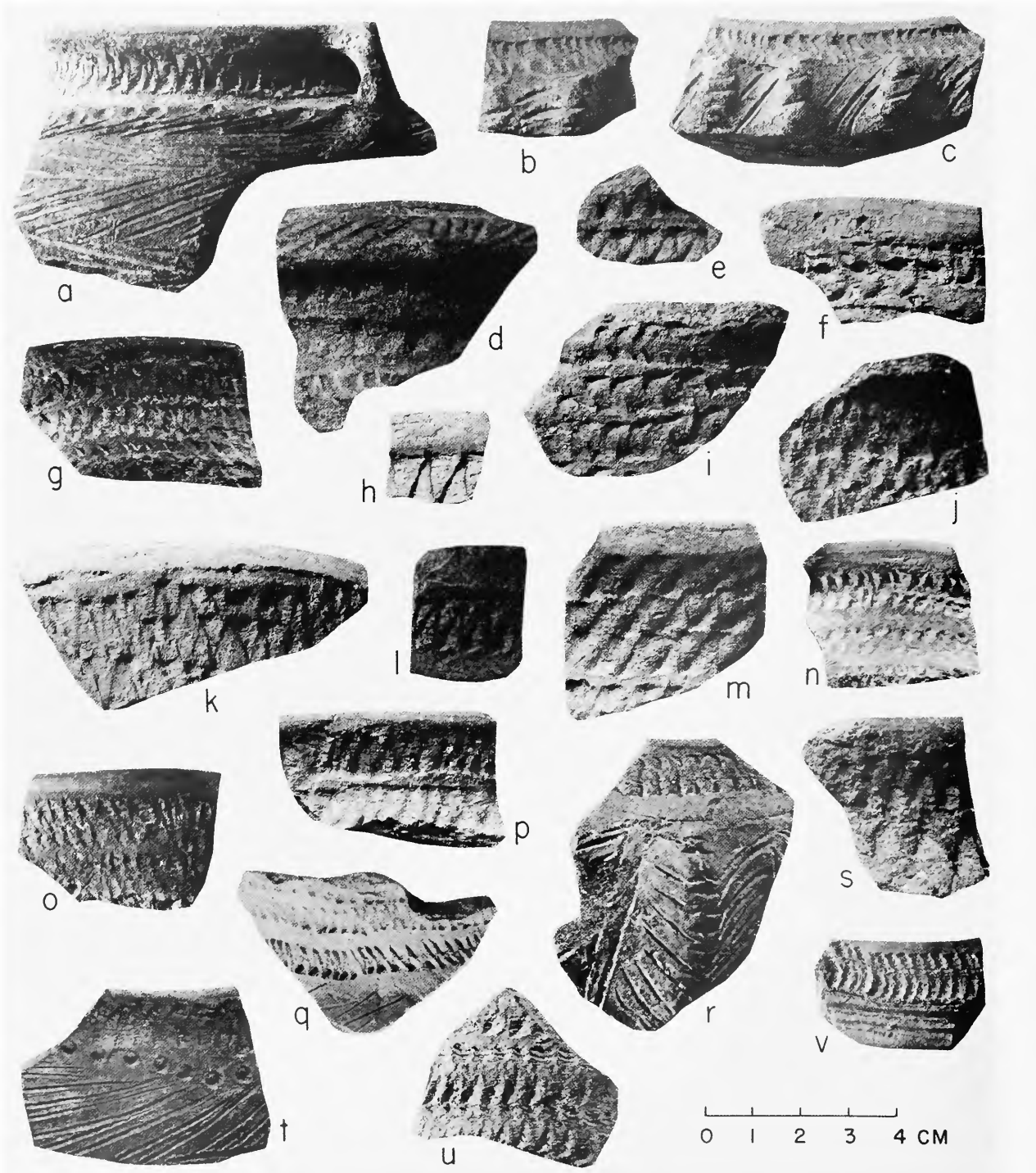

PLATE 112

Type sherds of Valdivia Rocker Stamped. Neck or rim exterior of jars of Form 4 and 5, some with additional decoration by incision or nicked rib.

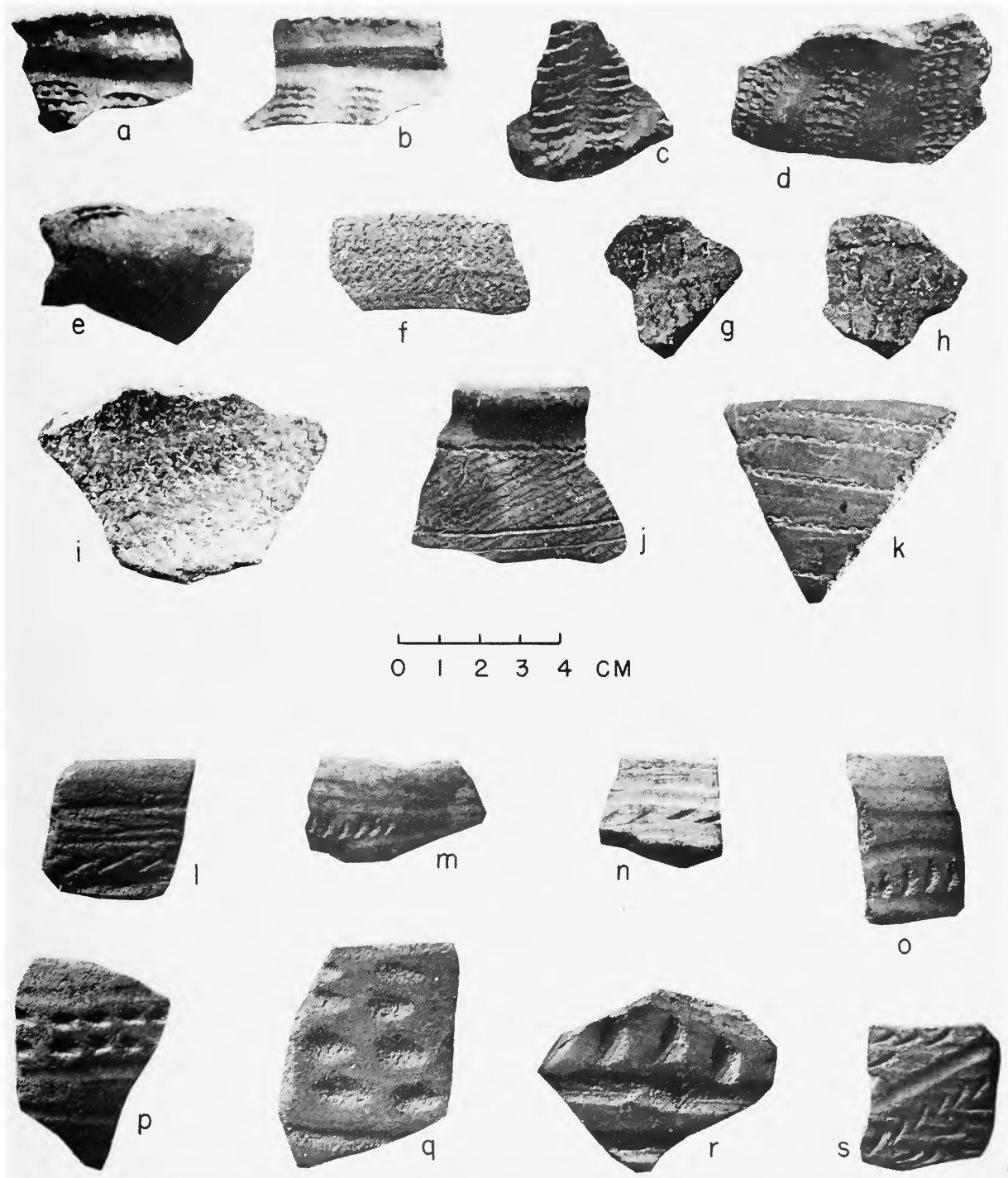

PLATE 113

Type sherds of several Valdivia Phase decorated pottery types. *a–e*, Valdivia Shell Stamped, Motif 1. *f–i*, Valdivia Shell Stamped, Motif 2. *j–k*, Valdivia Shell Stamped, Motif 3. *l–o*, Valdivia Zoned Incised, Technique 1. *p–r*, Valdivia Zoned Incised, Technique 2. *s*, Valdivia Zoned Incised, unclassified.

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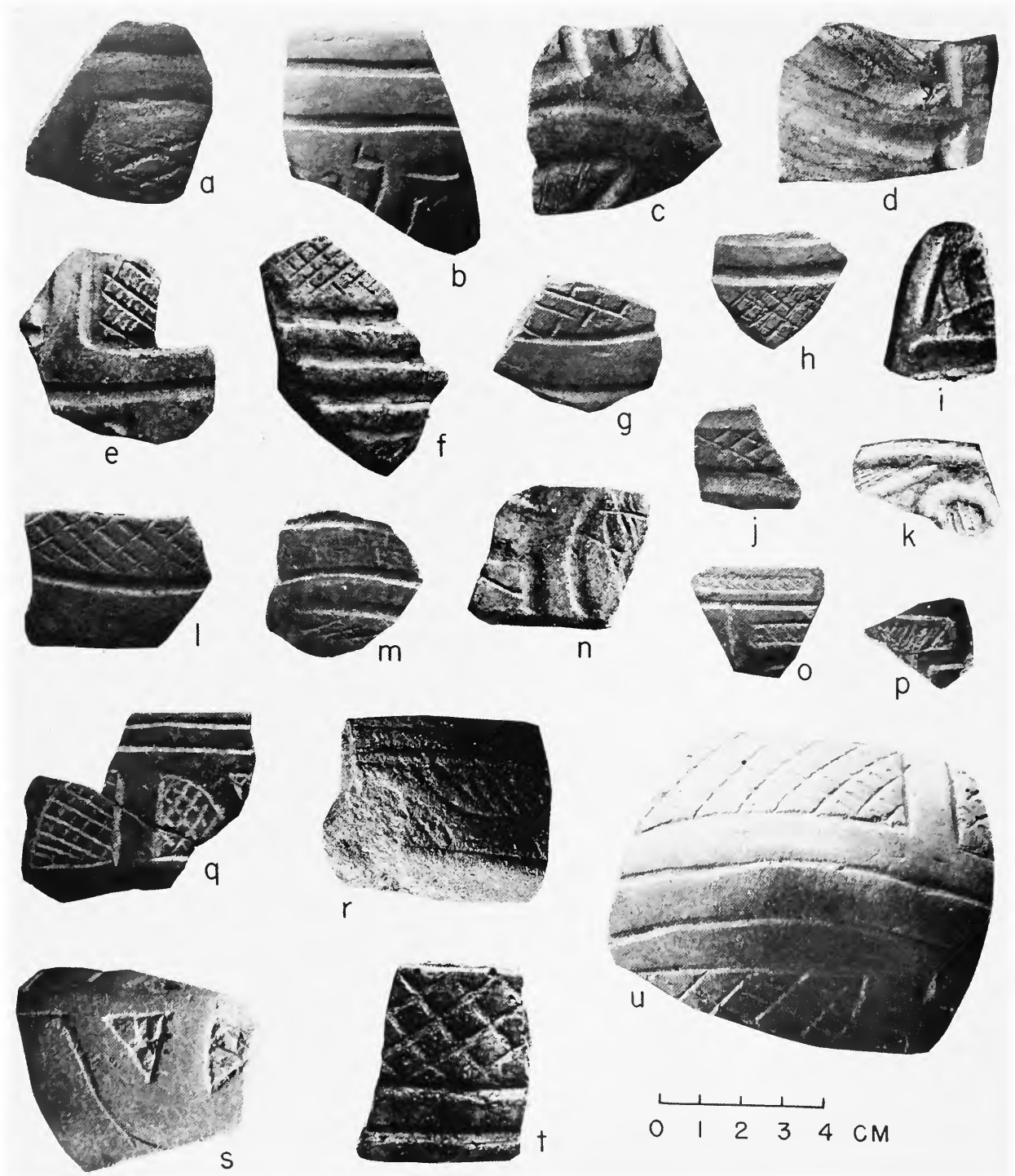

PLATE 114

Type sherds of Valdivia Zoned Incised. *a–p*, Technique 3. *q–u*, Technique 4.

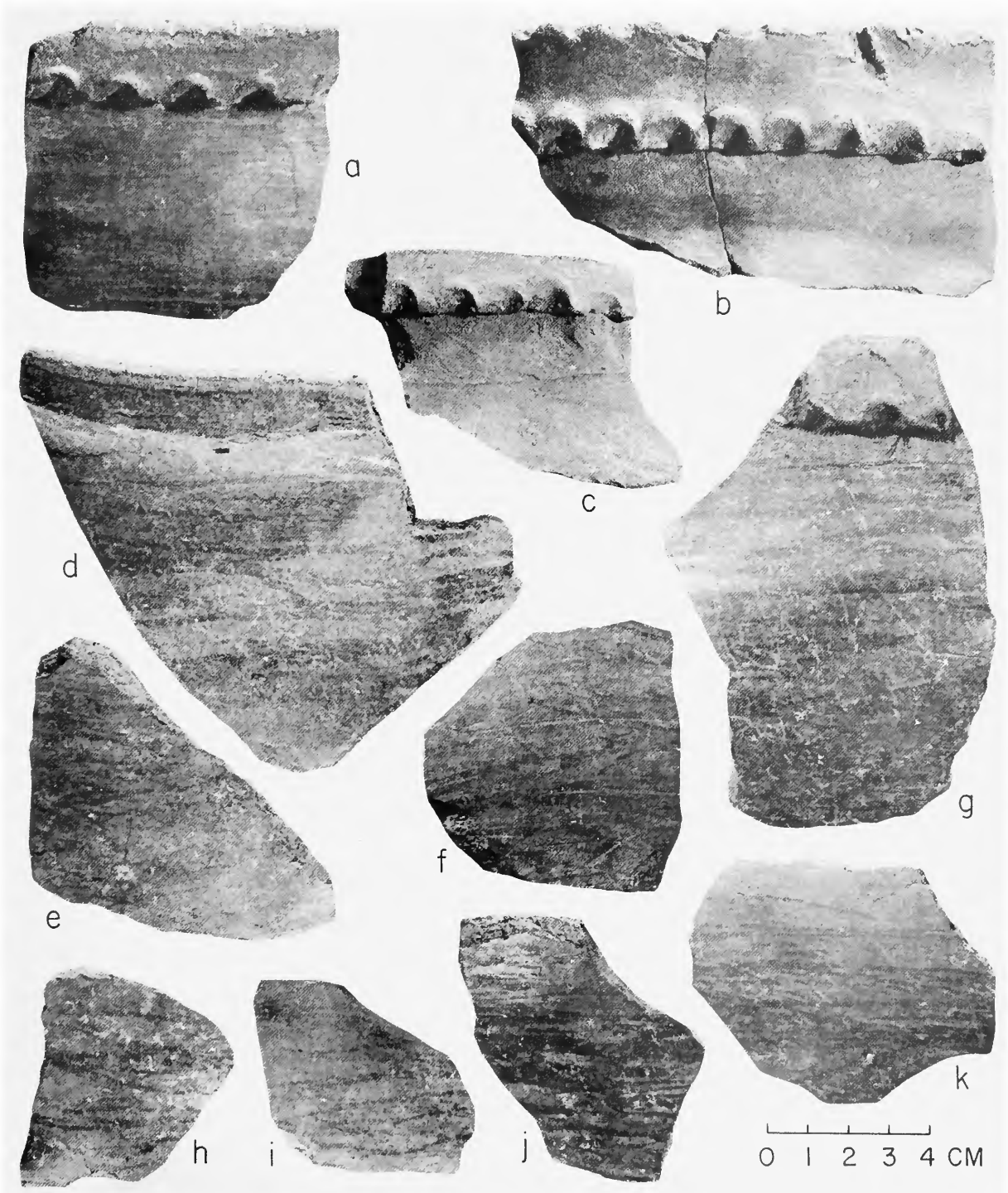

PLATE 115

Type sherds of Valdivia Striated Polished Plain.

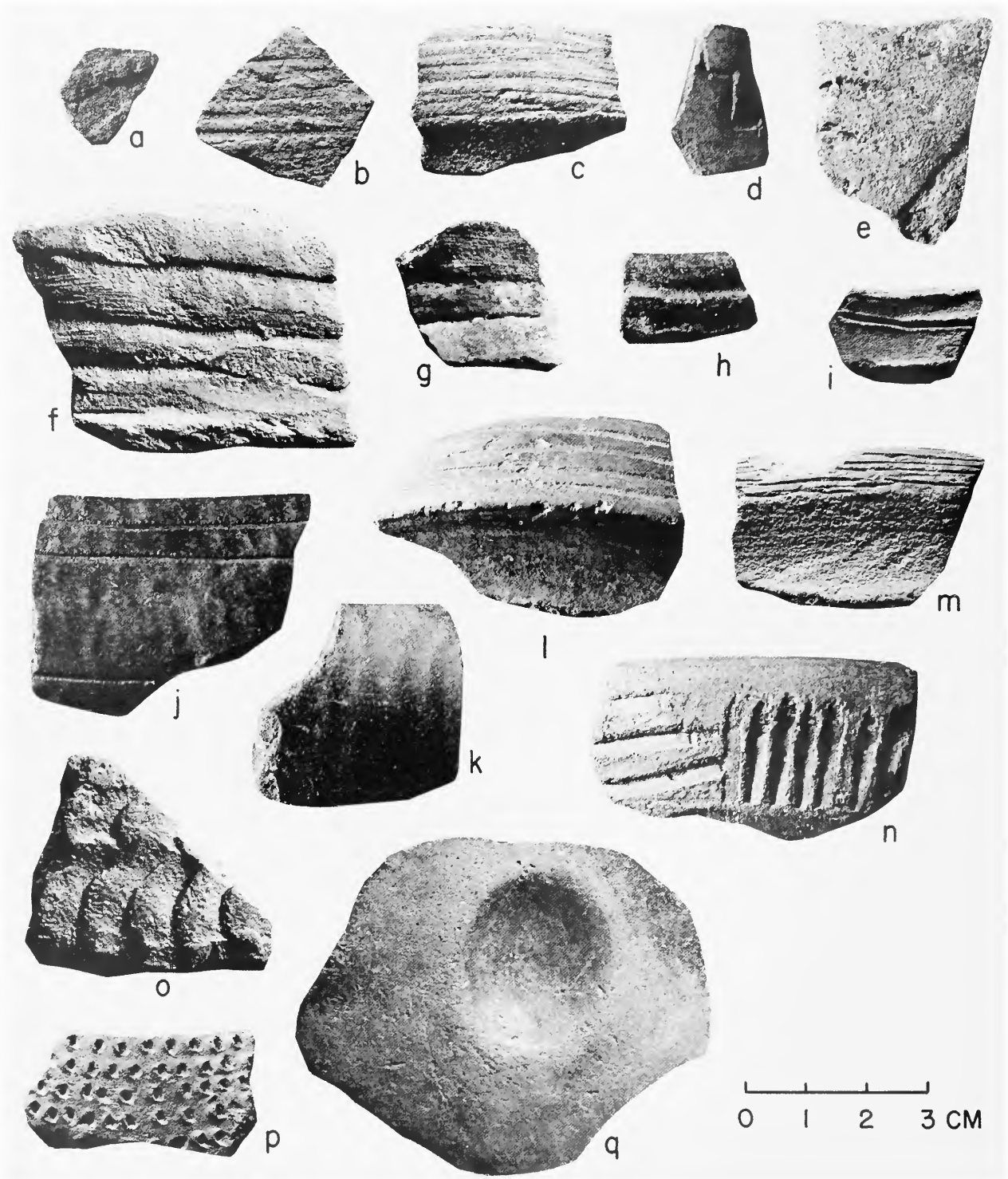

PLATE 116

Sherds of Valdivia Phase types from sites of the Machalilla Phase. *a*, Valdivia Applique Fillet. *b–c*, Valdivia Brushed. *d–e*, *h*, Valdivia Broad-line Incised. *f–g*, Valdivia Corrugated. *i*, *m–n*, Valdivia Incised. *j–k*, Valdivia Pebble Polished. *o*, Valdivia Pseudo-Corrugated. *p*, Valdivia Punctate. *q*, Valdivia Polished Red, concave base.

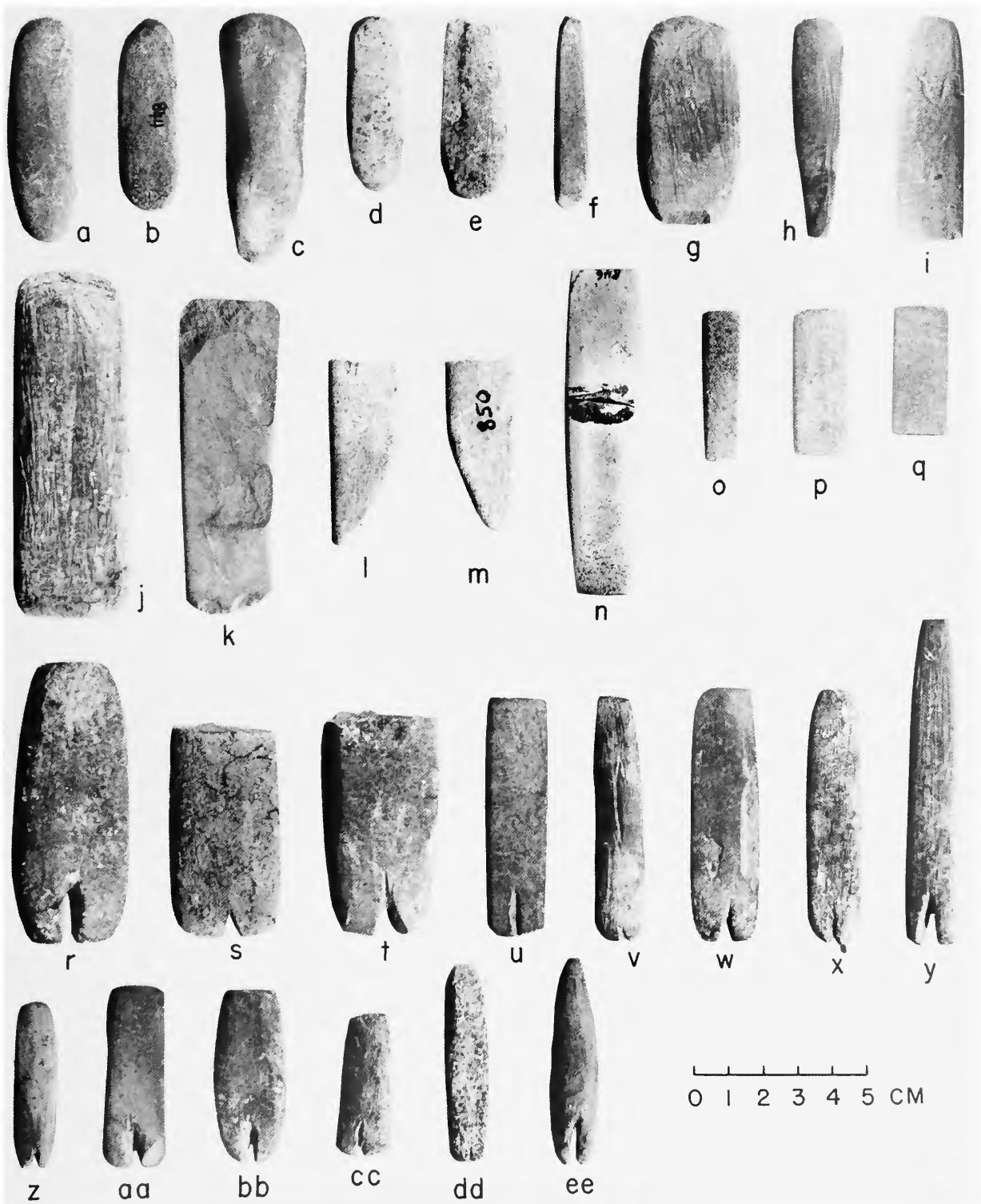

PLATE 117

Stone figurines of the Valdivia Phase. *a–q*, Palmar Plain type. *r–ee*, Palmar Notched type.

PLATE 118

Stone figurines of the Valdivia Phase. *a–j*, Palmar Incised type. *k–r*, Stone variant of the Buena Vista type.

PLATE 119

Broken pottery figurines of the Valdivia and San Pablo types showing method of construction. *a–q*, Vertical fracture resulting from double coil foundation. *r–z*, Hair partly or completely sloughed off as a result of application when underlying surface was too dry.

PLATE 120

Figurines of the Valdivia type, showing variable treatment of the common long bob hairstyle.

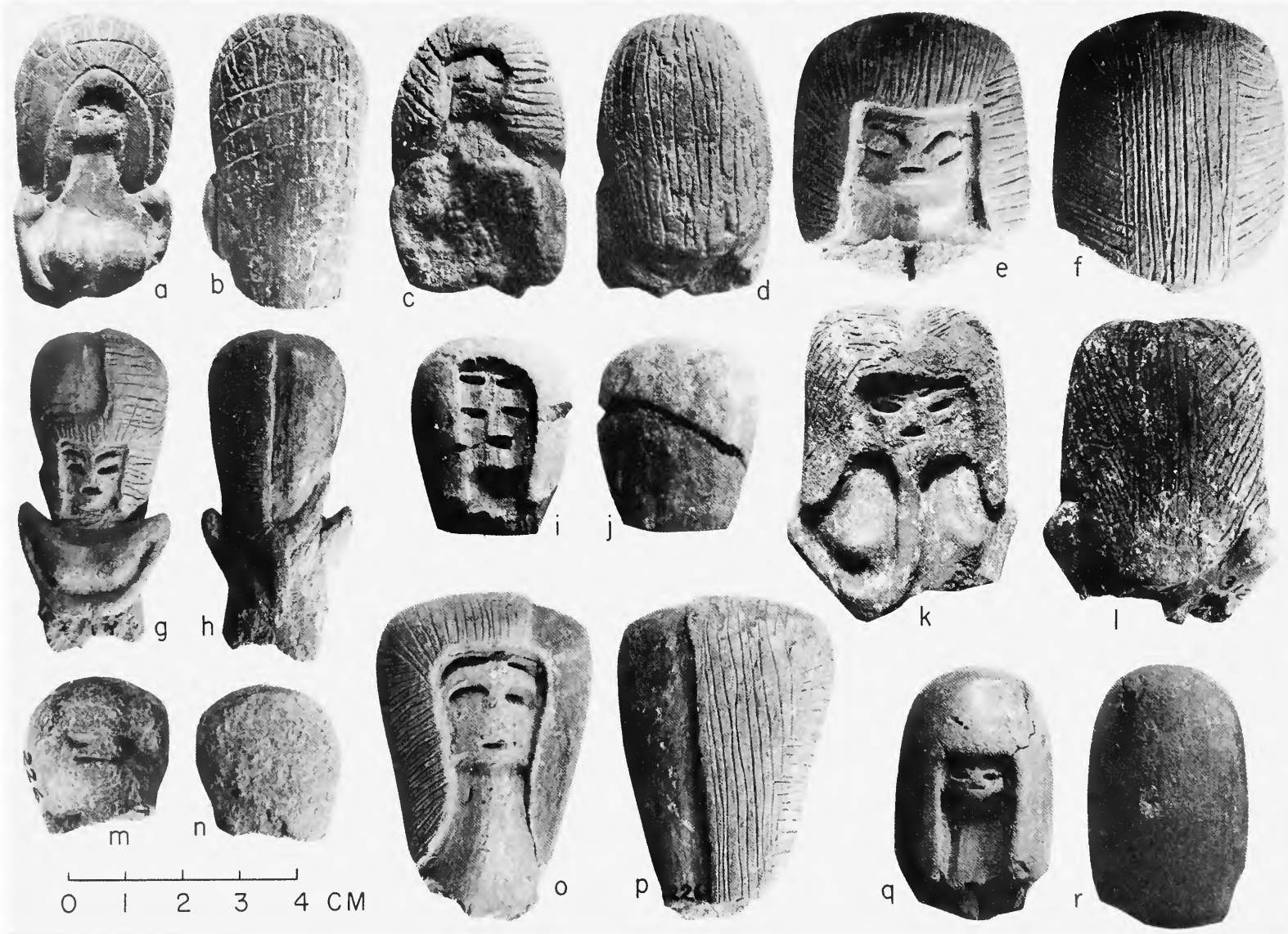

PLATE 121

Figurines of the Valdivia type, showing variable treatment of the long bob hair style.

PLATE 122

Figurines of the Valdivia type, showing variation in hair style. *a–d, g–h,* Long bob. *e–f, k–l,* Side loops or buns. *i–j, m–n,* Asymmetrical length at front. *o–r,* "Pigtail" down center of back.

PLATE 123

Figurines of the Valdivia type, showing variation in size, workmanship and stylistic detail. *a–bb, ff–ii*, Single headed. *cc–ee*, Double headed.

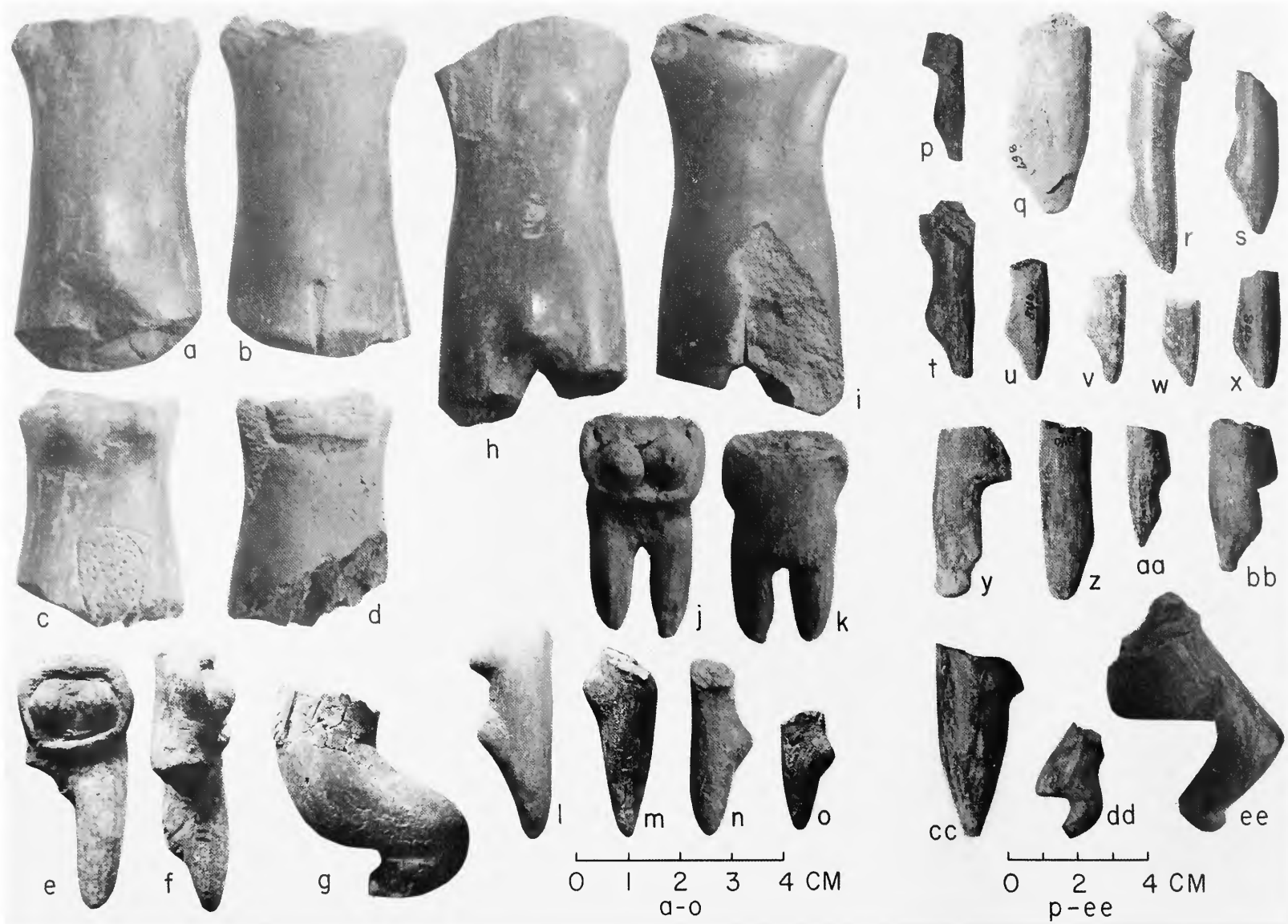

PLATE 124

Bodies of Valdivia type figurines showing variation in surface finish and typical leg treatment (shown in profile).

PLATE 125

Figurines of the San Pablo type showing variation in hair style.

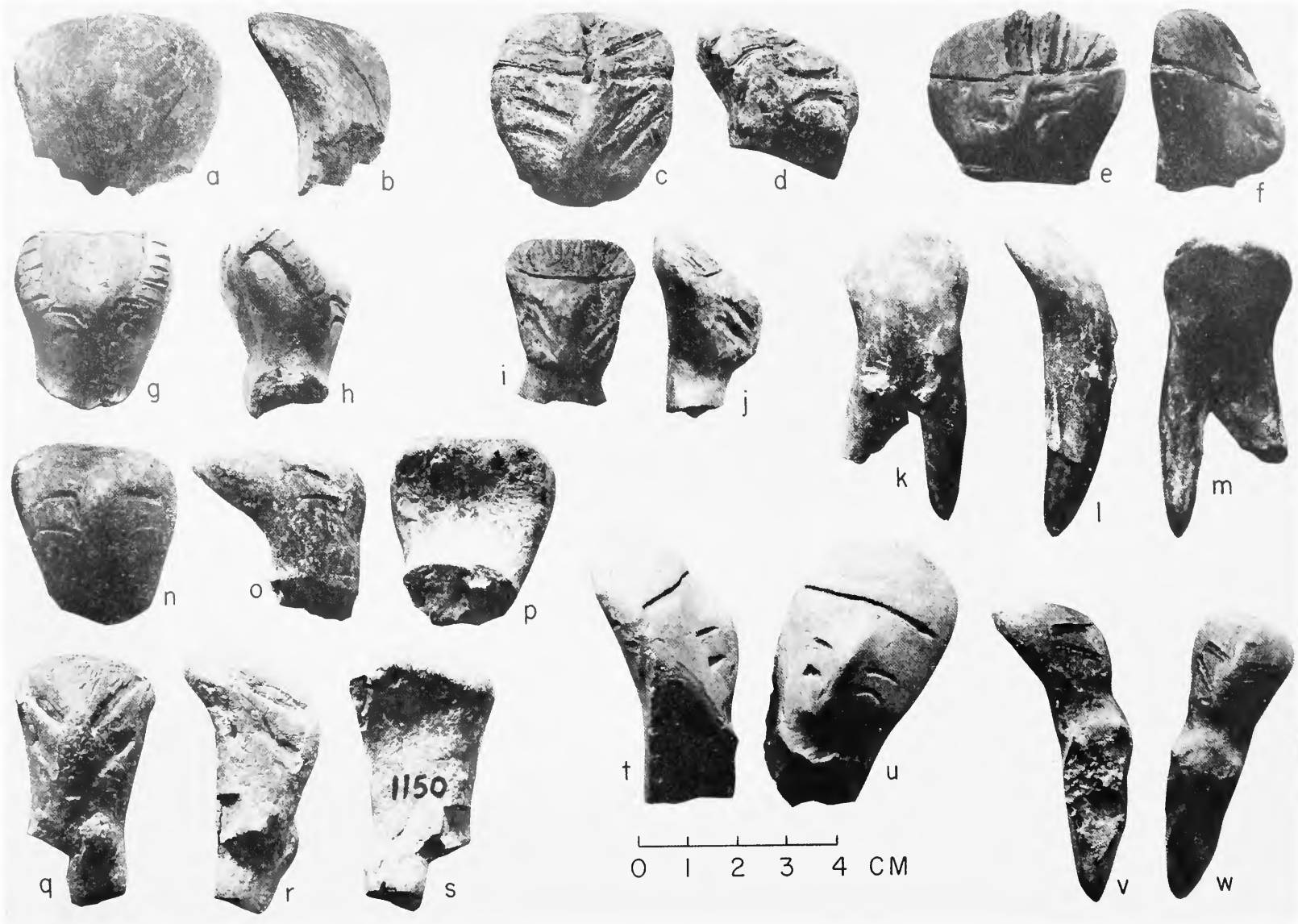

PLATE 126

Figurines of the Buena Vista type, showing variation in hair treatment. *a–s*, Single headed. *t–w*, Double headed.

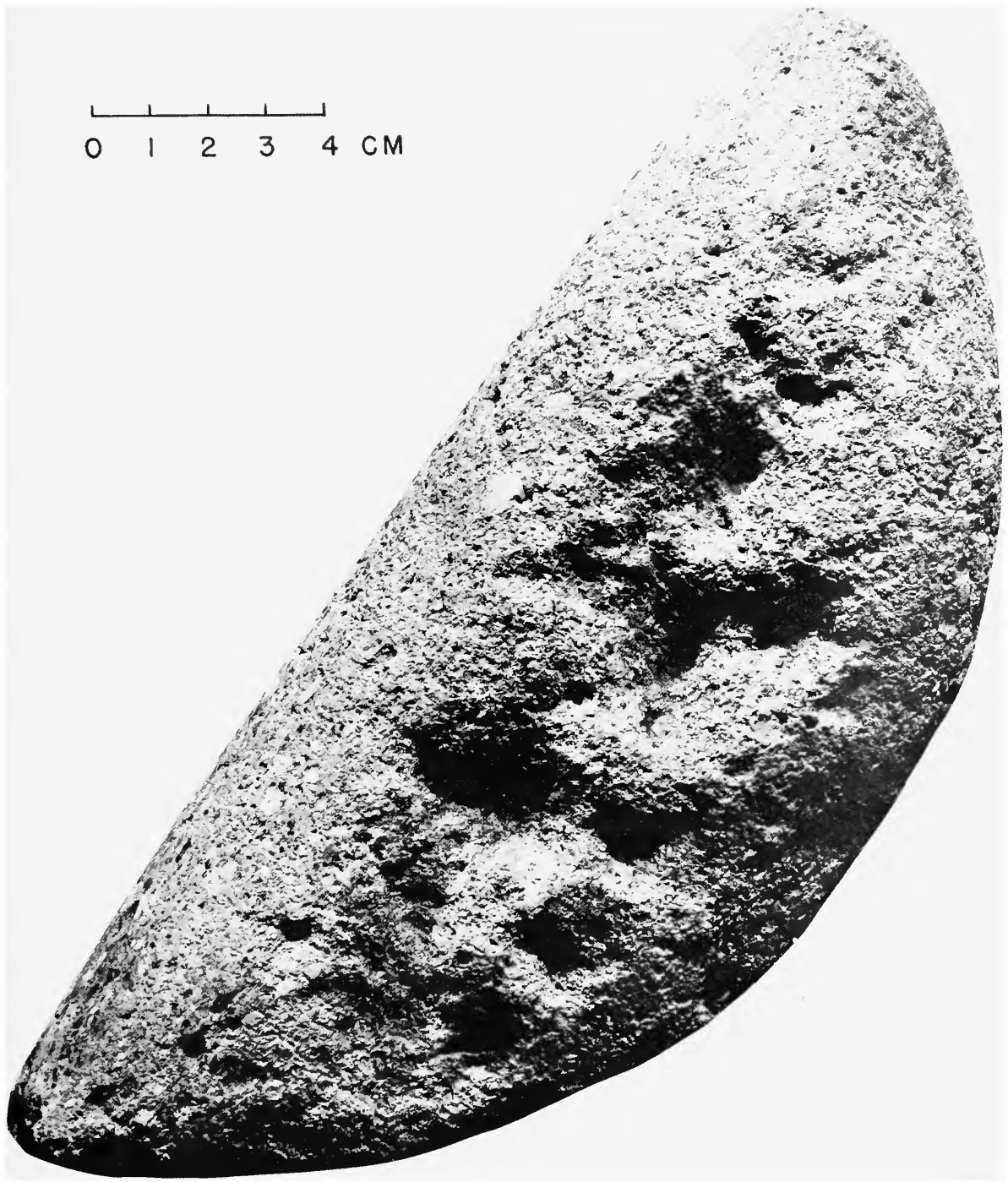

PLATE 127

Large grinding stone from G–110: La Cabuya, a Period C site of the Machalilla Phase.

PLATE 128

Natural pebbles used as polishing stones from Machalilla Phase sites.

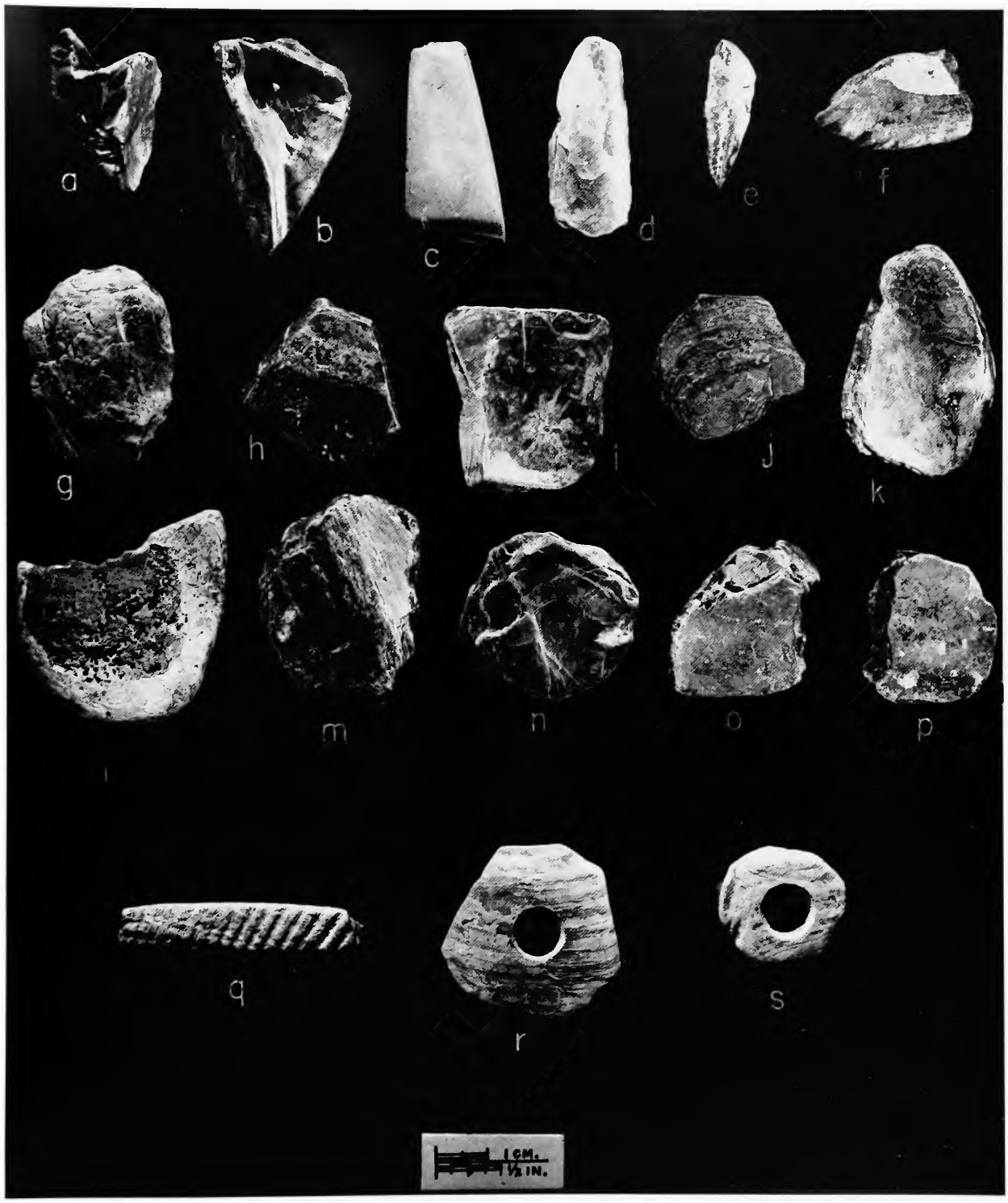

PLATE 129

Worked shell from Machalilla Phase sites. *a–p*, Cut pieces, probably blanks for pendants or fishhooks. *q*, Bracelet fragment. *r–s*, Perforated fishhook blanks.

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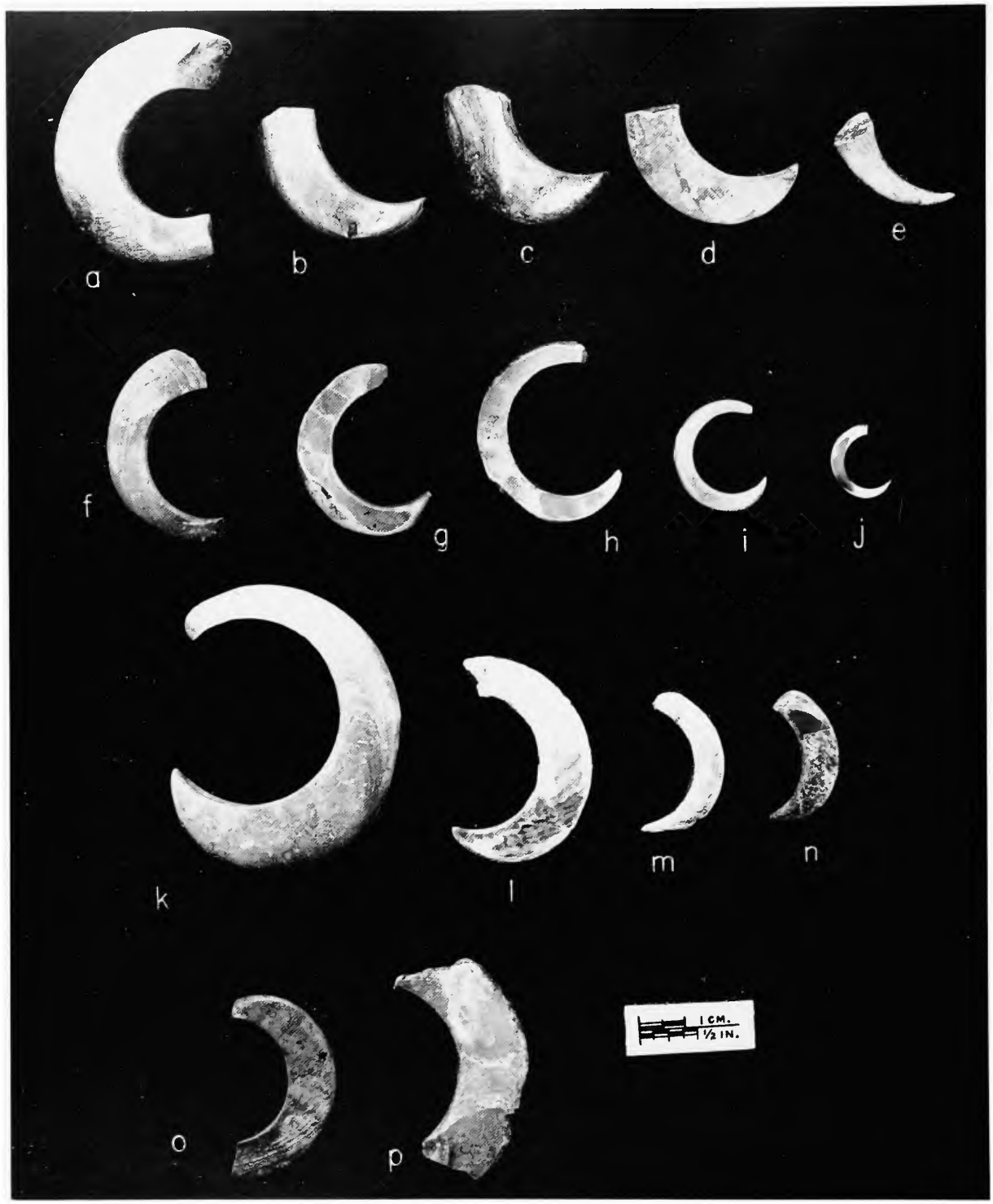

PLATE 130

Shell fishhooks from the Machalilla Phase, showing range in size.

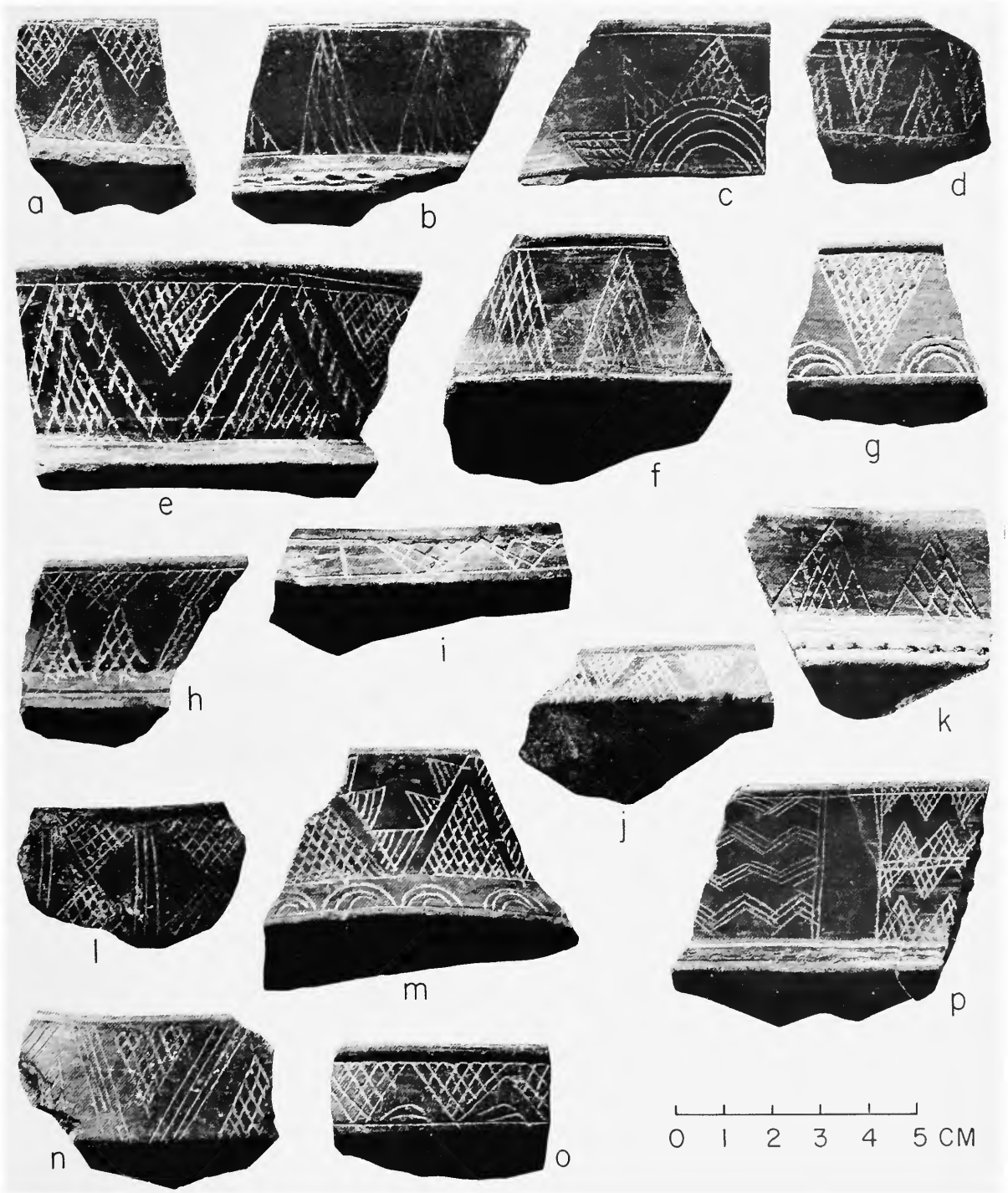

PLATE 131

Type sherds of Ayangue Incised, Motif 1, triangles.

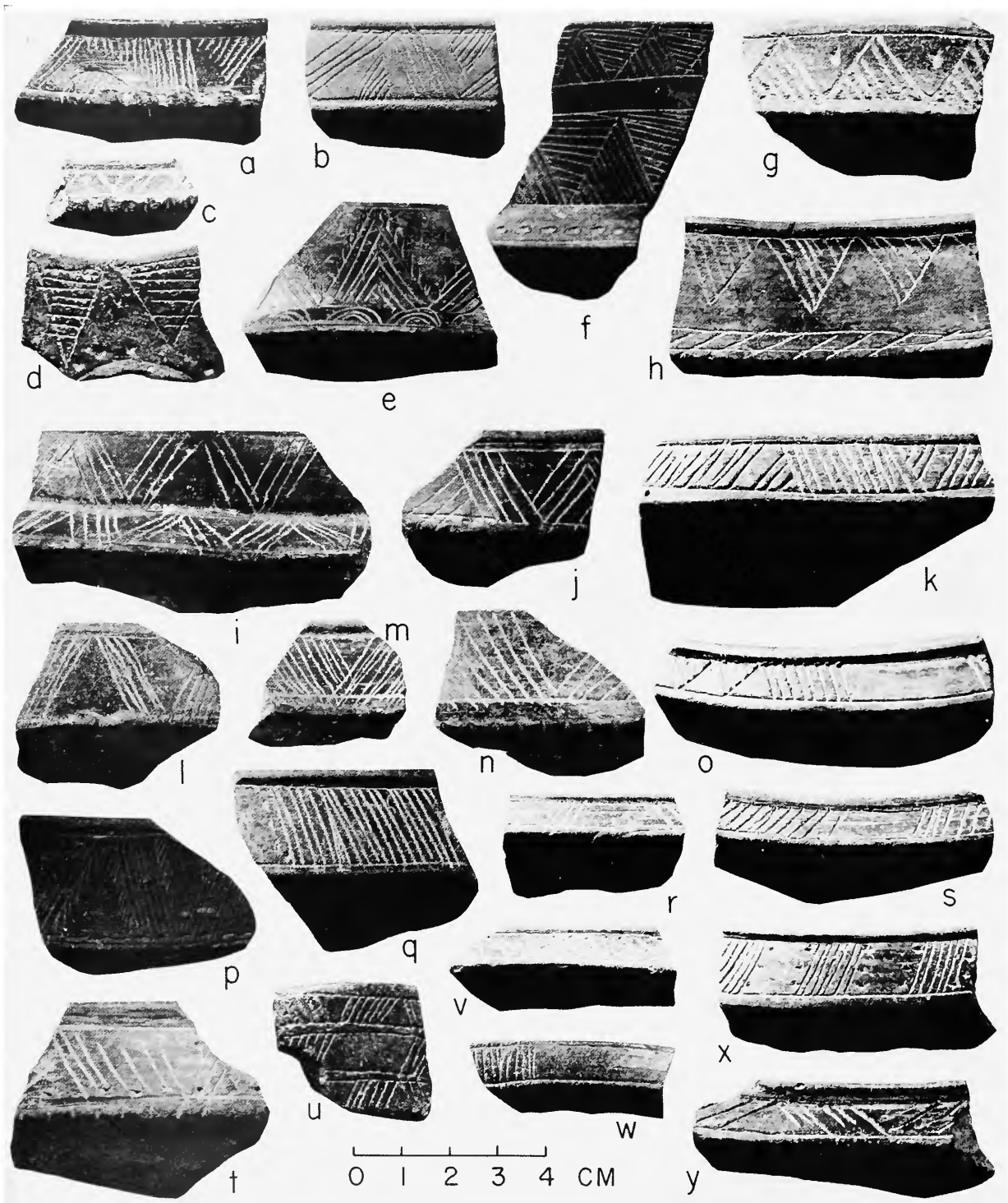

PLATE 132

Type sherds of Ayangue Incised. *a–h*, Motif 1, triangles. *i–y*, Motif 2, slanting parallel lines.

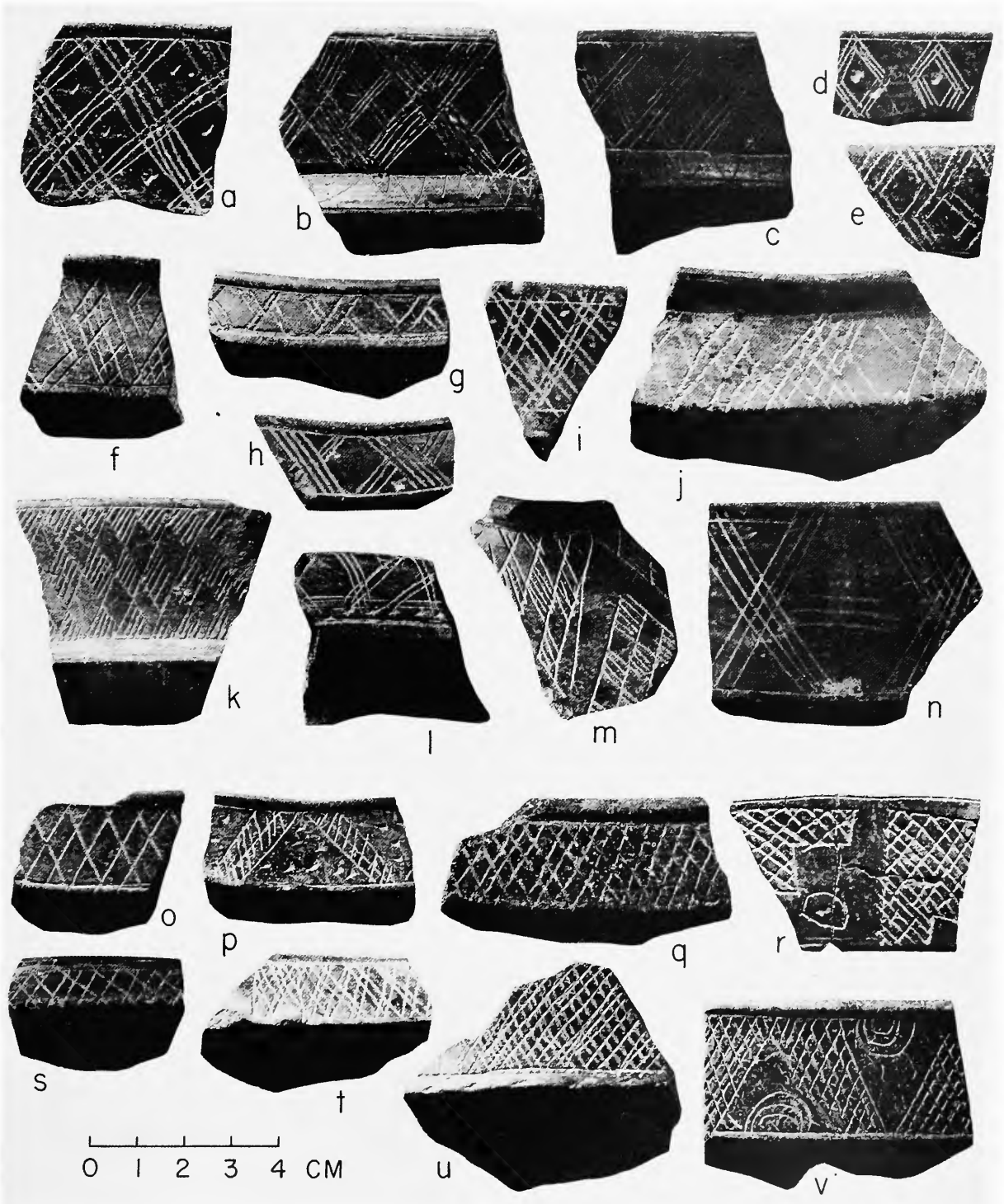

PLATE 133

Type sherds of Ayangue Incised. *a–n*, Motif 3, diamonds. *o–v*, Motif 4, crosshatched bands.

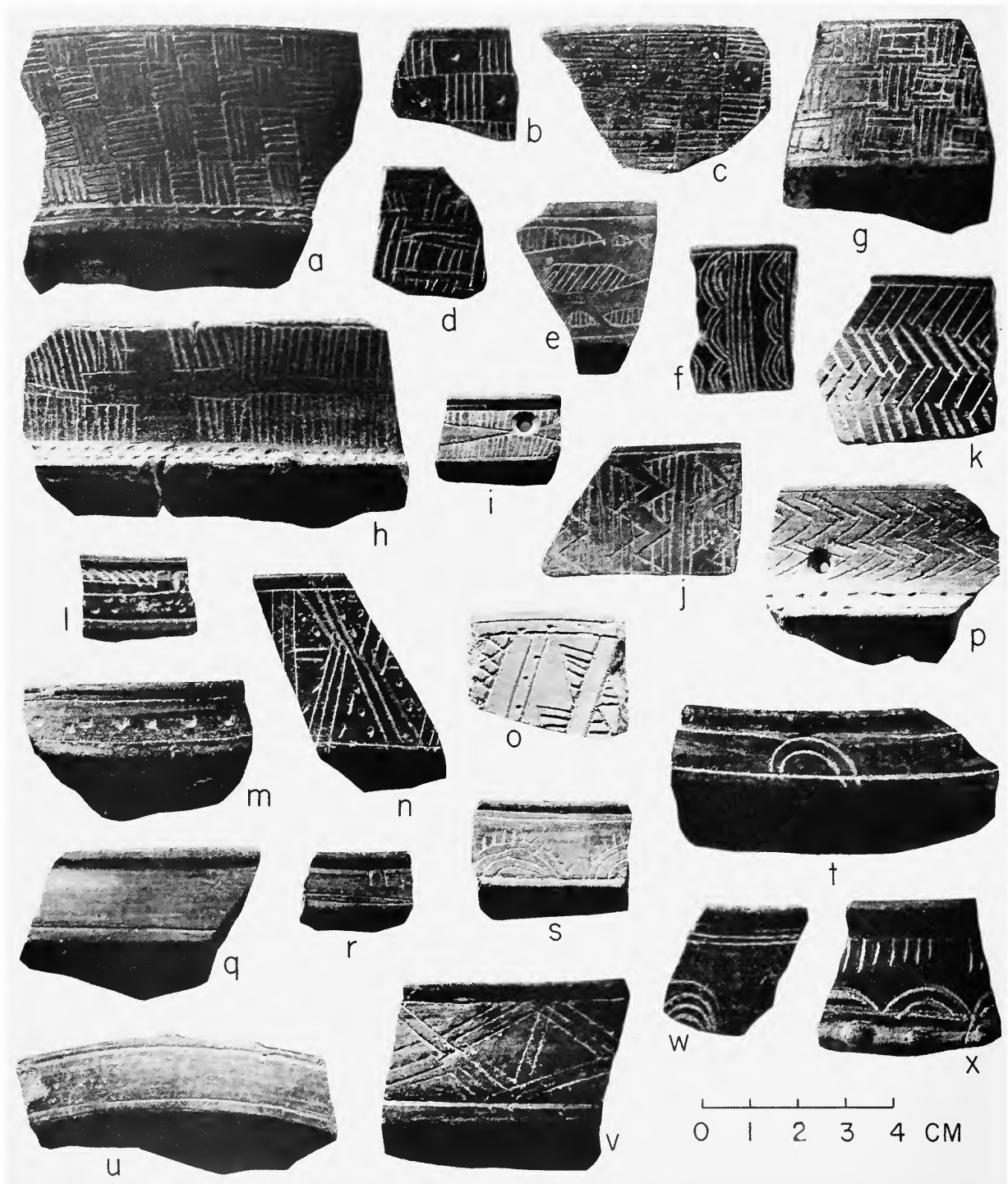

PLATE 134

Type sherds of Ayangue Incised. *a–d, g*, Motif 5, checkerboard. *e–f, h–x*, Unclassified motifs.

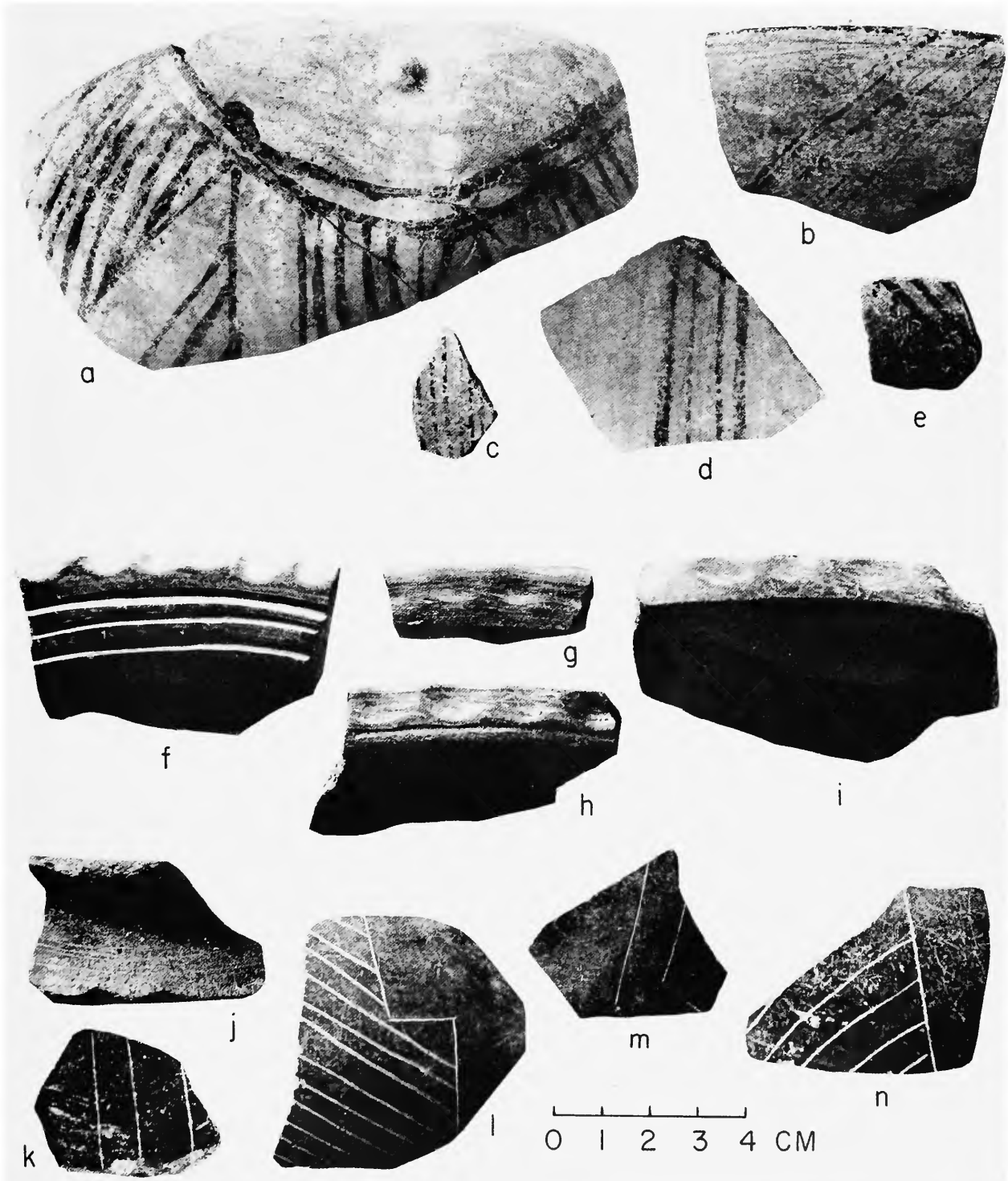

PLATE 135

Minor decorated types of the late Machalilla Phase. *a–e*, Cabuya Black-on-White. *f–i*, Cabuya Finger Pressed Rim. *j–n*, Chorrera Incised.

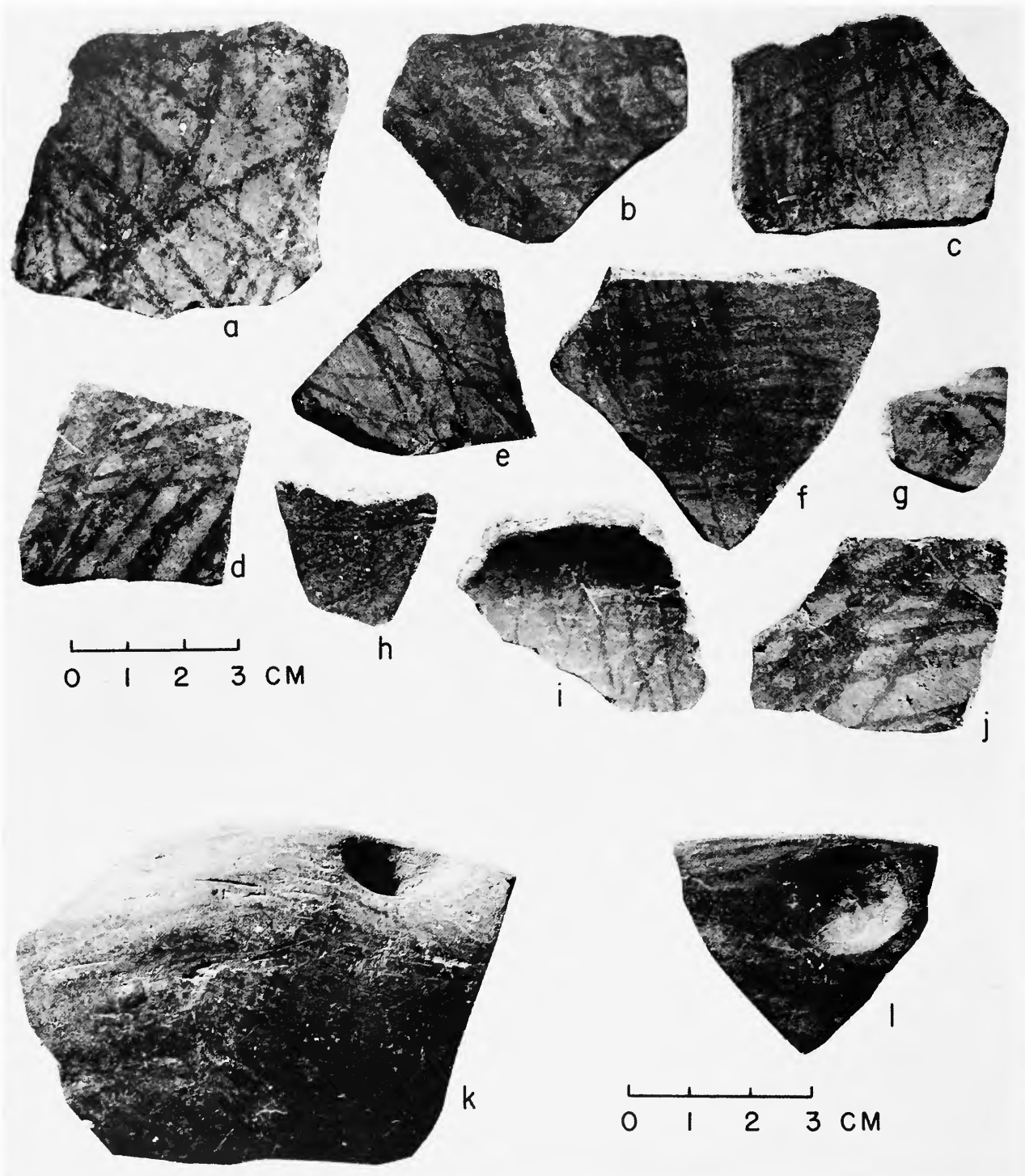

PLATE 136

Type sherds of minor Machalilla Phase decorated types. *a–j*, Machalilla Burnished Line. *k–l*, Machalilla Finger Punched.

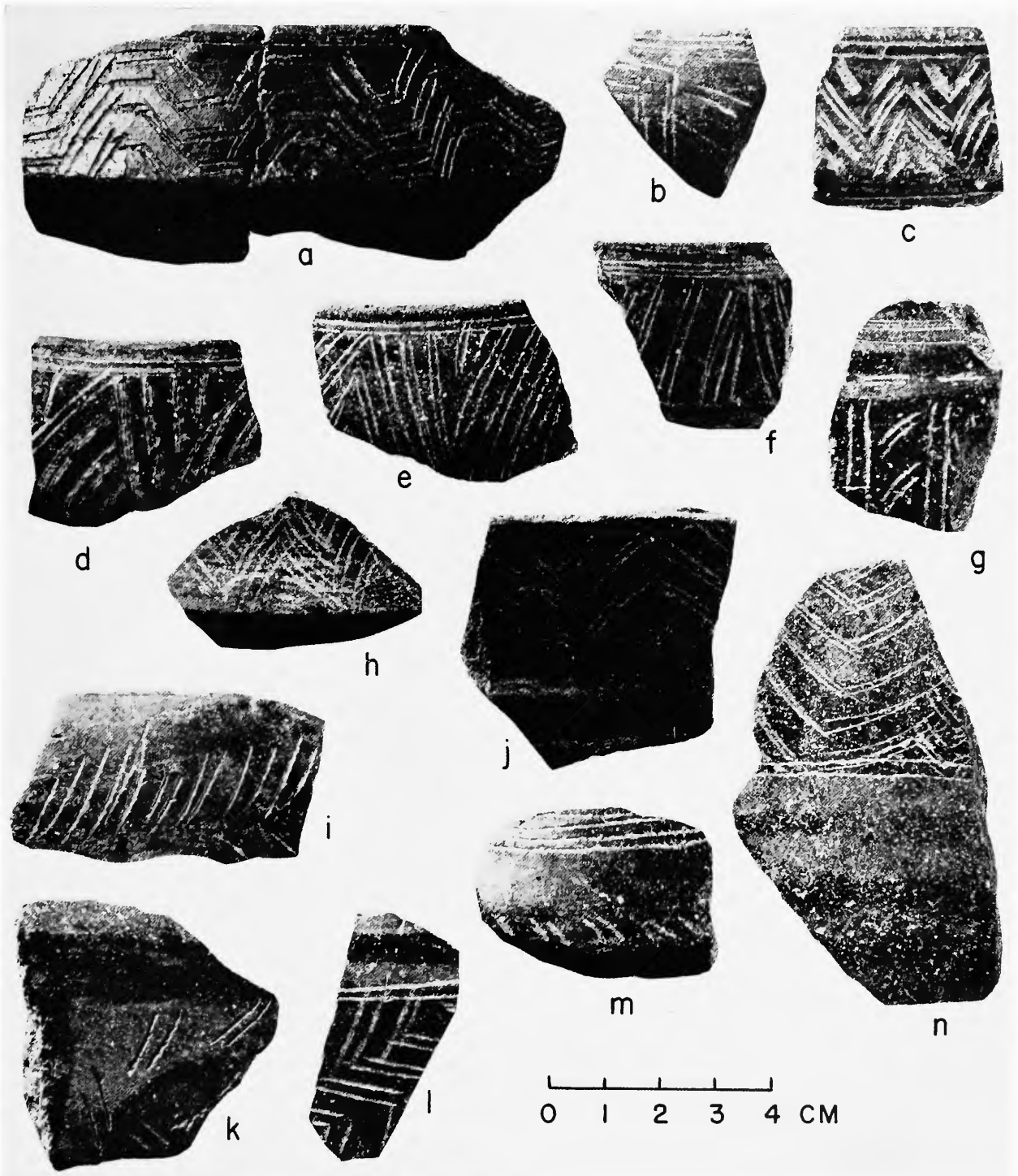

PLATE 137

Type sherds of Machalilla Double-line Incised.

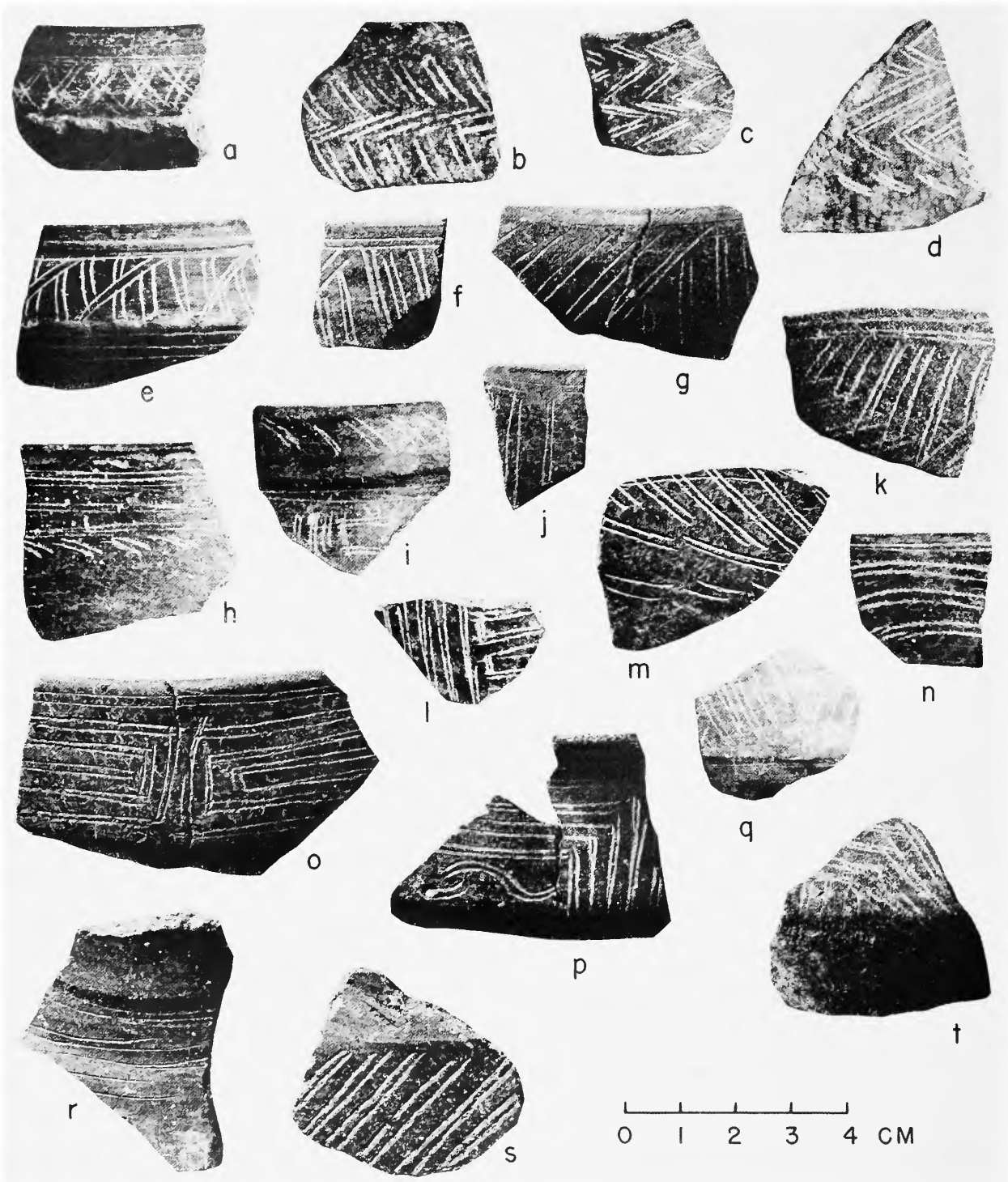

PLATE 138

Trade sherds of Machalilla Double-line Incised from the Valdivia Phase site of G–54.

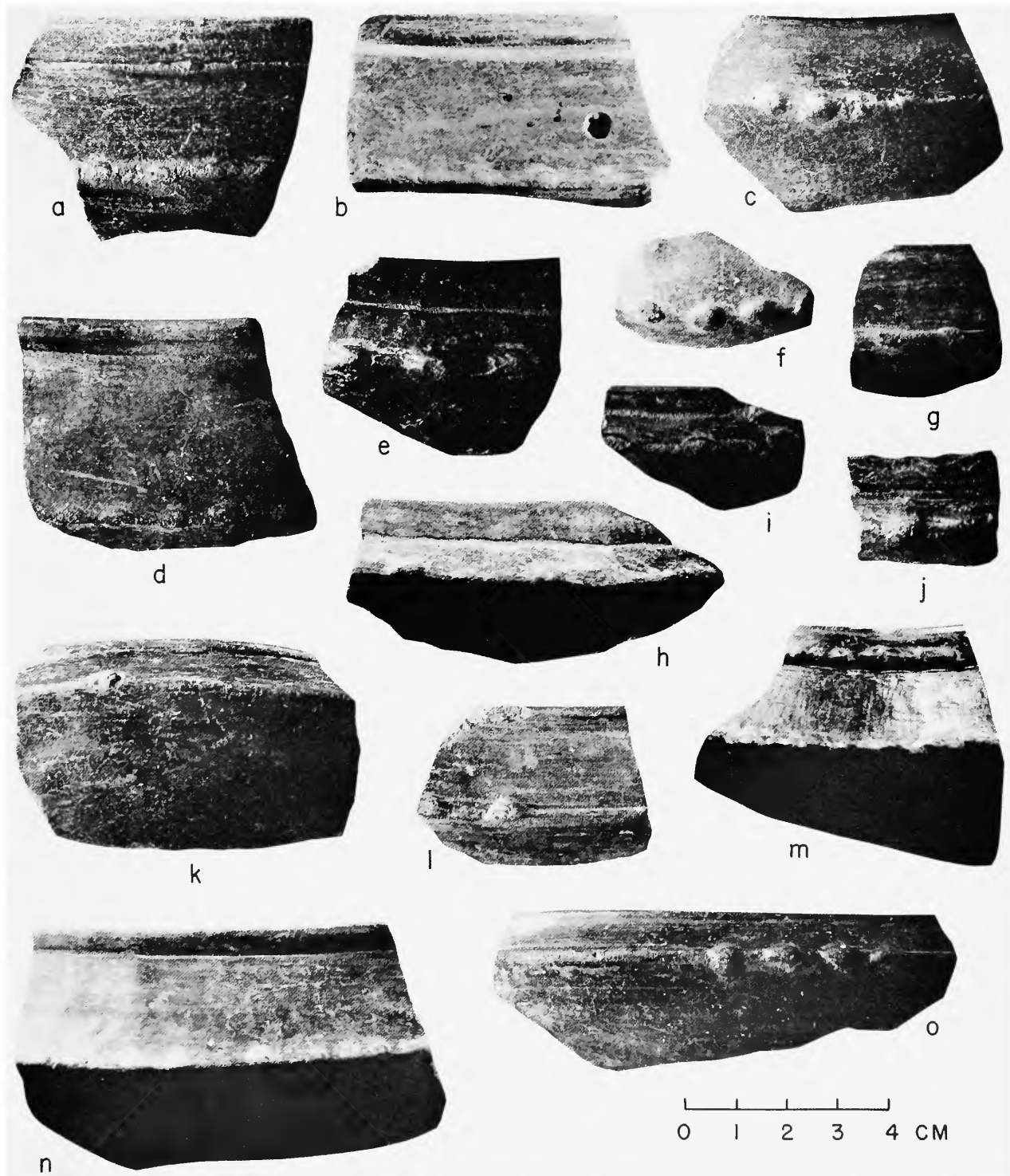

PLATE 139

Type sherds of Machalilla Embellished Shoulder, Technique 1, nubbins.

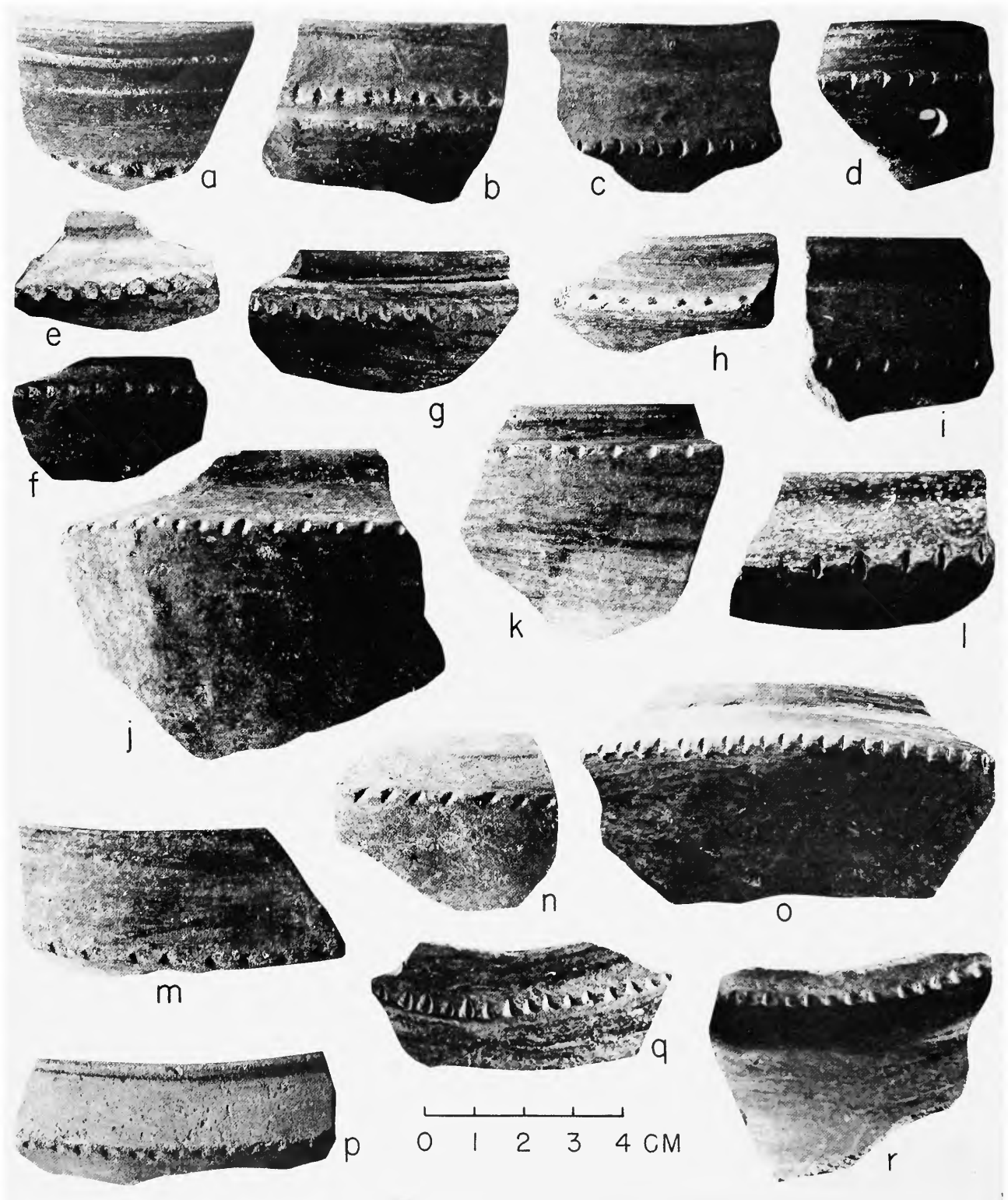

PLATE 140

Type sherds of Machalilla Embellished Shoulder, Technique 2: gashes.

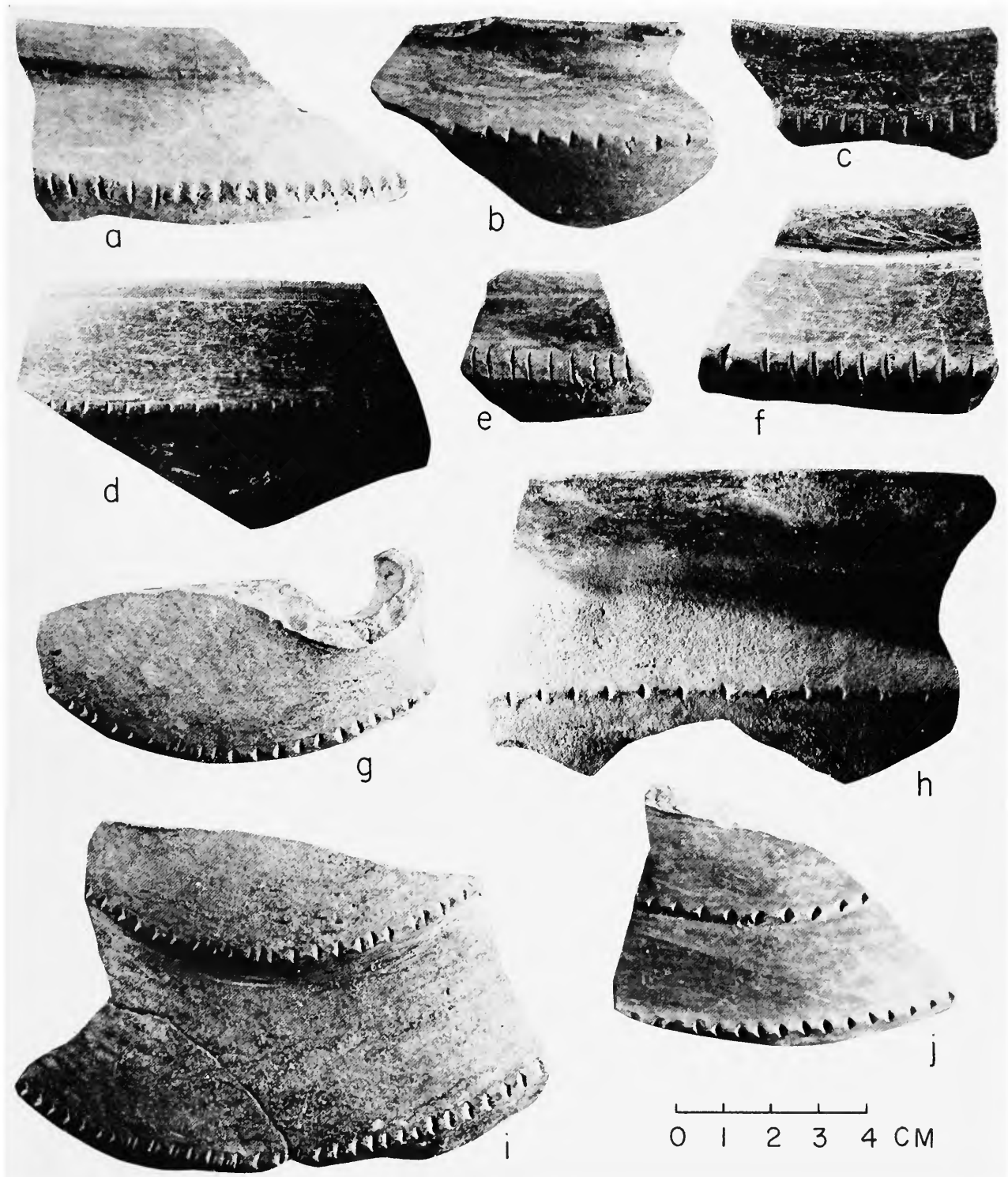

PLATE 141

Type sherds of Machalilla Embellished Shoulder. *a–b*, *g–j*, Technique 2, gashes. *c–f*, Technique 3, nicks.

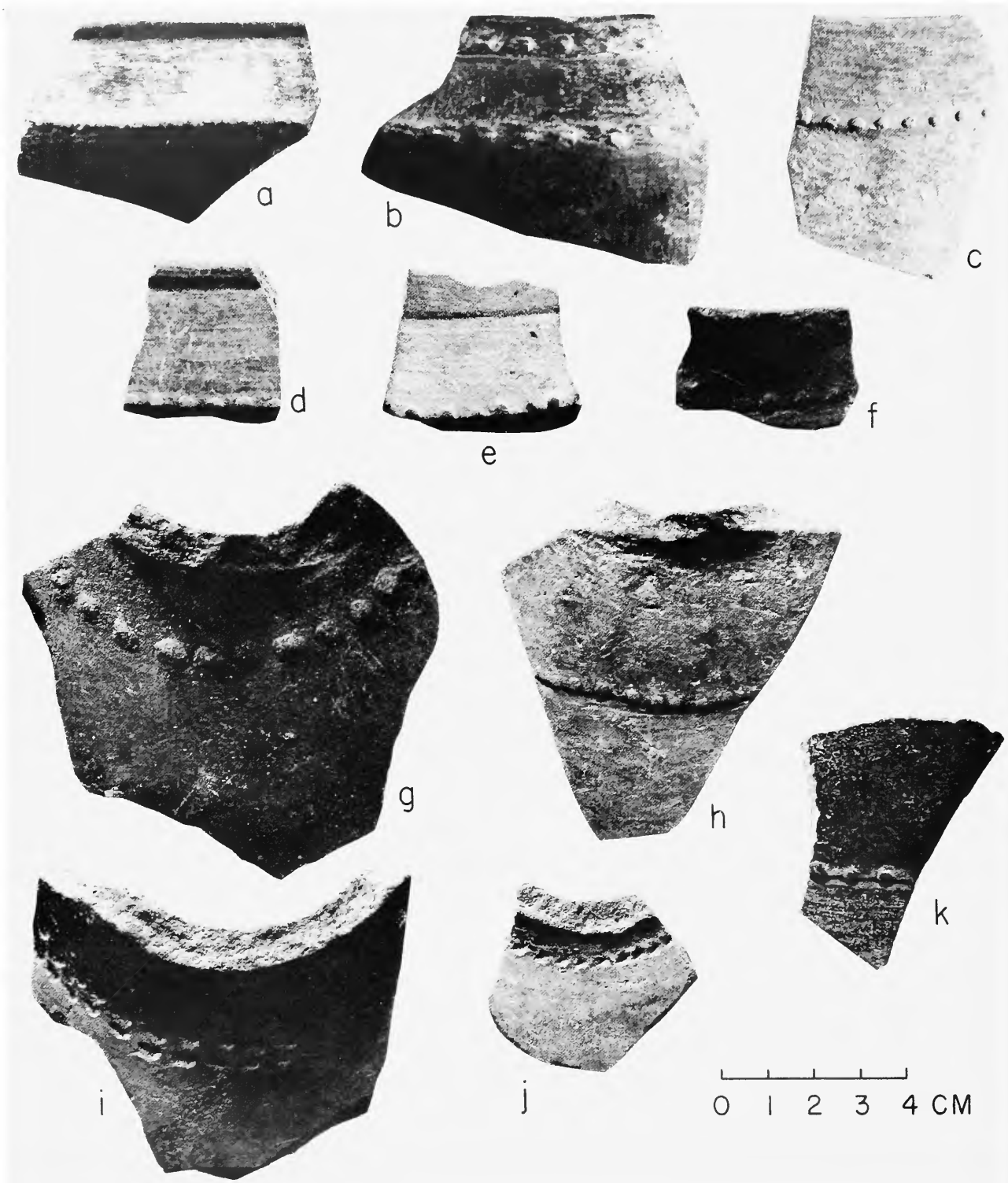

PLATE 142

Decorated pottery types of the Machalilla Phase. *a–f*, Machalilla Embellished Shoulder, Technique 4: "molded". *g–k*, Machalilla Embellished and Red Zoned.

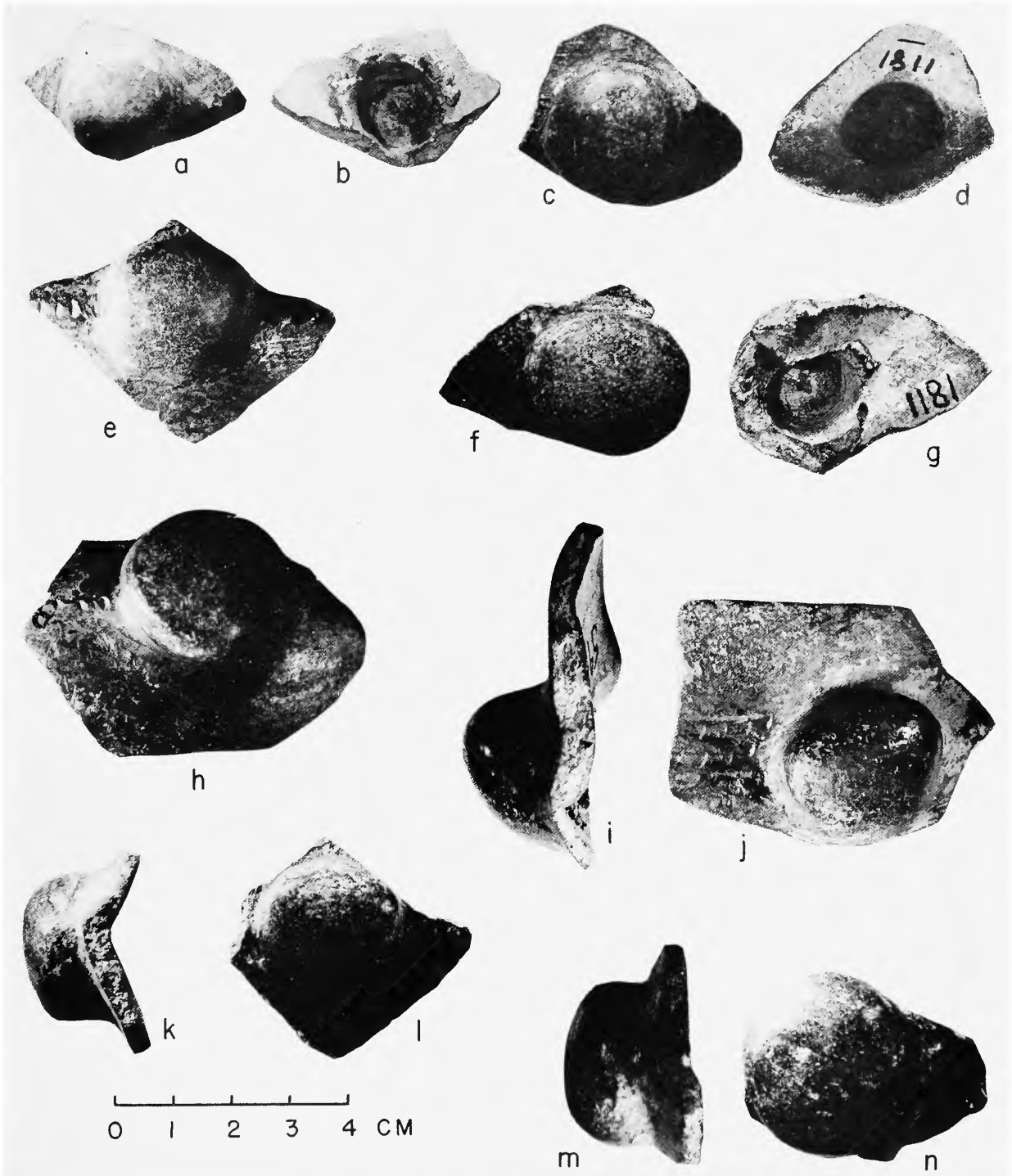

PLATE 143

Type sherds of Machalilla Embellished Shoulder, showing variation in size and shape of bosses.

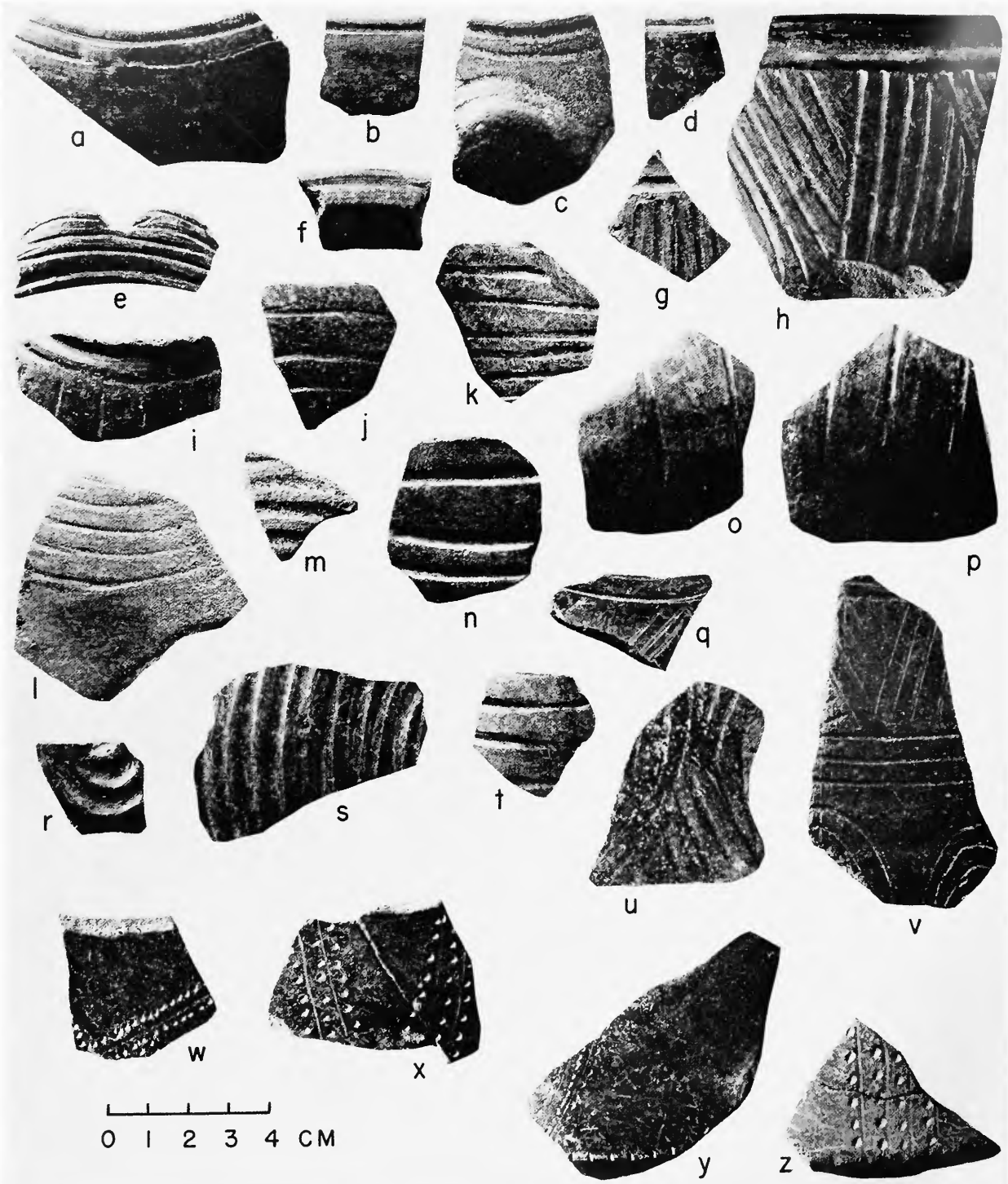

PLATE 144

Type sherds of Machalilla Phase decorated types. *a–v*, Machalilla Incised. *w–z*, Machalilla Incised and Punctate.

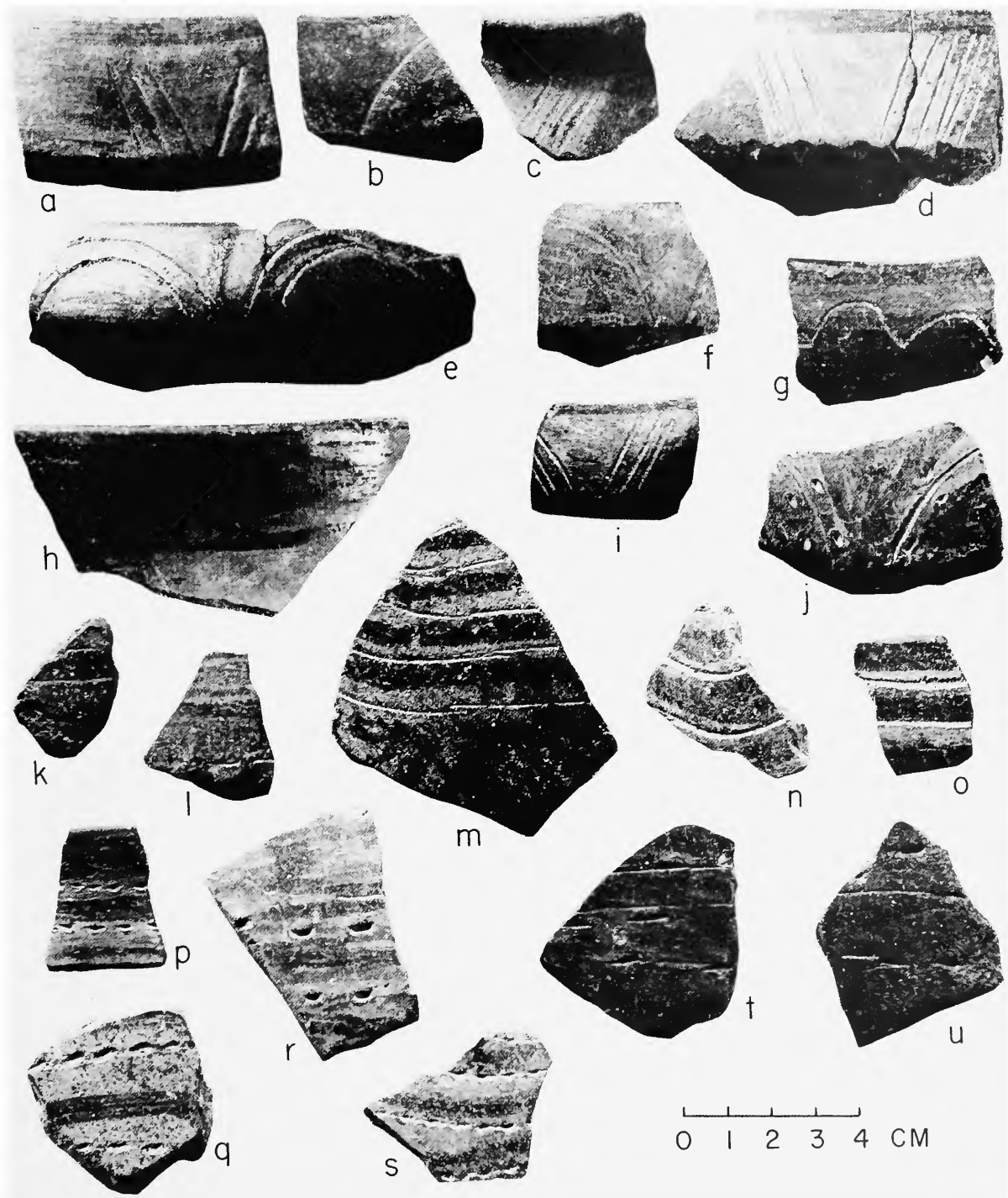

PLATE 145

Type sherds of Machalilla Incised and Red Zoned and Machalilla Punctate and Red Zoned. *a–i*, Typical decoration of Machalilla Incised and Red Zoned. *k*, *m–o*, Rare variant alternating incised line and red band. *l*, *p–s*, Rare variant of Machalilla Punctate and Red Zoned alternating punctate line and red band. *j*, *t–u*, Examples with both incision and punctation alternating with red bands.

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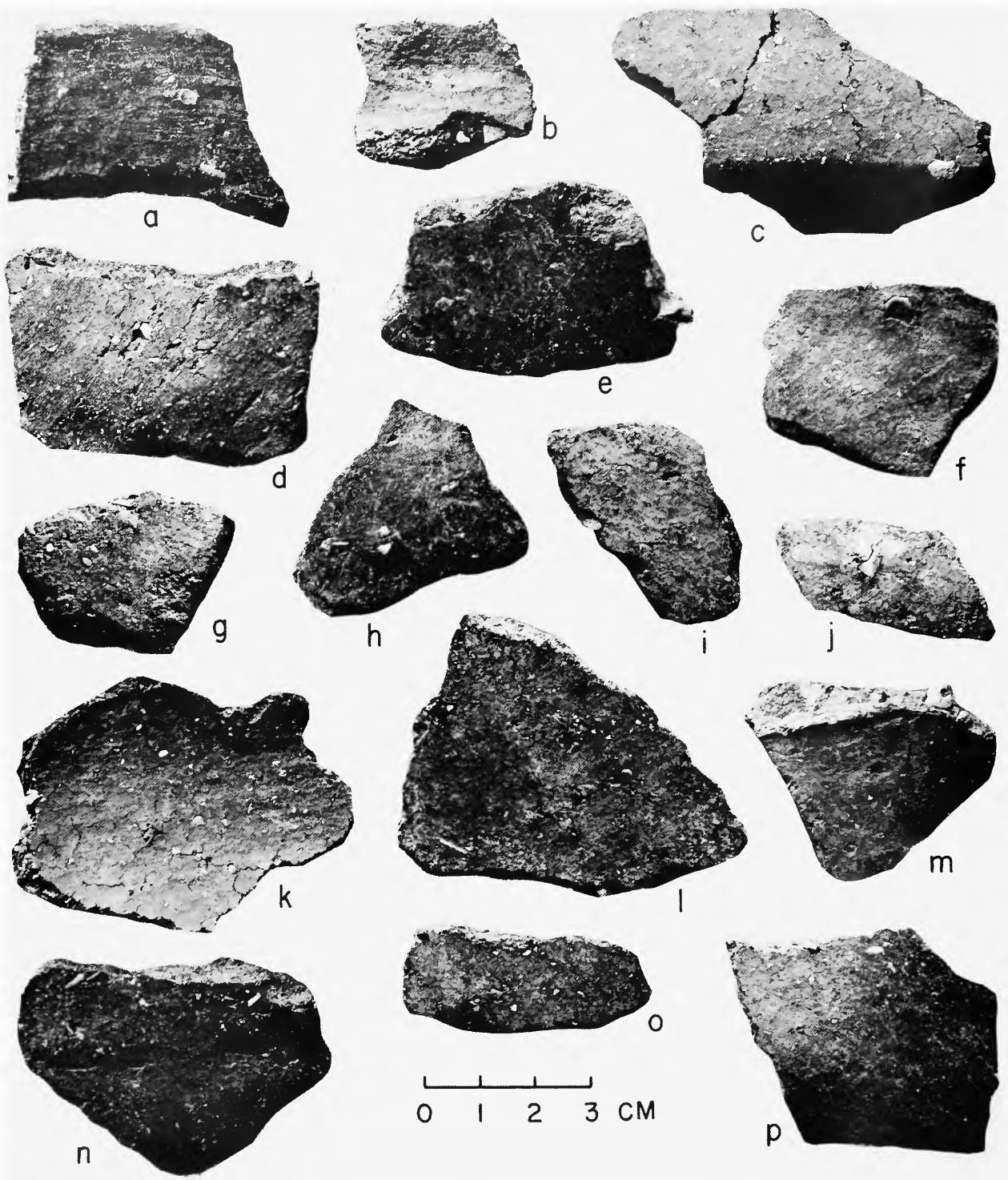

PLATE 146

Type sherds of Machalilla Plain.

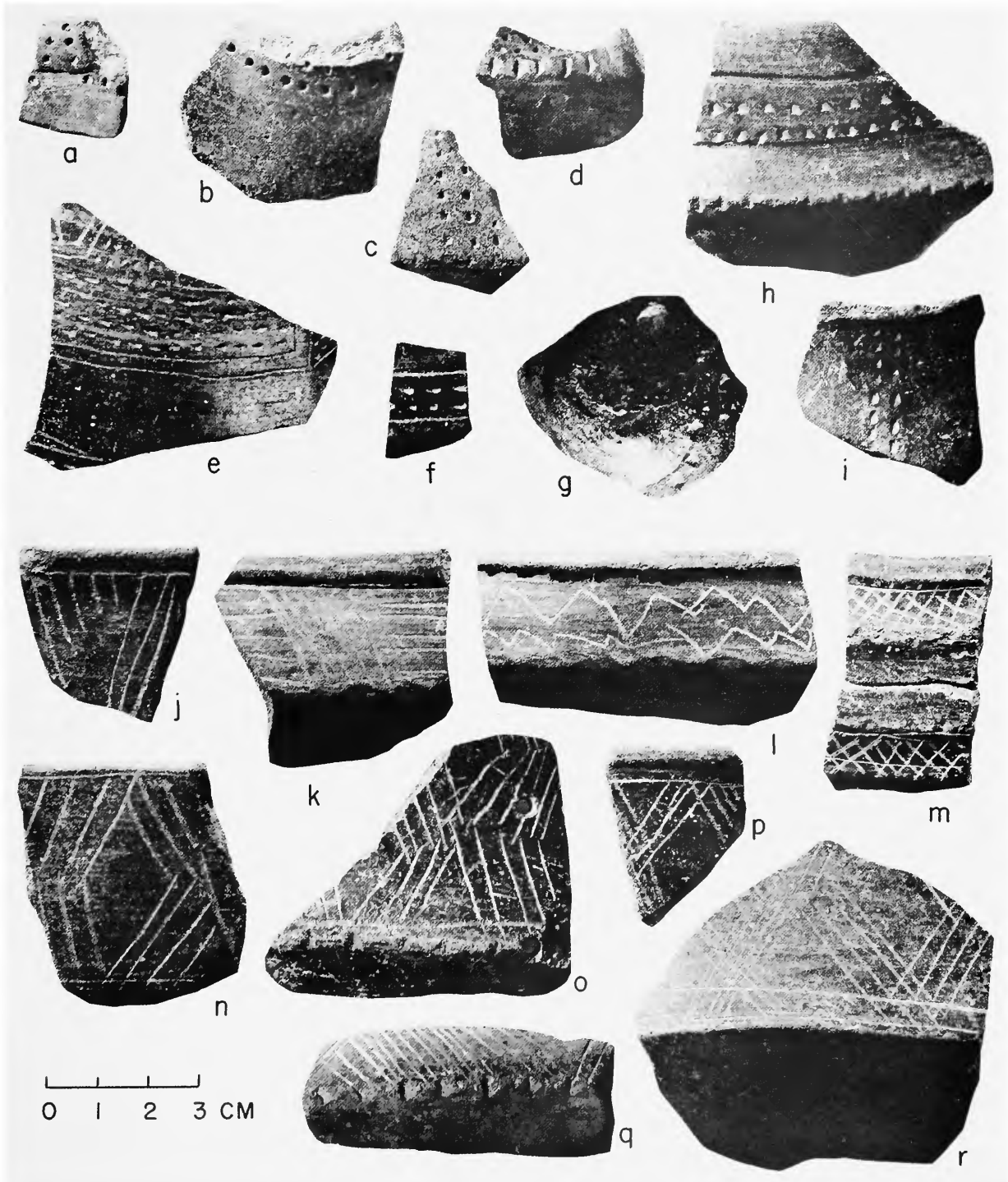

PLATE 147

Type sherds of Machalilla Phase decorated types. *a–i*, Machalilla Punctate. *j–r*, Machalilla Red Incised.

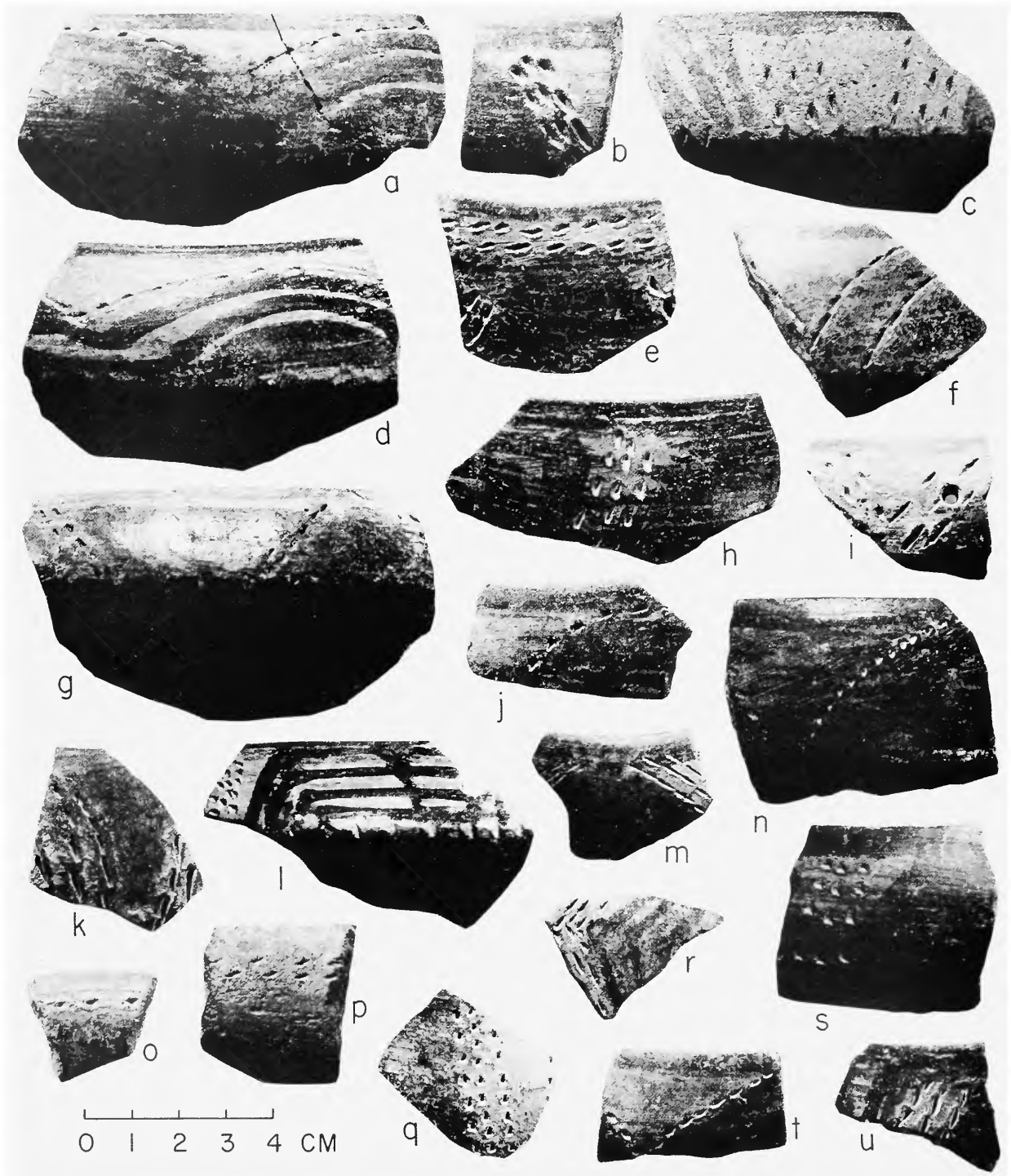

PLATE 148

Type sherds of Machalilla Punctate and Red Zoned. *a–s*, Sherds from Machalilla Phase sites. *t–u*, Sherds of trade origin from the Valdivia Phase site of G–54.

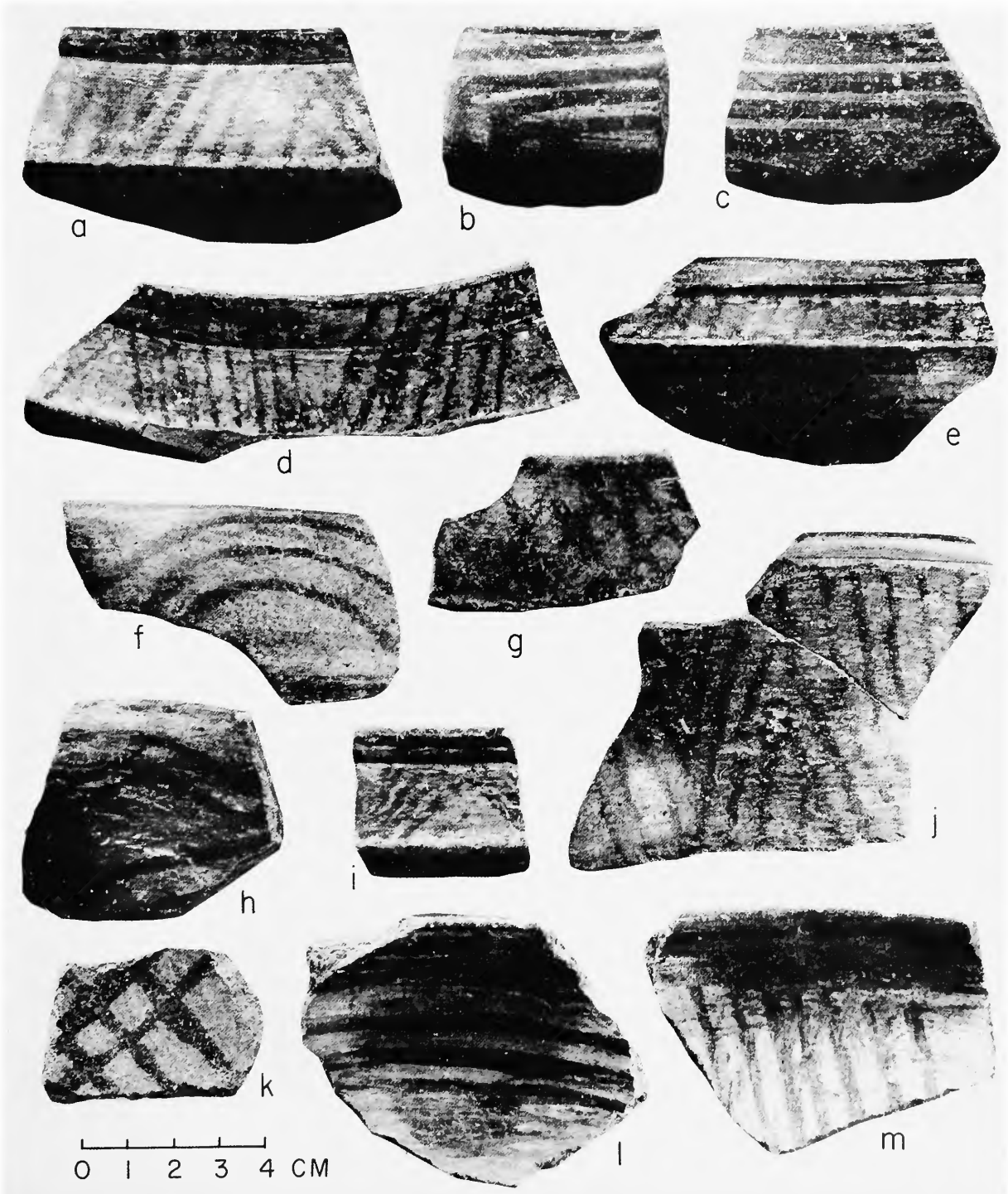

PLATE 149

Type sherds of Machalilla Red Banded, narrow variety. *a–j*, Bowl exteriors. *k–m*, Bowl interiors.

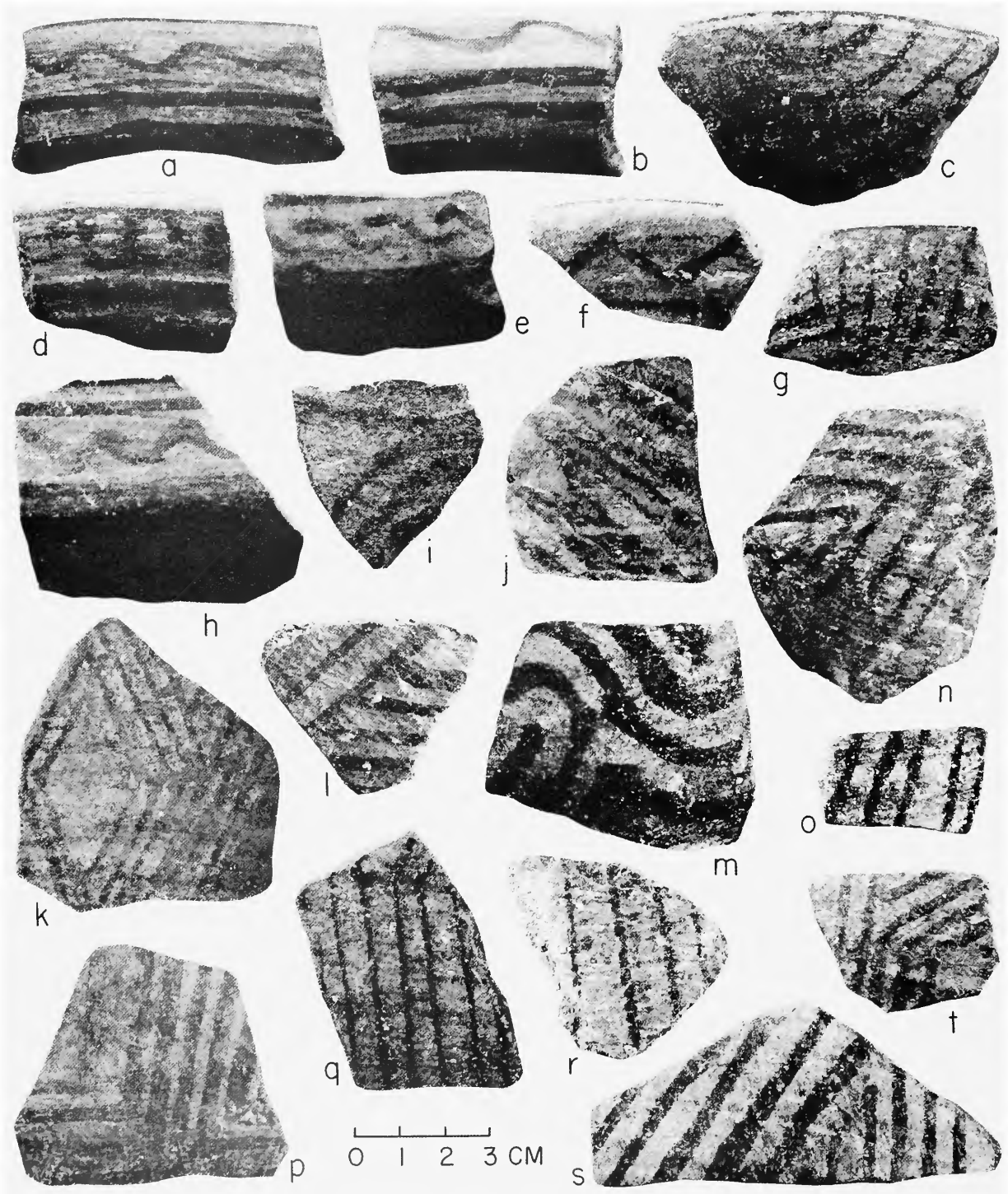

PLATE 150

Type sherds of Machalilla Red Banded, narrow variety. *a–g*, Interior of jar rims. *h–t*, Jar body exterior.

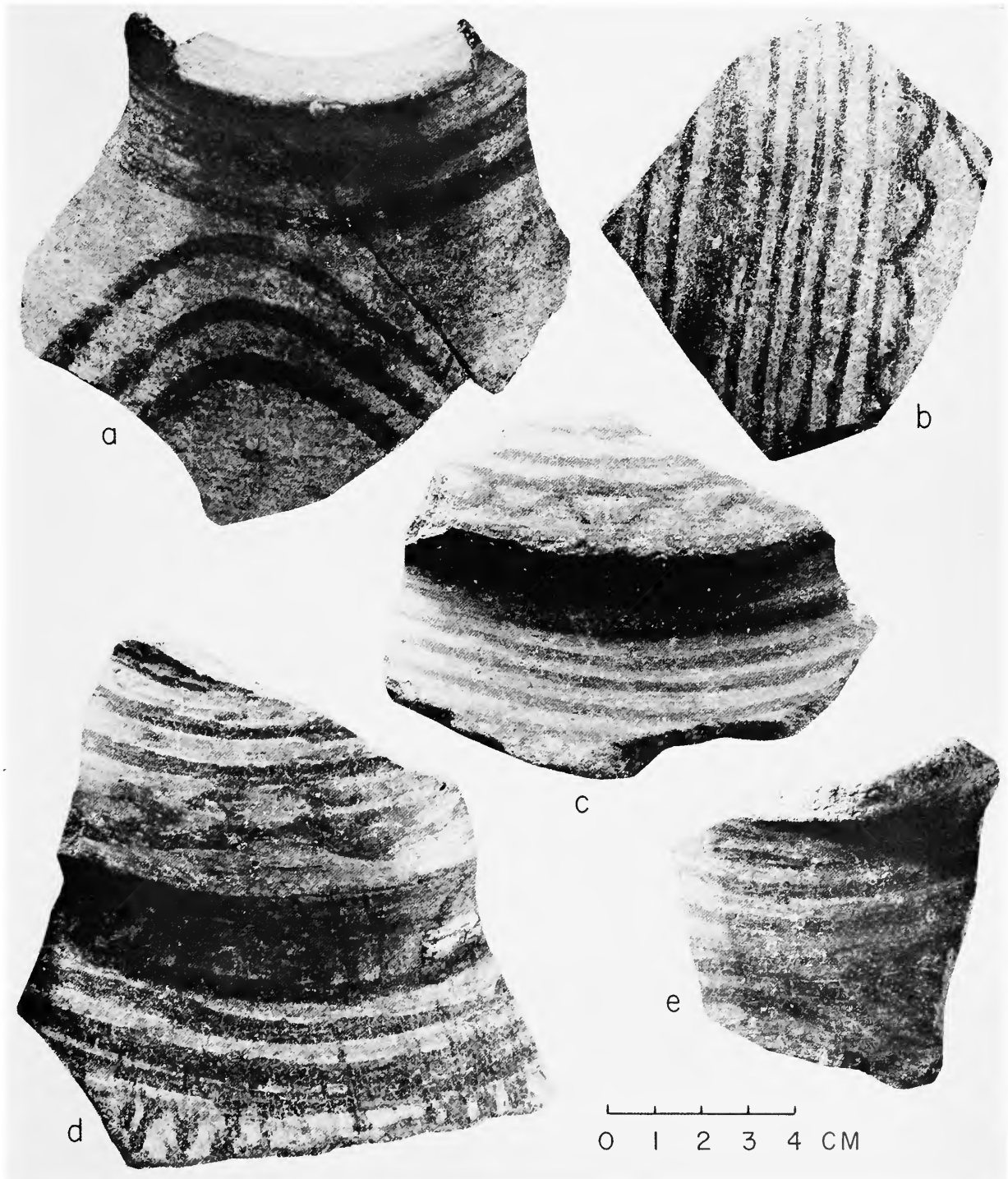

PLATE 151

Type sherds of Machalilla Red Banded, narrow variety, jar exteriors.

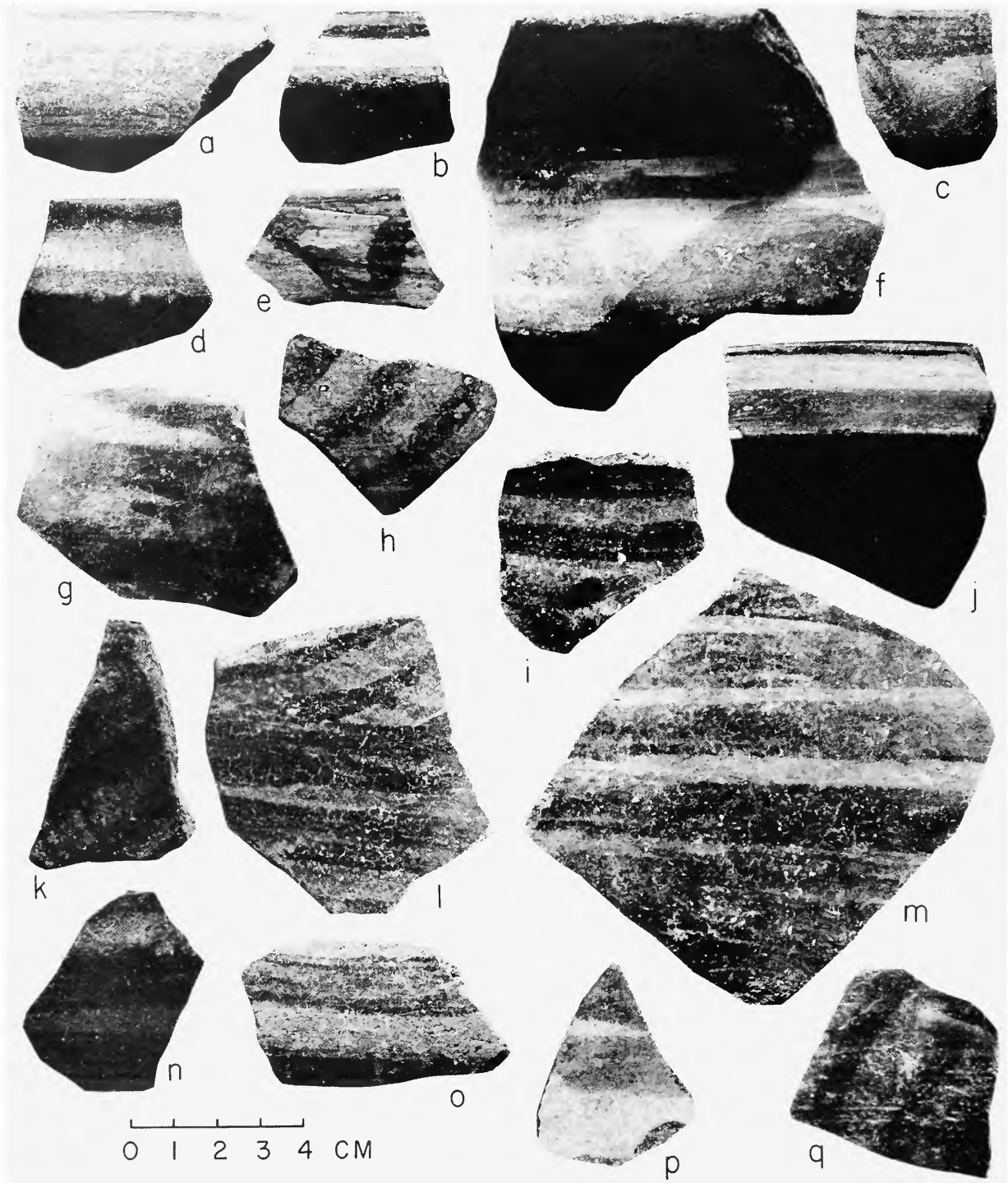

PLATE 152

Type sherds of Machalilla Red Banded, wide variety.

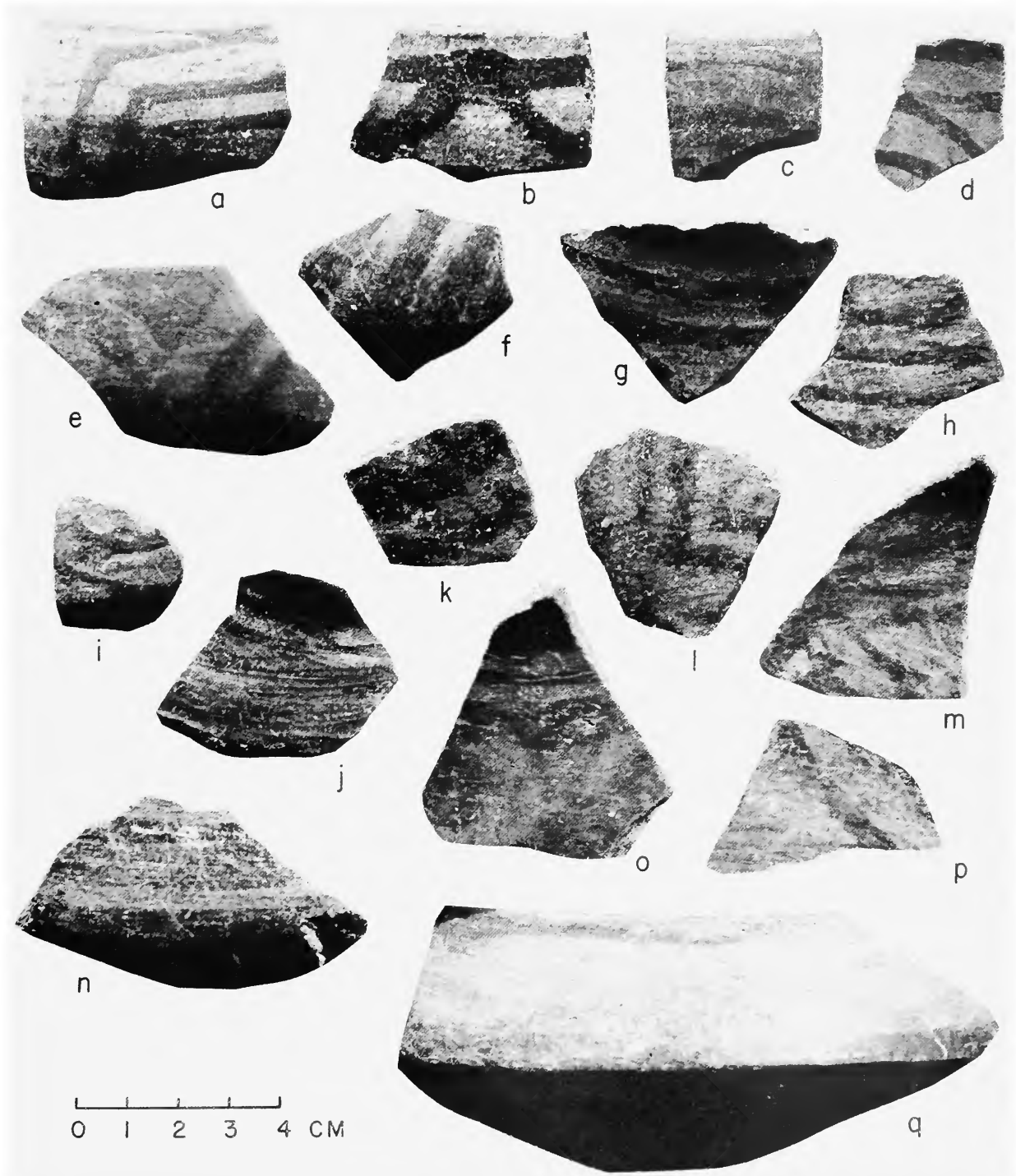

PLATE 153

Machalilla Red Banded sherds from the Valdivia Phase site of G–54: Buena Vista. *a–m*, *o–p*, Narrow bands. *n*, *q*, Wide bands.

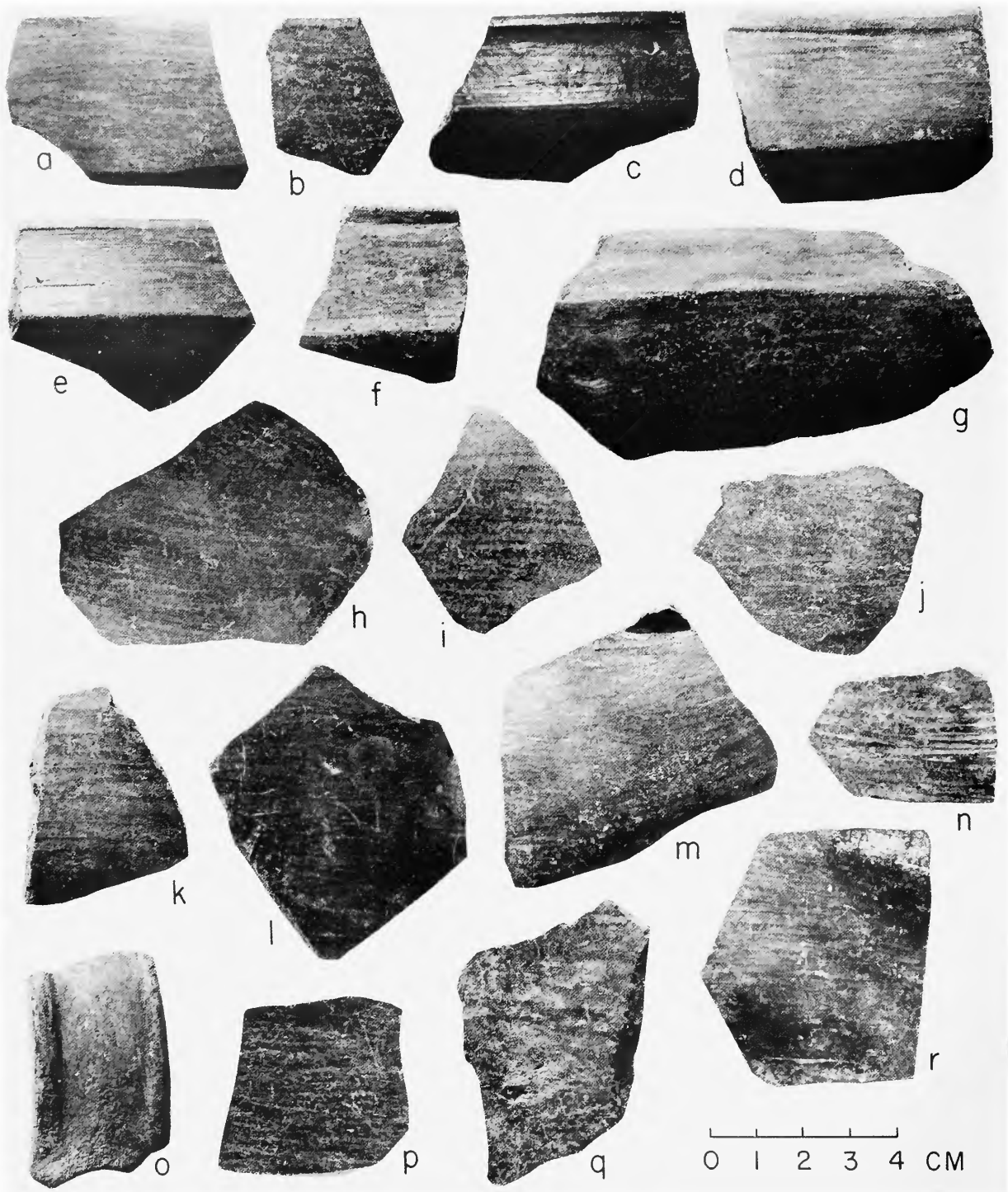

PLATE 154

Type sherds of Machalilla Striated Polished Plain.

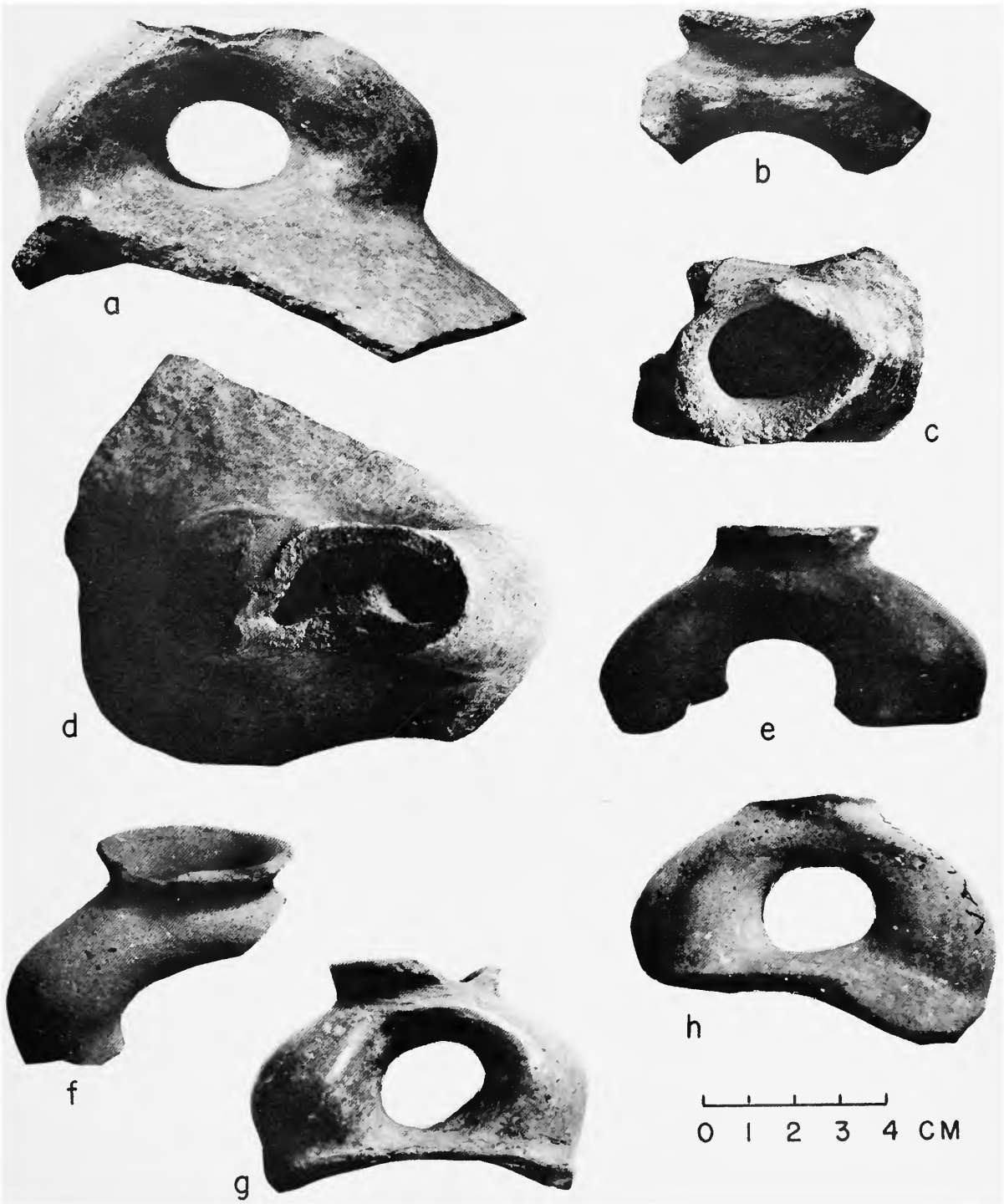

PLATE 155

Stirrup spouts of Machalilla Striated Polished Plain.

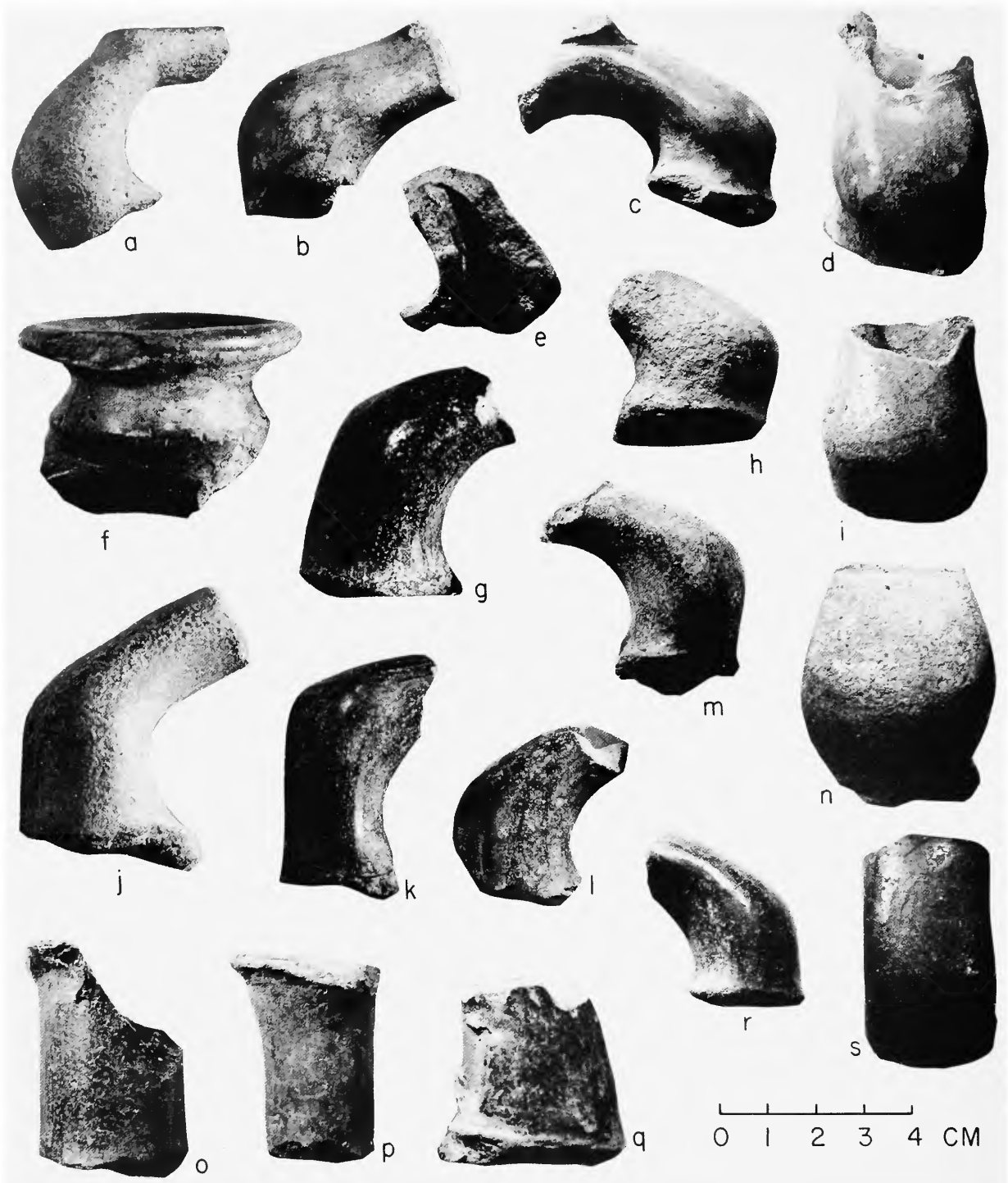

PLATE 156

Machalilla Striated Polished Plain stirrup and cylindrical spout fragments. *a–n*, *r–s*, Stirrup spout fragments. *o–q*, Cylindrical spout fragments.

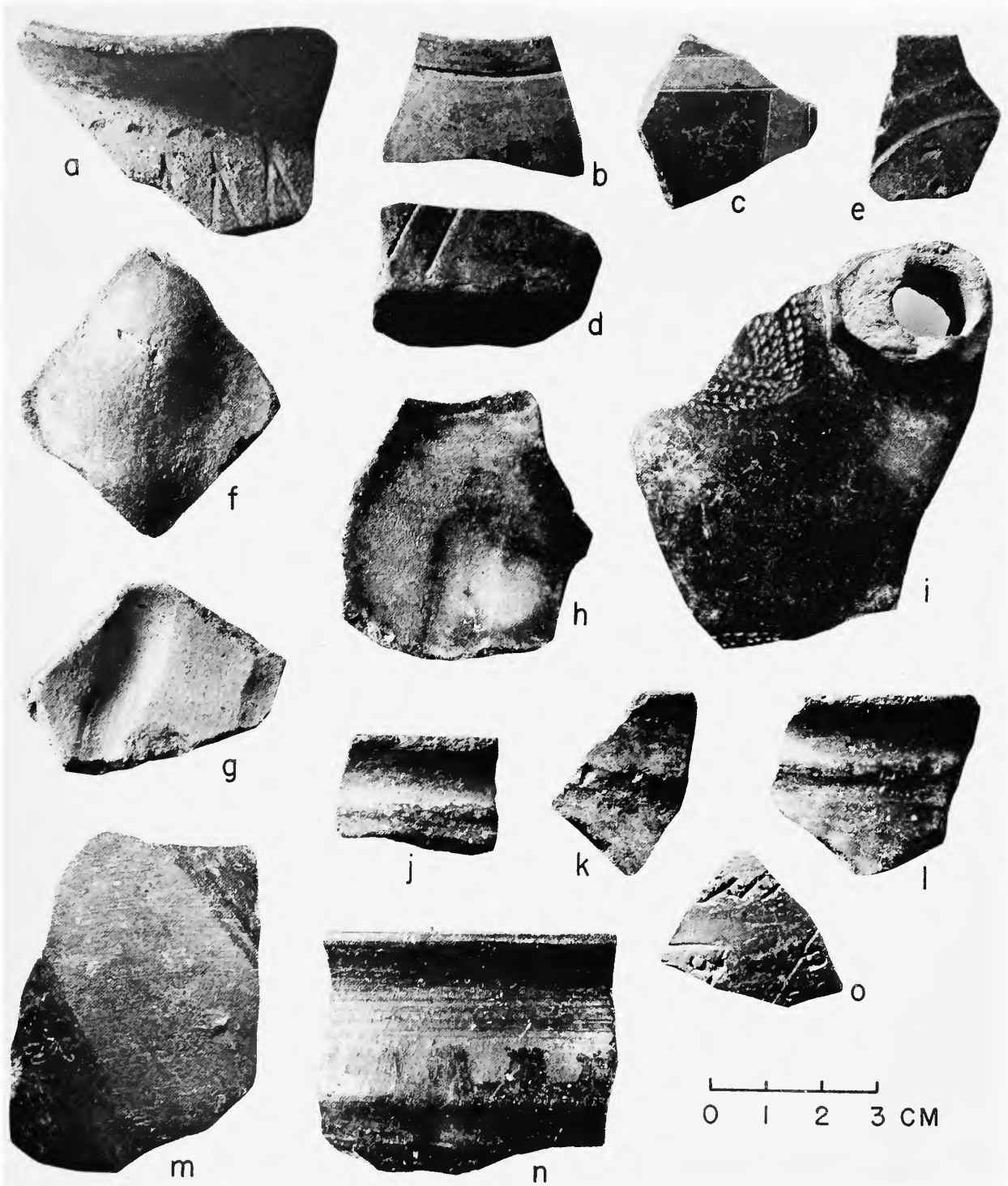

PLATE 157

Unclassified decorated sherds from Machalilla Phase sites. *a*, Rocker stamped. *b–c*, Zoned red. *d*, Zoned red and black. *e*, Zoned punctate. *f–h*, Finger grooved. *i*, Dentate stamped. *j–l*, Horizontal ridge. *m–n*, Pattern burnished. *o*, Zoned rings.

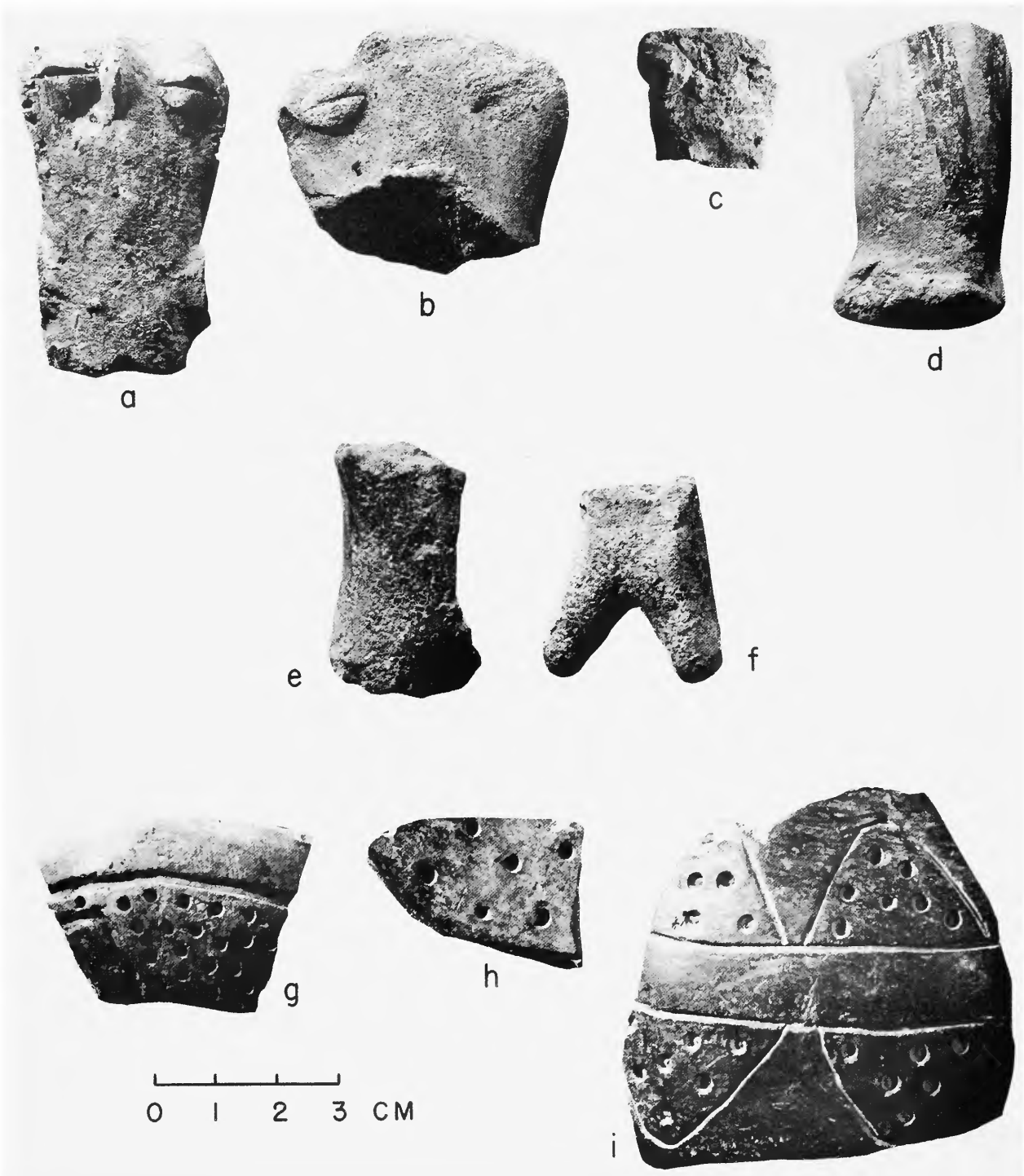

PLATE 158

Figurines and unclassified decorated sherds from Machalilla Phase sites. *a–d*, Machalilla figurines. *e–f*, Figurine fragments of Valdivia Phase origin. *g–i*, Zoned punctate sherds of unidentified origin.

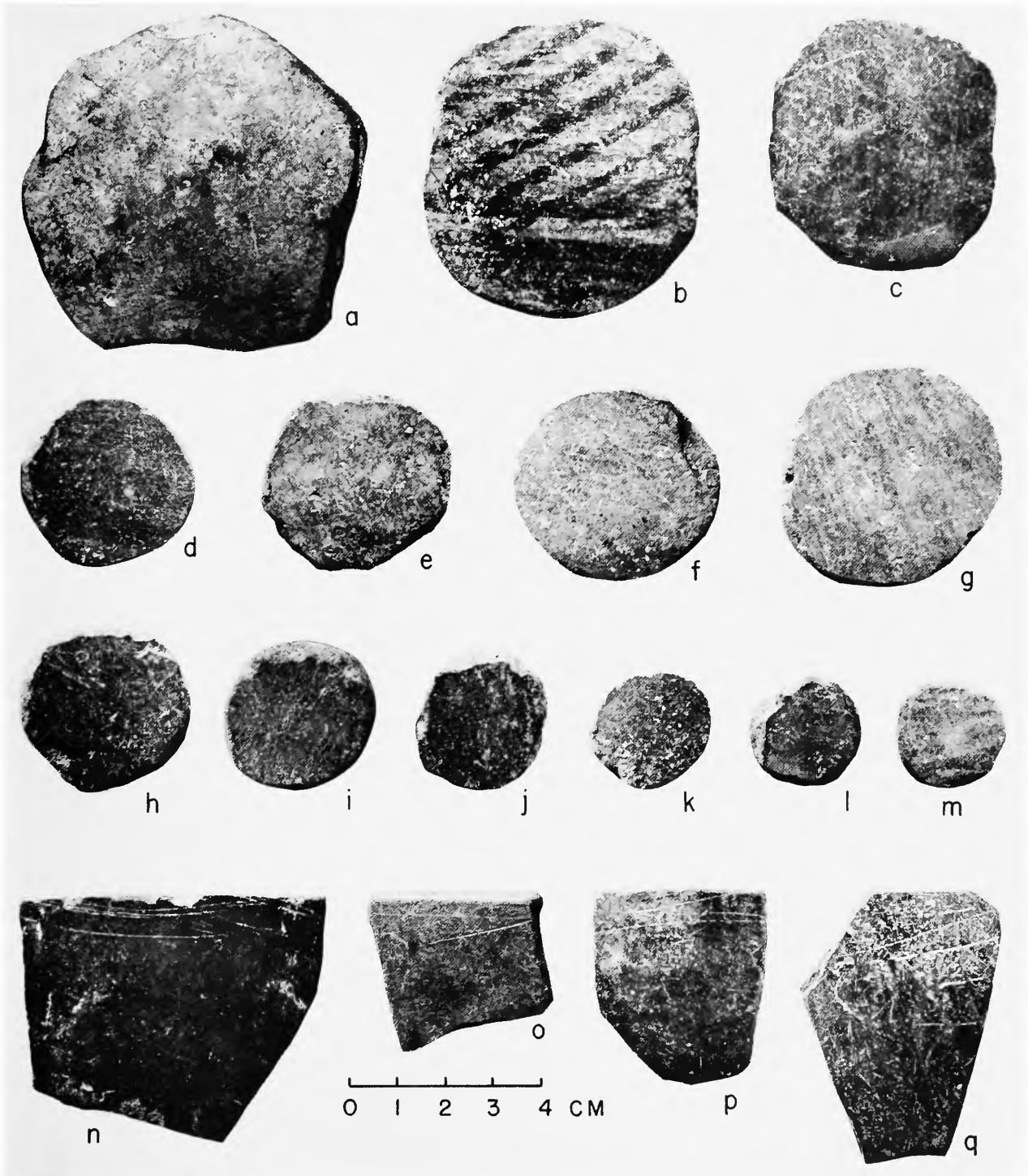

PLATE 159

Worked sherds from Machalilla Phase sites. *a–m*, Disks. *n–q*, Scrapers.

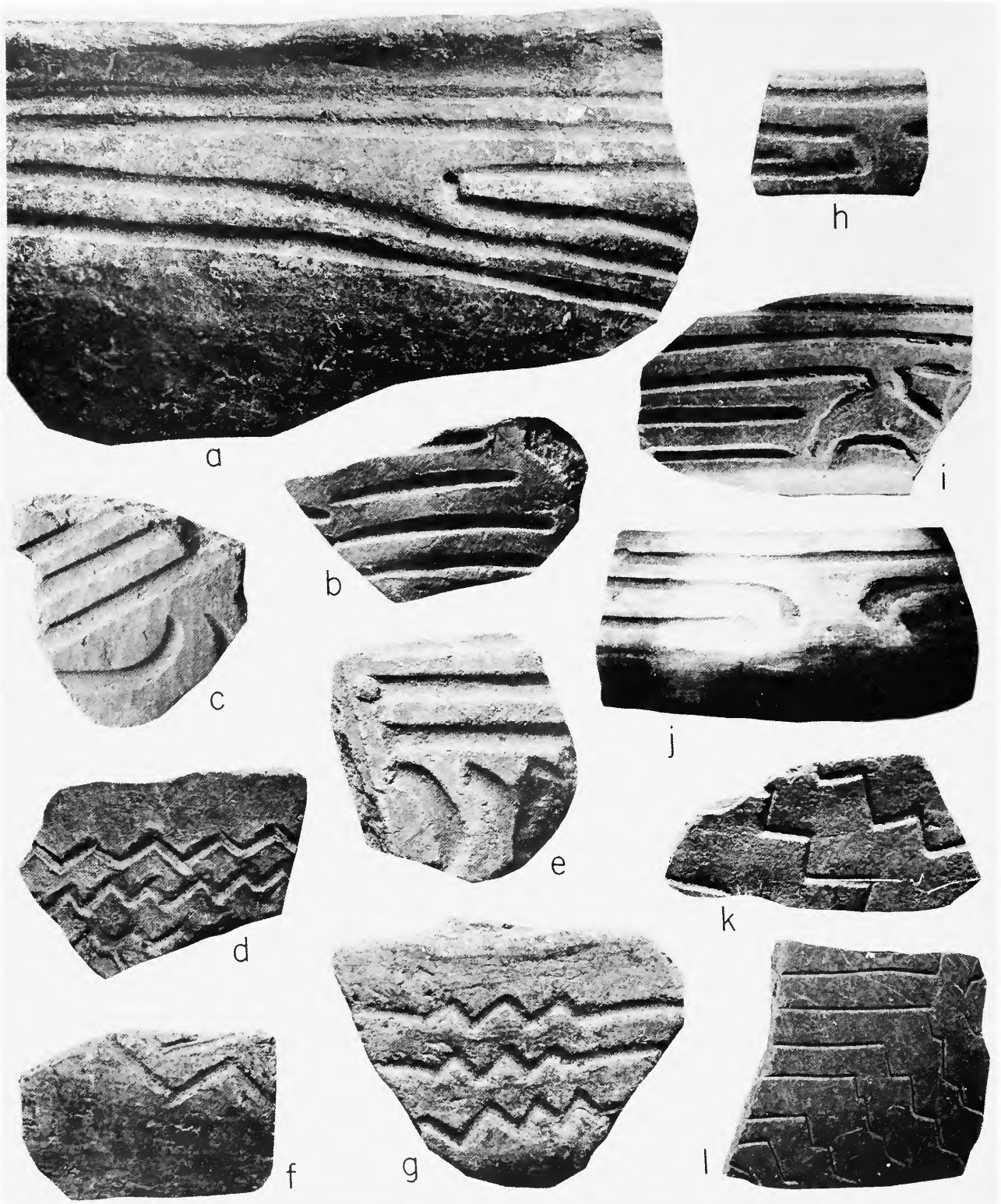

PLATE 160

Jomon and Valdivia Phase sherds showing similar technique and motif in broad-line incised designs. *a*, Izumi. *b*, Sobata. *c*, *e*, Natsushima. *d*, *f–g*, Kasugacho. *h–l*, Valdivia Phase sites.

PLATE 161

Jomon and Valdivia Phase sherds with similar broad-line incised motifs. *a*, Ataka (after Kidder, 1957, pl. IV–1). *b–c*, Ataka. *d–h*, Valdivia Phase sites.

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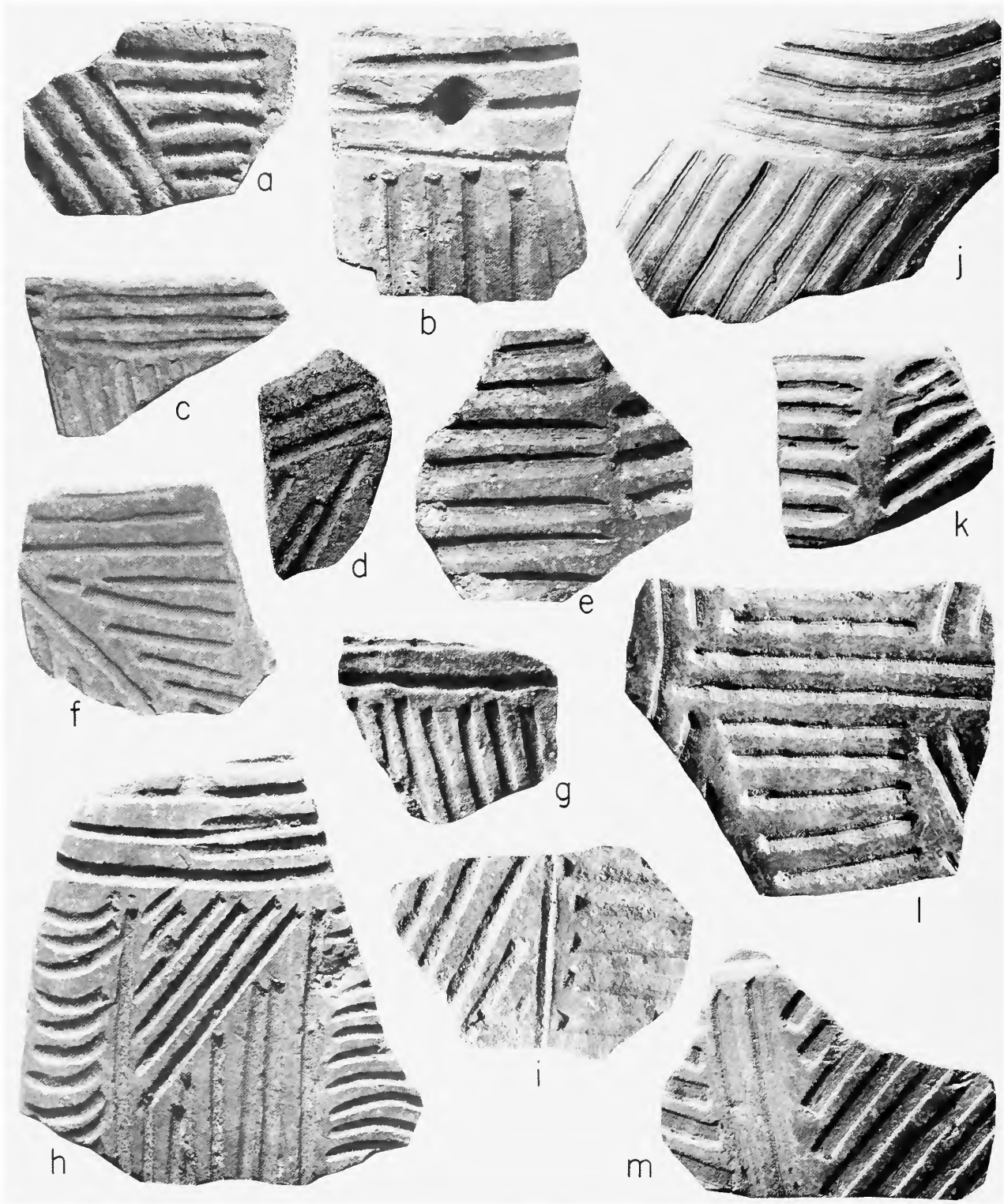

PLATE 162

Jomon and Valdivia Phase sherds with broad-line incised designs of similar technique and motif. *a*, *c*, *f–g*, Sobata. *b*, *e*, *h–ı*, Natsushima. *d*, Mito. *j–m*, Valdivia Phase sites.

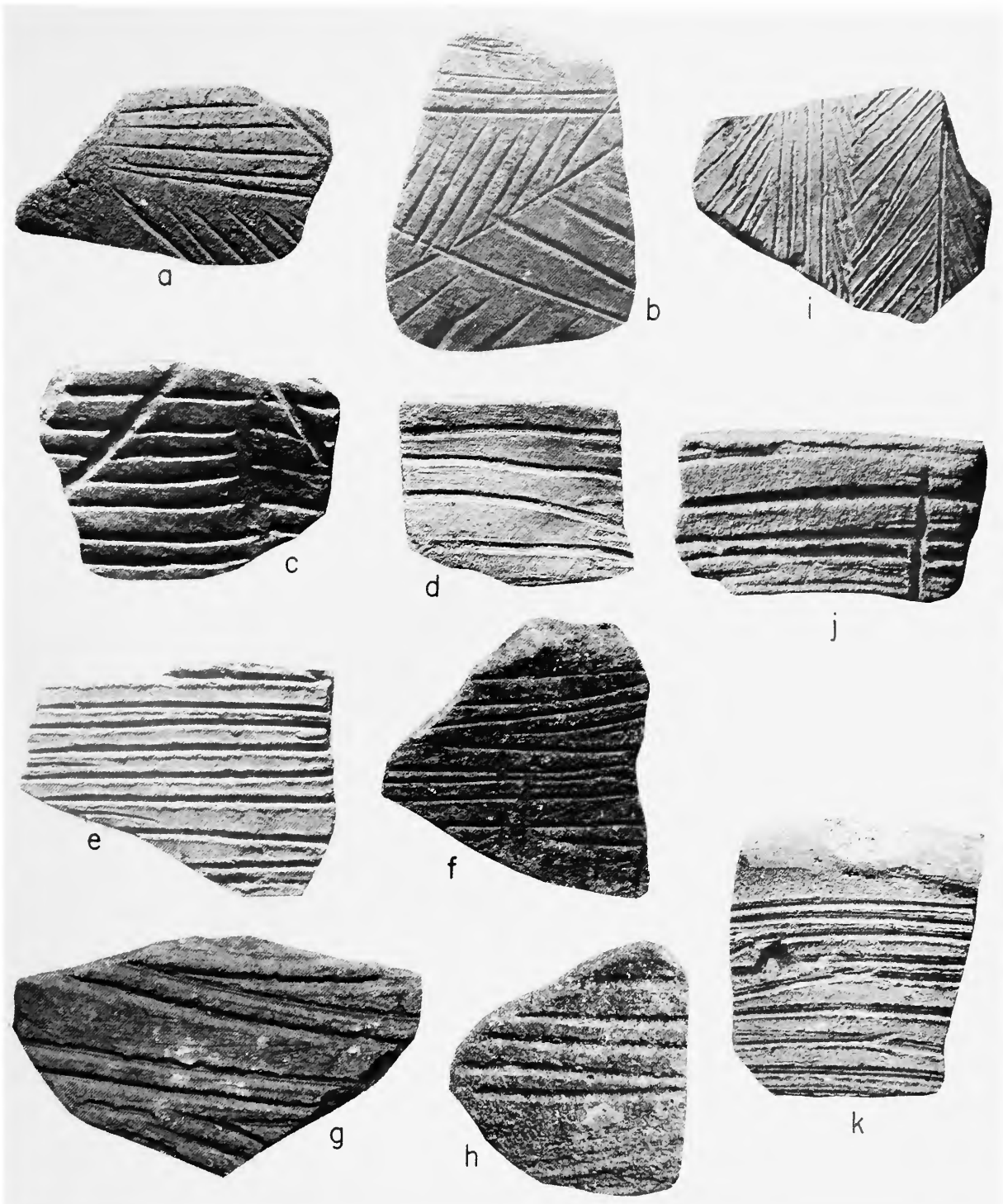

PLATE 163

Jomon and Valdivia Phase sherds with incised decoration in similar technique and motifs. *a*, Mito. *b*, *e–f*, Natsushima. *c–d*, Ryuo. *g*, Moroiso. *h*, Izumi. *i–k*, Valdivia Phase sites.

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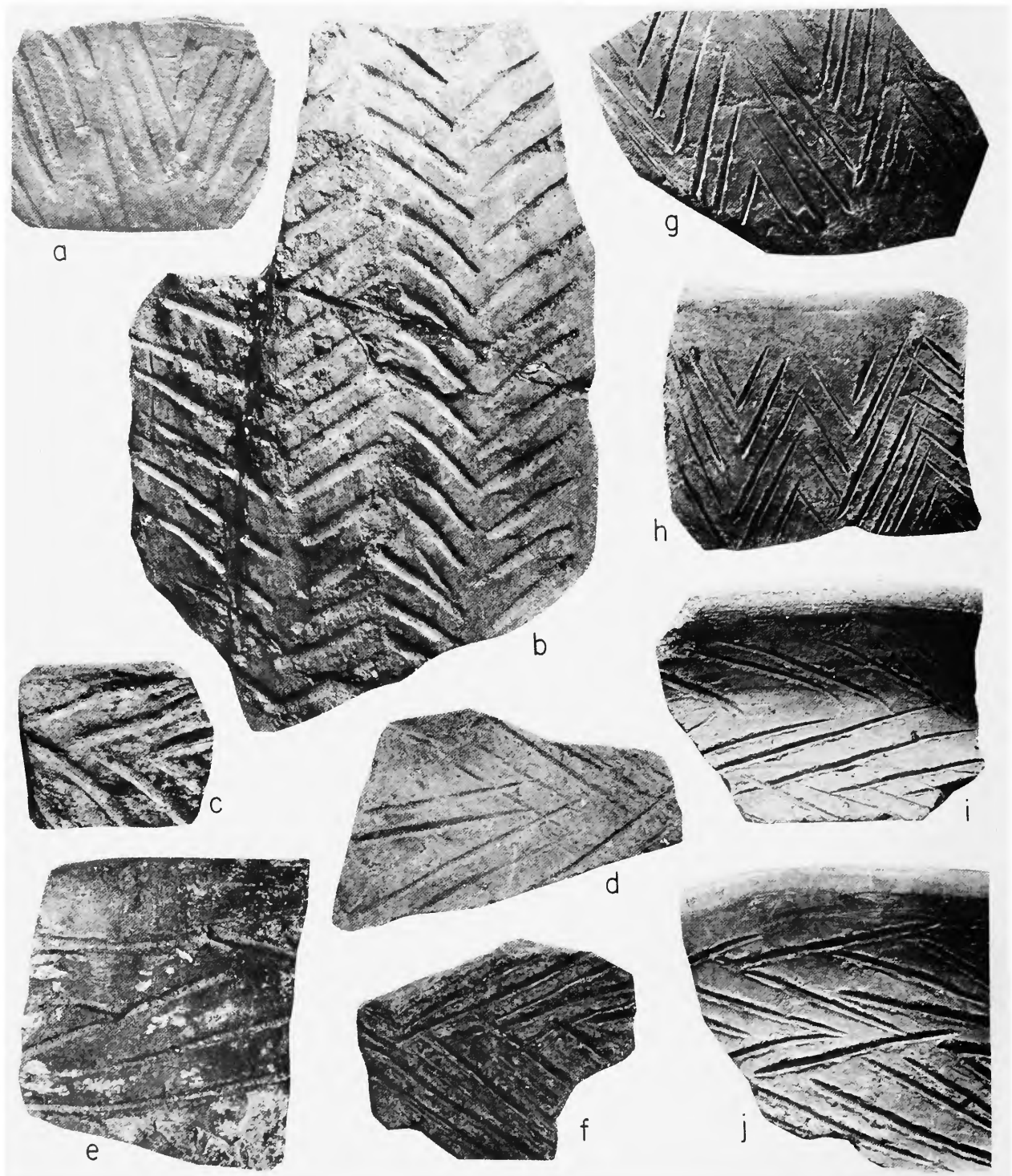

PLATE 164

Jomon and Valdivia Phase sherds with similar incised decoration in vertical or horizontal zigzag motif. *a*, Sobata. *b*, Honjo. *c*, *e*, Izumi. *d*, *f*, Moroiso. *g–j*, Valdivia Phase sites.

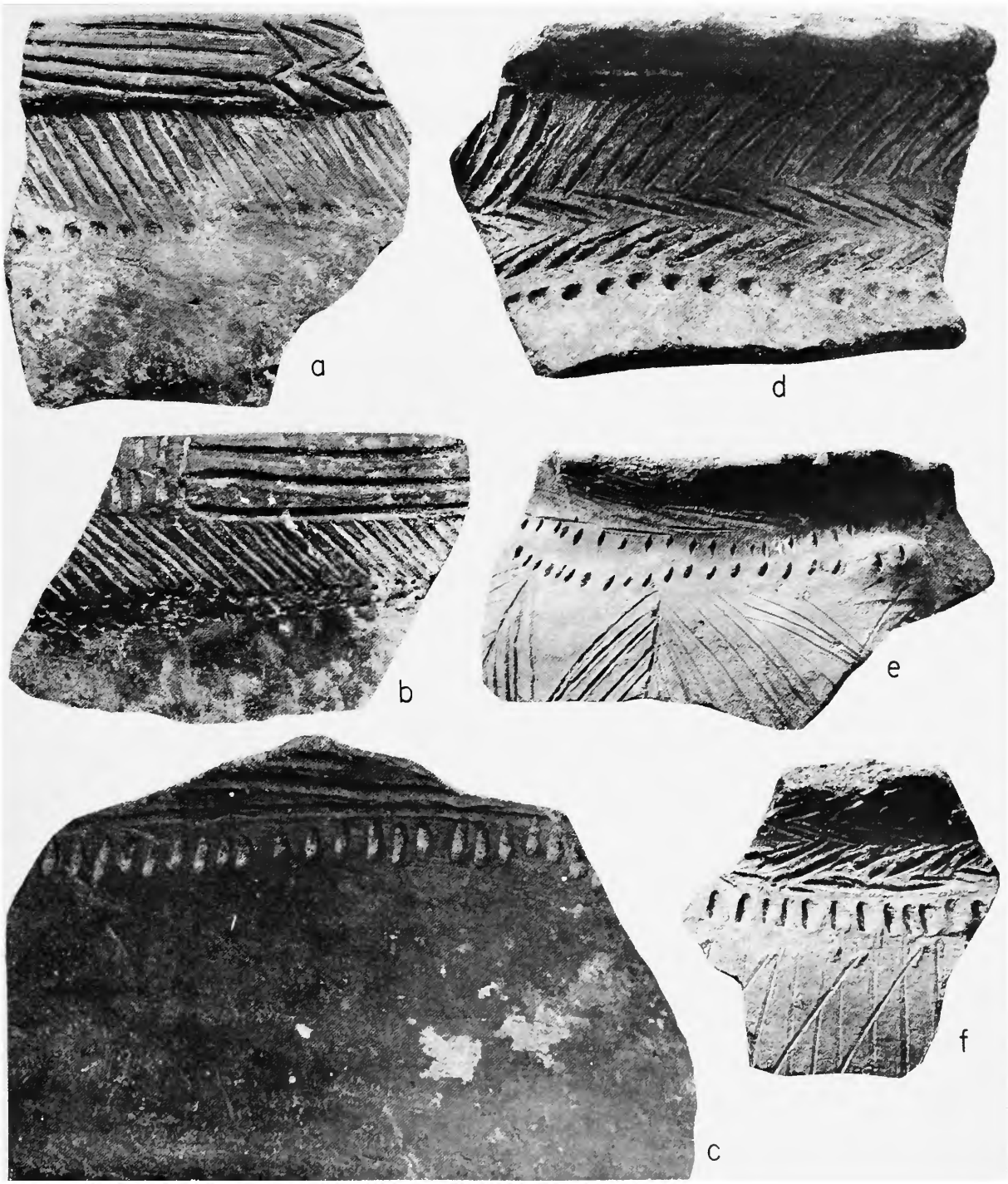

PLATE 165

Jomon and Valdivia Phase sherds with incised decoration combined with one or two rows of punctation at the base of the neck. *a–b*, Izumi. *c*, Sobata. *d–f*, Valdivia Phase sites.

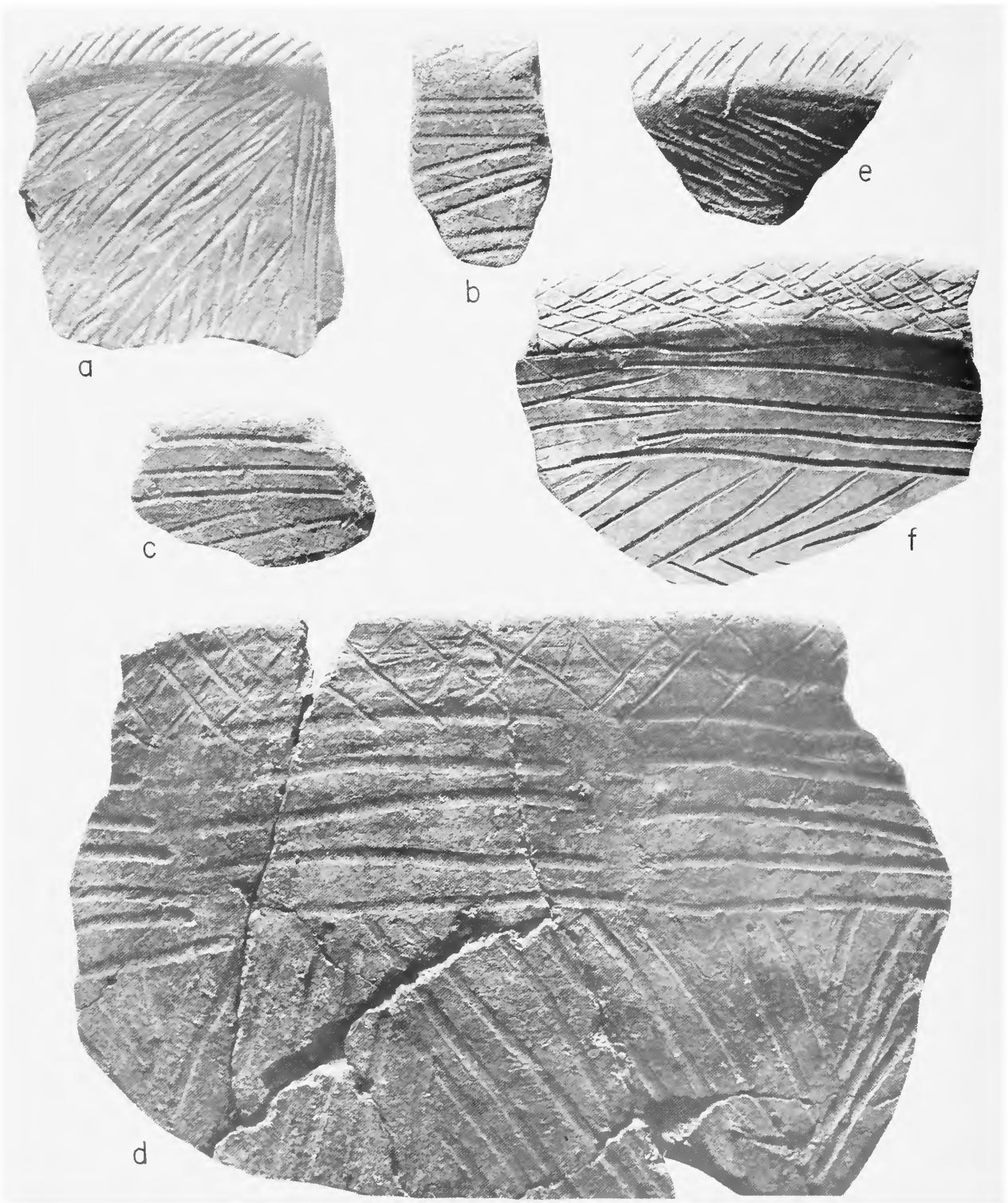

PLATE 166

Jomon and Valdivia Phase sherds showing similar combinations of motifs in incised decoration. *a–c*, Natsushima. *d*, Sobata. *e–f*, Valdivia Phase sites.

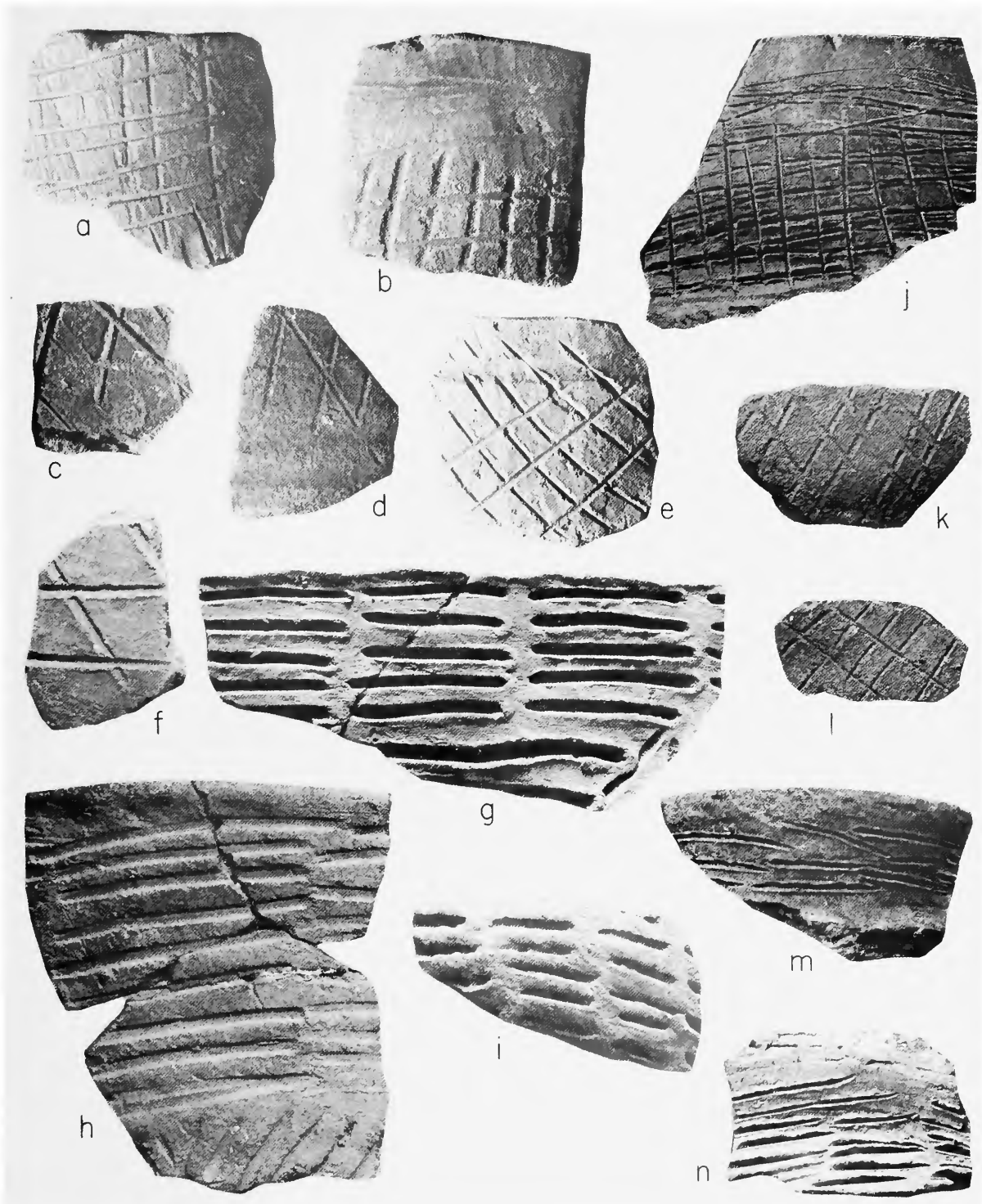

PLATE 167

Jomon and Valdivia Phase sherds with incised decoration in similar technique and motifs. *a–f*, Natsushima. *g*, *i*, Sobata. *h*, Honjo. *i–n*, Valdivia Phase sites.

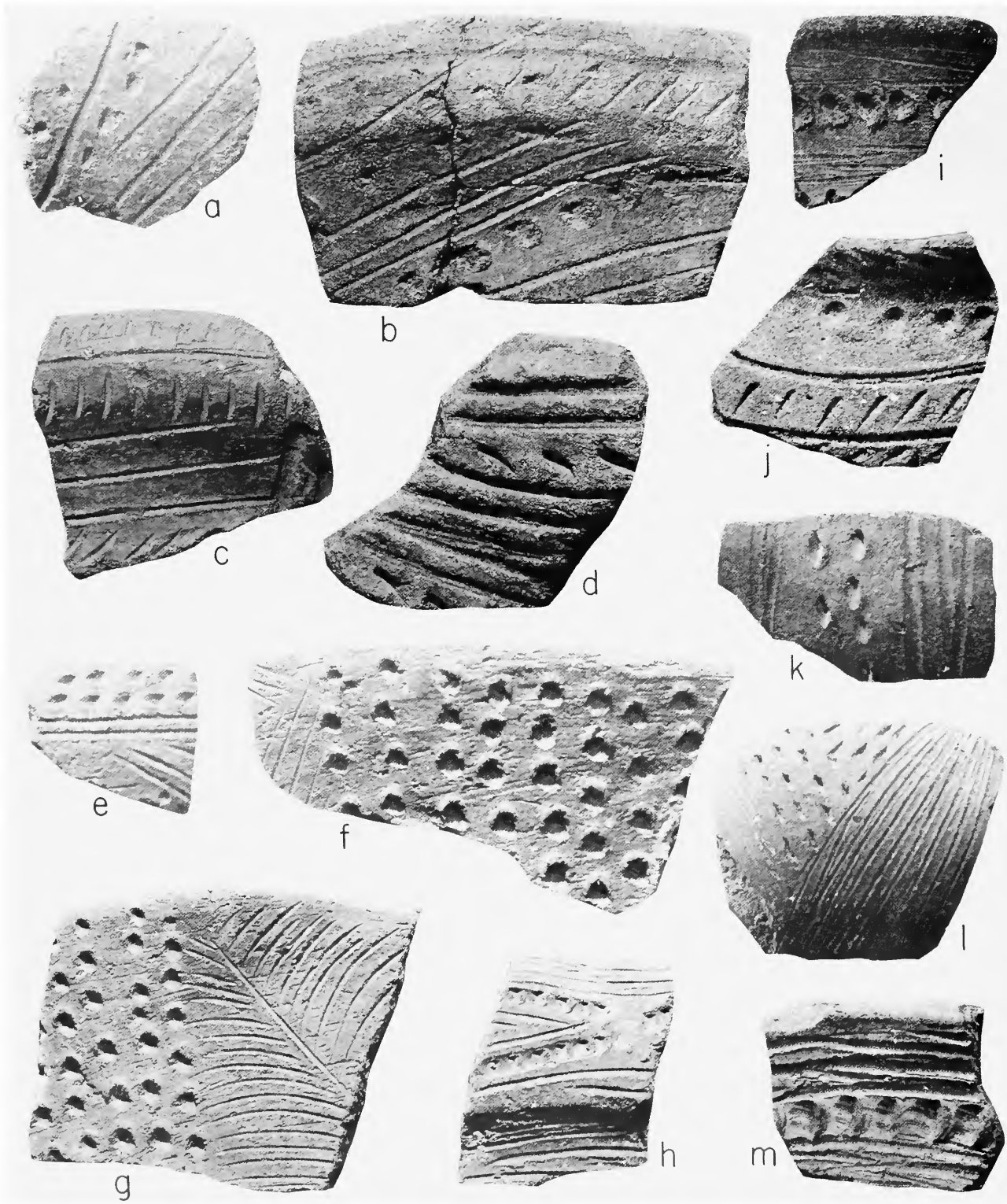

PLATE 168

Jomon and Valdivia Phase sherds showing similar execution of zoned punctate decoration. *a–h*, Natsushima. *i–m*, Valdivia Phase sites.

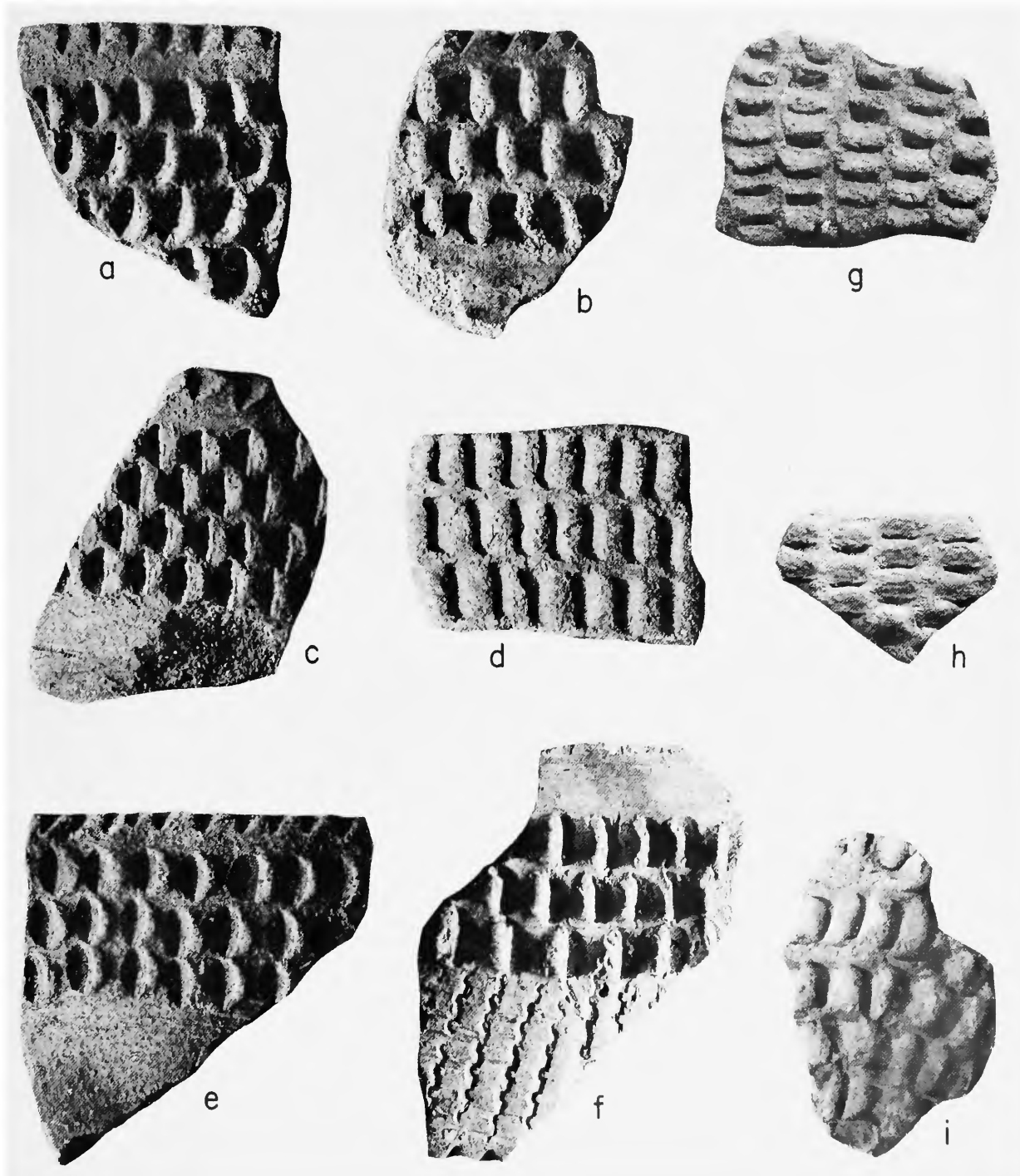

PLATE 169

Jomon and Valdivia Phase sherds with similar pseudocorrugated decoration. *a–c*, *e–f*, Shirahama. *d*, Mito. *g–i*, Valdivia Phase sites.

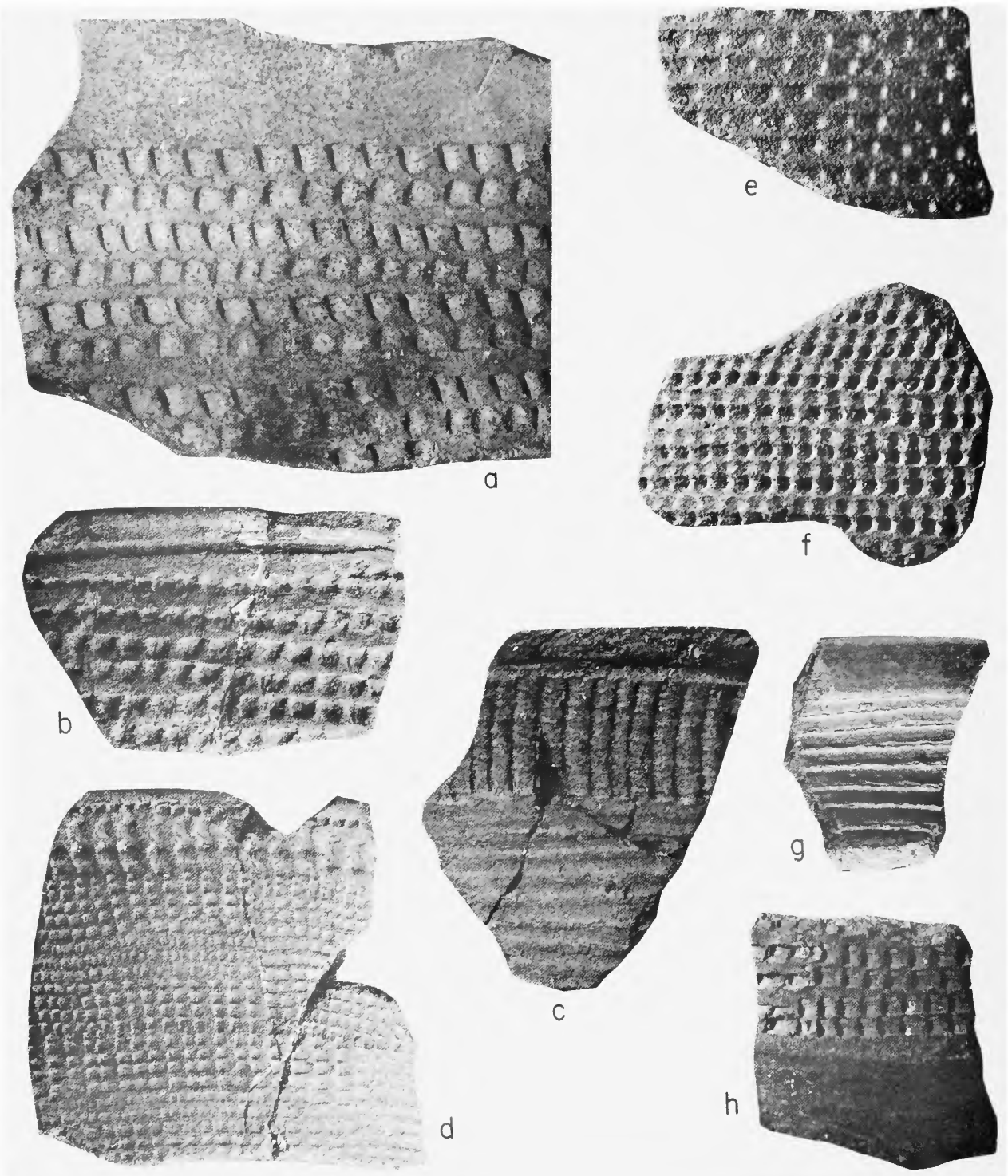

PLATE 170

Jomon and Valdivia Phase sherds with similar decoration by multiple drag-and-jab punctate. *a*, Hajima. *b–d*, Yoshida. *e–h*, Valdivia Phase sites.

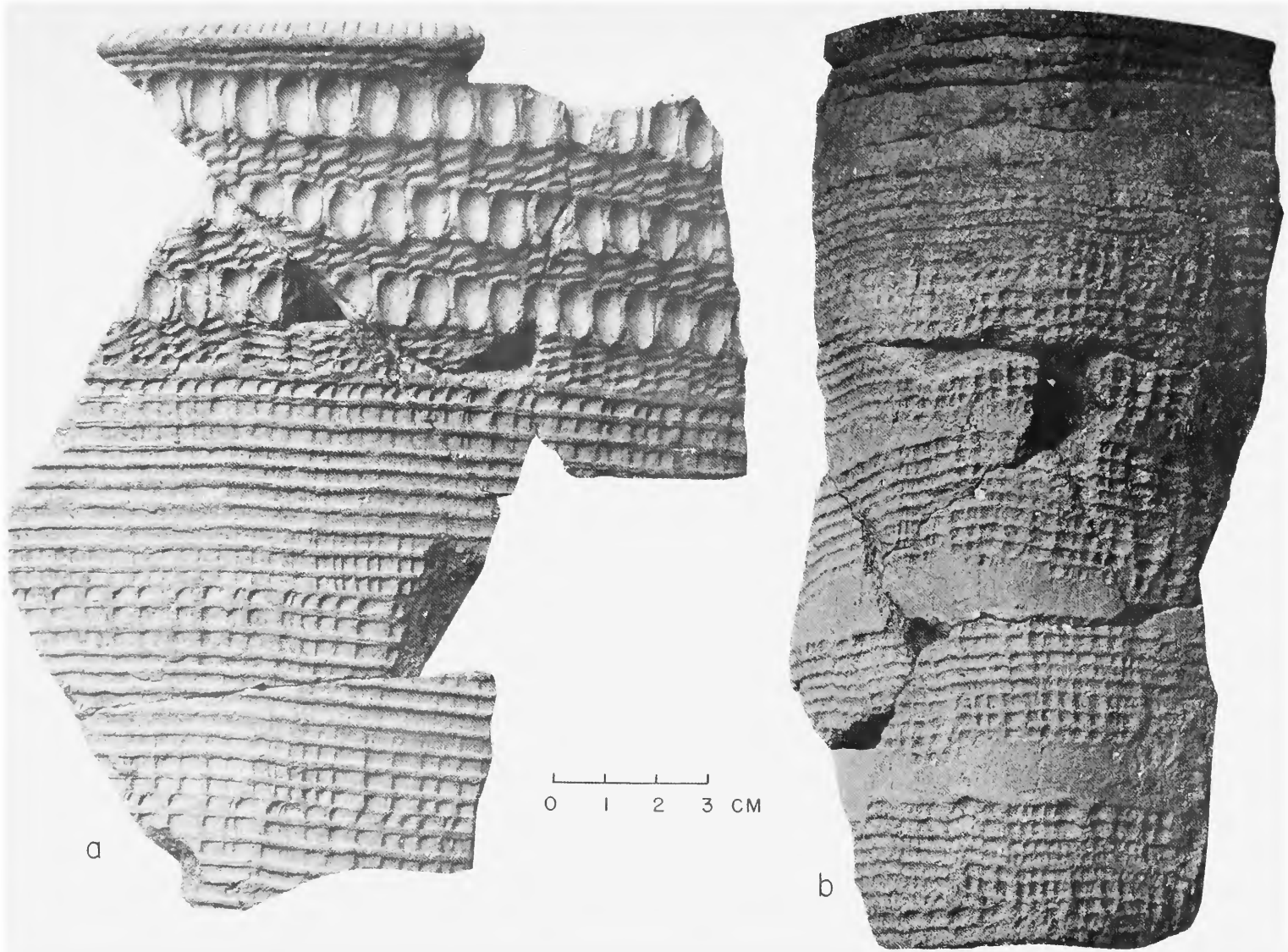

PLATE 171

Jomon sherds from Yoshida site with multiple drag-and-jab punctate decoration.

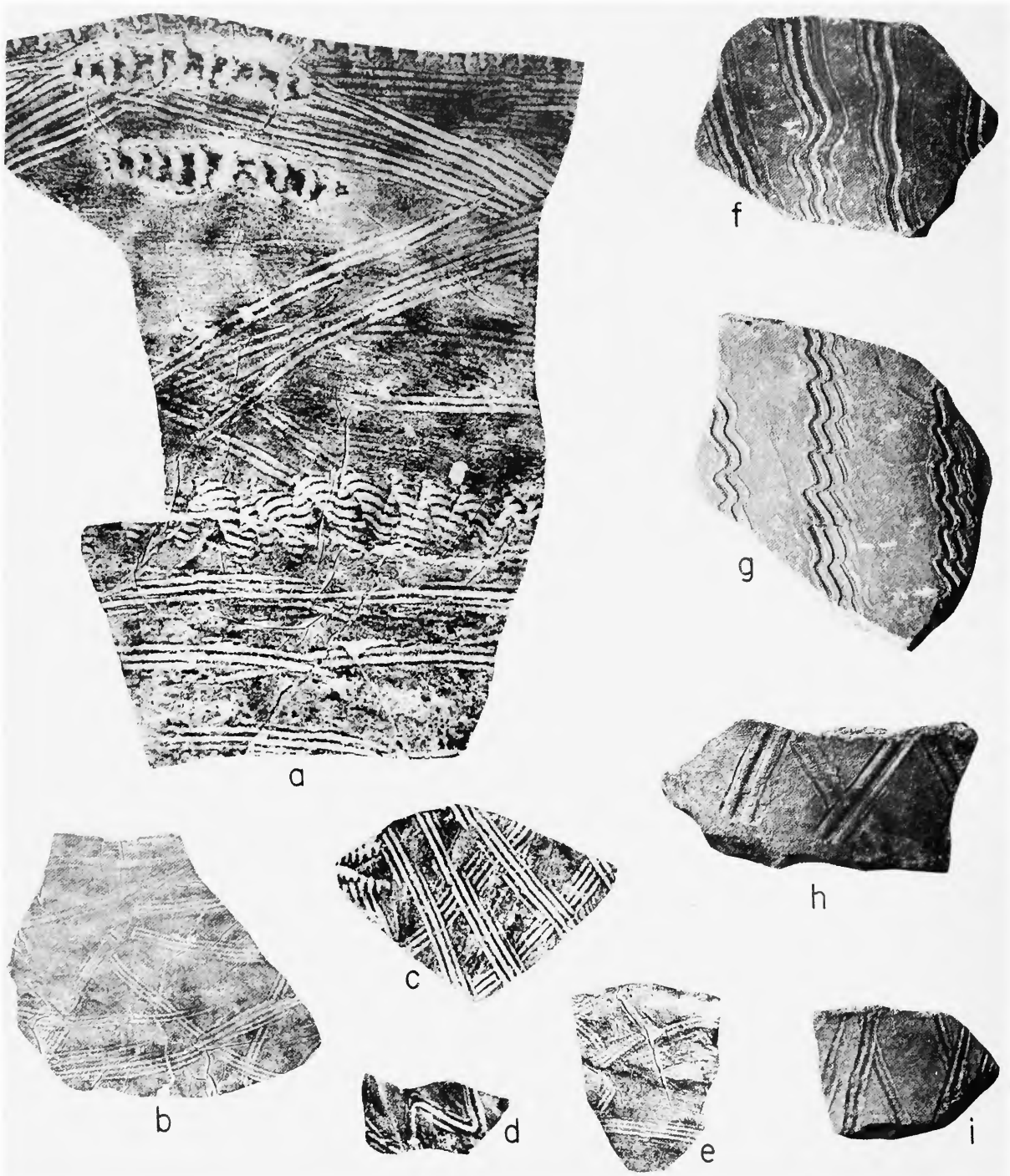

PLATE 172

Jomon and Valdivia Phase sherds with similar shell combed decoration. *a*, *c–d*, Tanegashima. *b*, *e*, Ataka. *f–i*, Valdivia Phase sites. (*a–e*, courtesy of J. E. Kidder, Jr.)

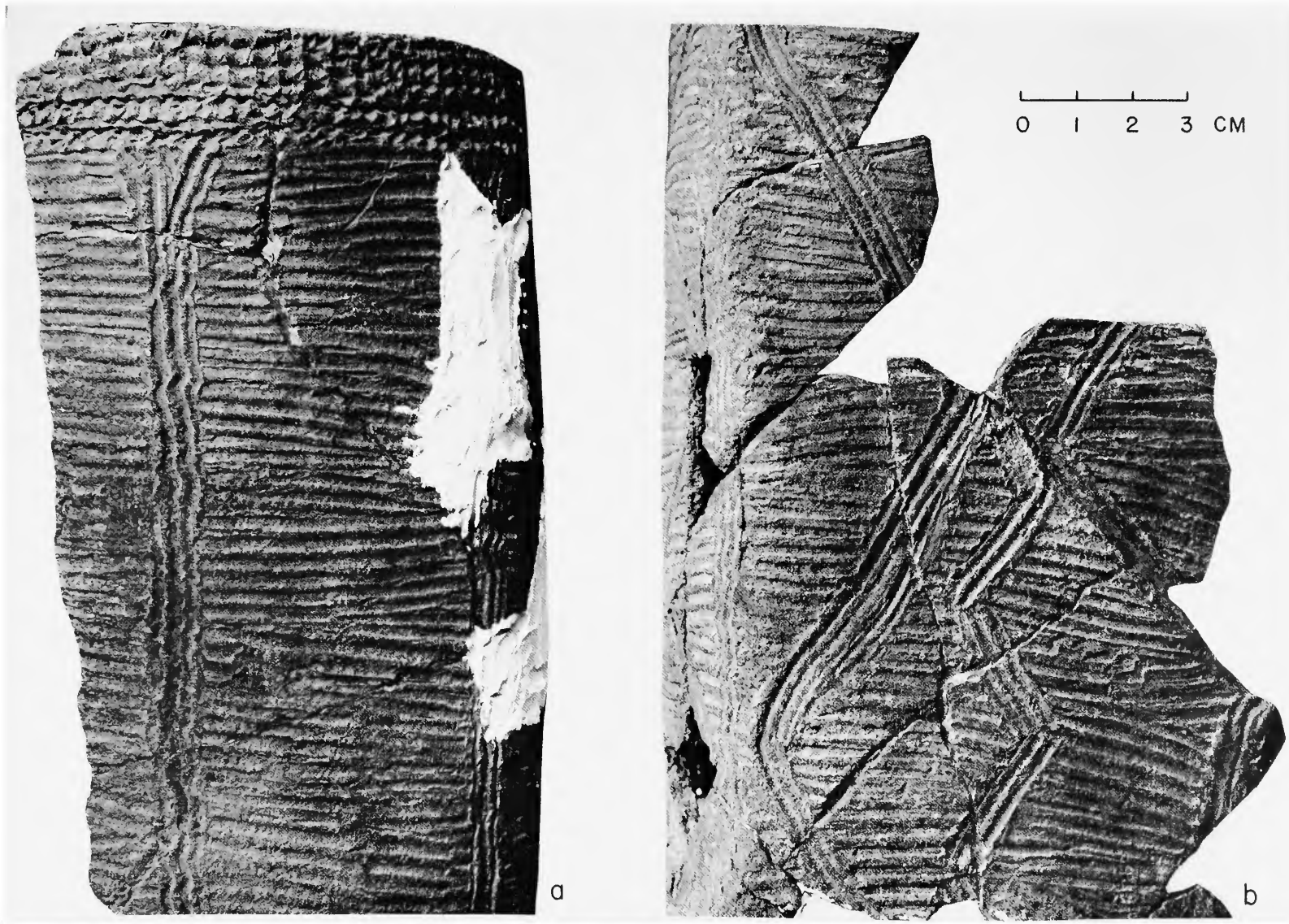

PLATE 173

Jomon vessels with combed decoration from Nanshu Shrine site.

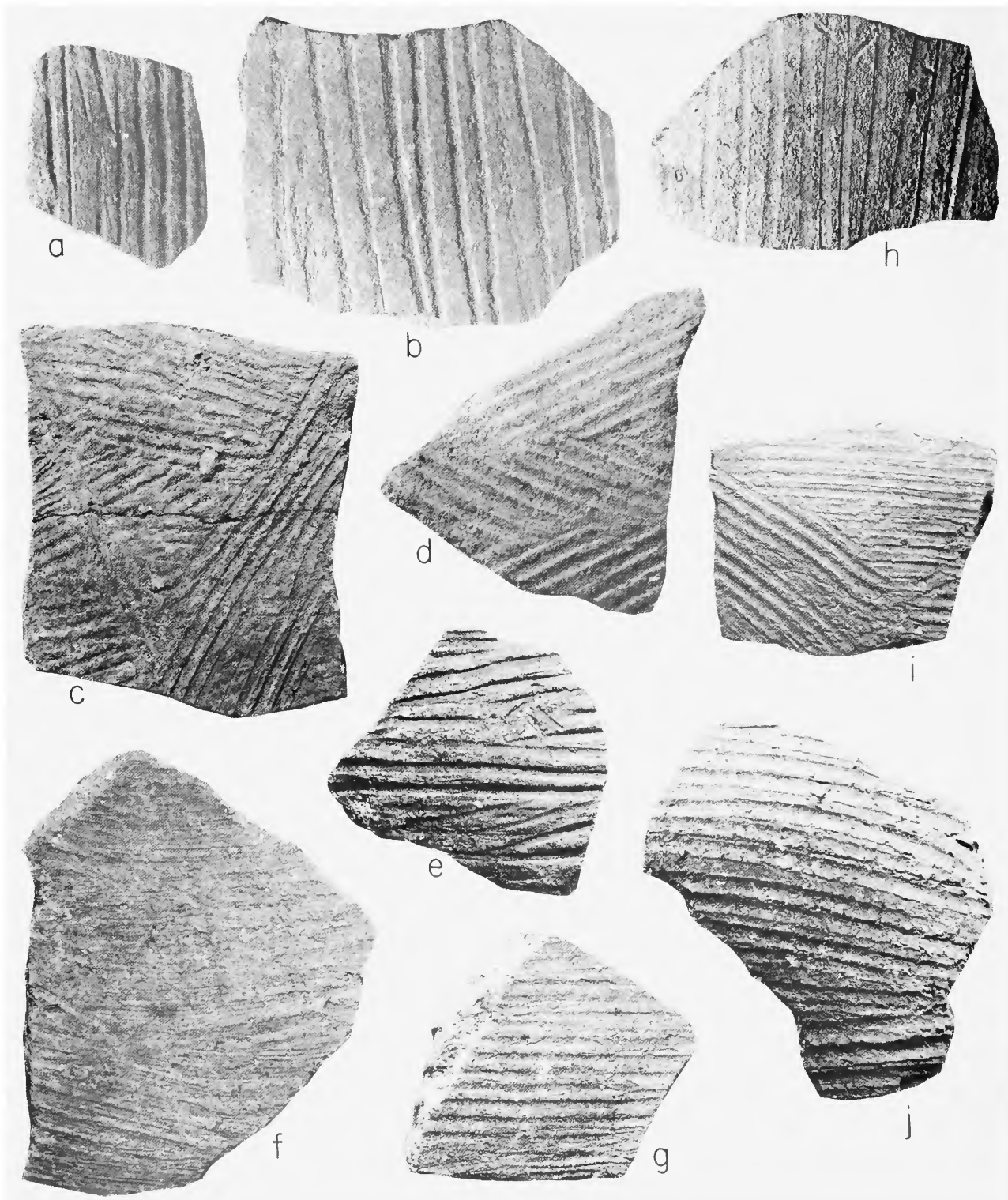

PLATE 174

Jomon and Valdivia Phase sherds showing similar overall texturing by brushing or shell scraping. *a–b, e, g,* Natsushima. *c,* Todoroki. *d,* Ishizaka. *f,* Sobata. *h–j,* Valdivia Phase sites.

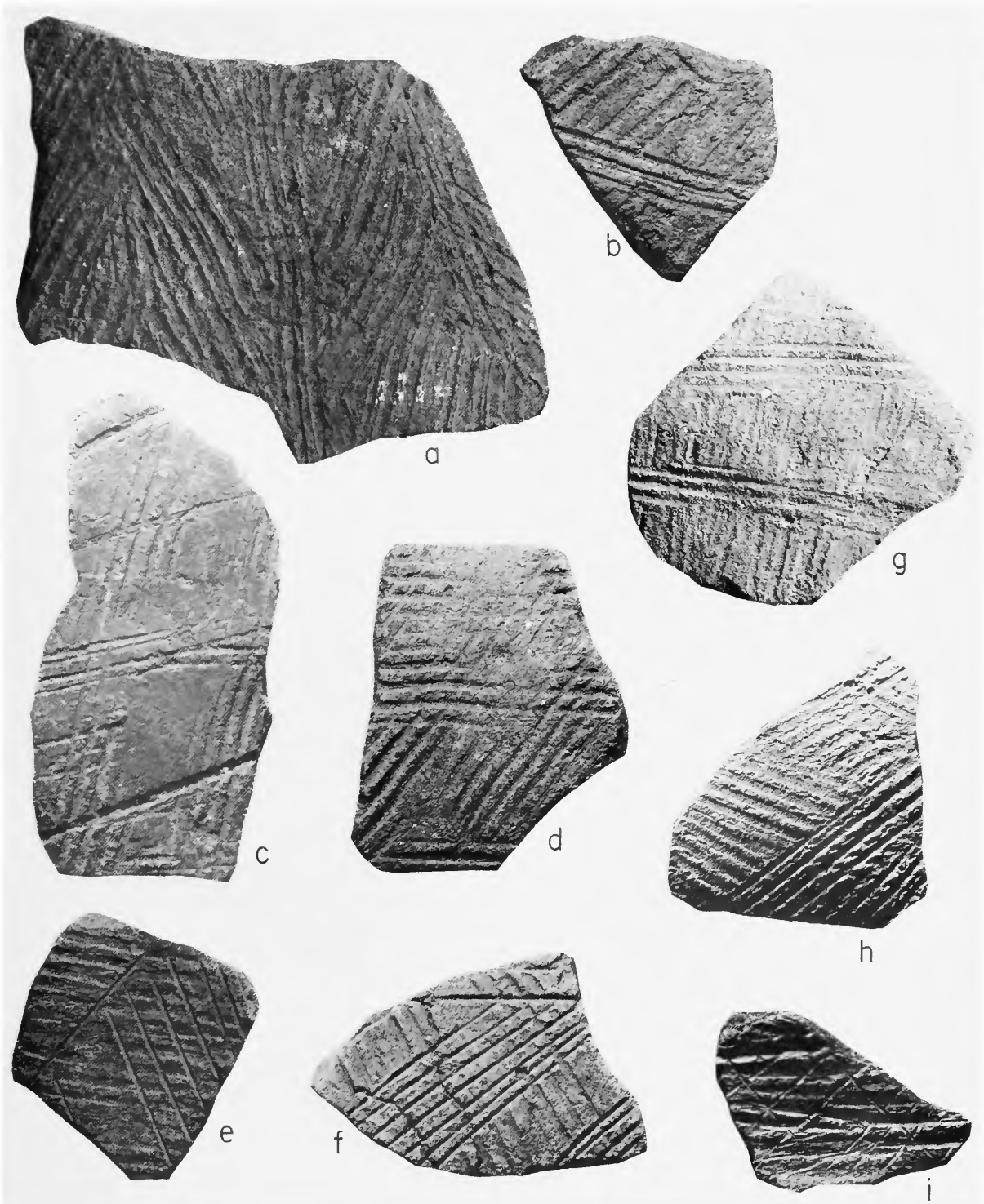

PLATE 175

Jomon and Valdivia Phase sherds with patterned overall shell scraping. *a–b*, Todoroki. *c*, Natsushima. *d–f*, Mito. *g–i*, Valdivia Phase sites.

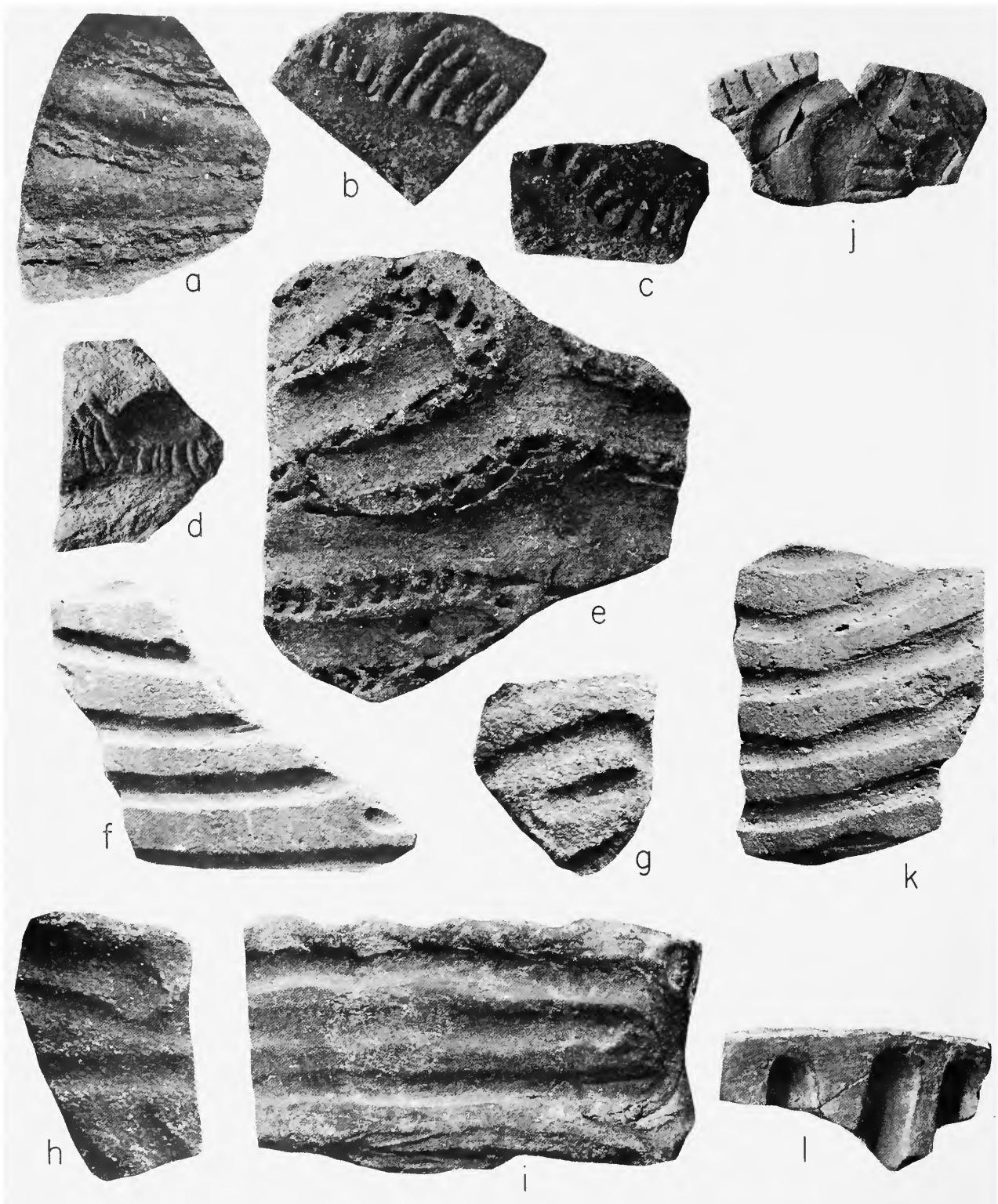

PLATE 176

Jomon and Valdivia Phase sherds with similar decoration by finger grooving. *a*, Ataka. *b–d*, *i*, Izumi. *e*, Todoroki. *f*, Natsushima *g–h*, Mie. *j–l*, Valdivia Phase sites.

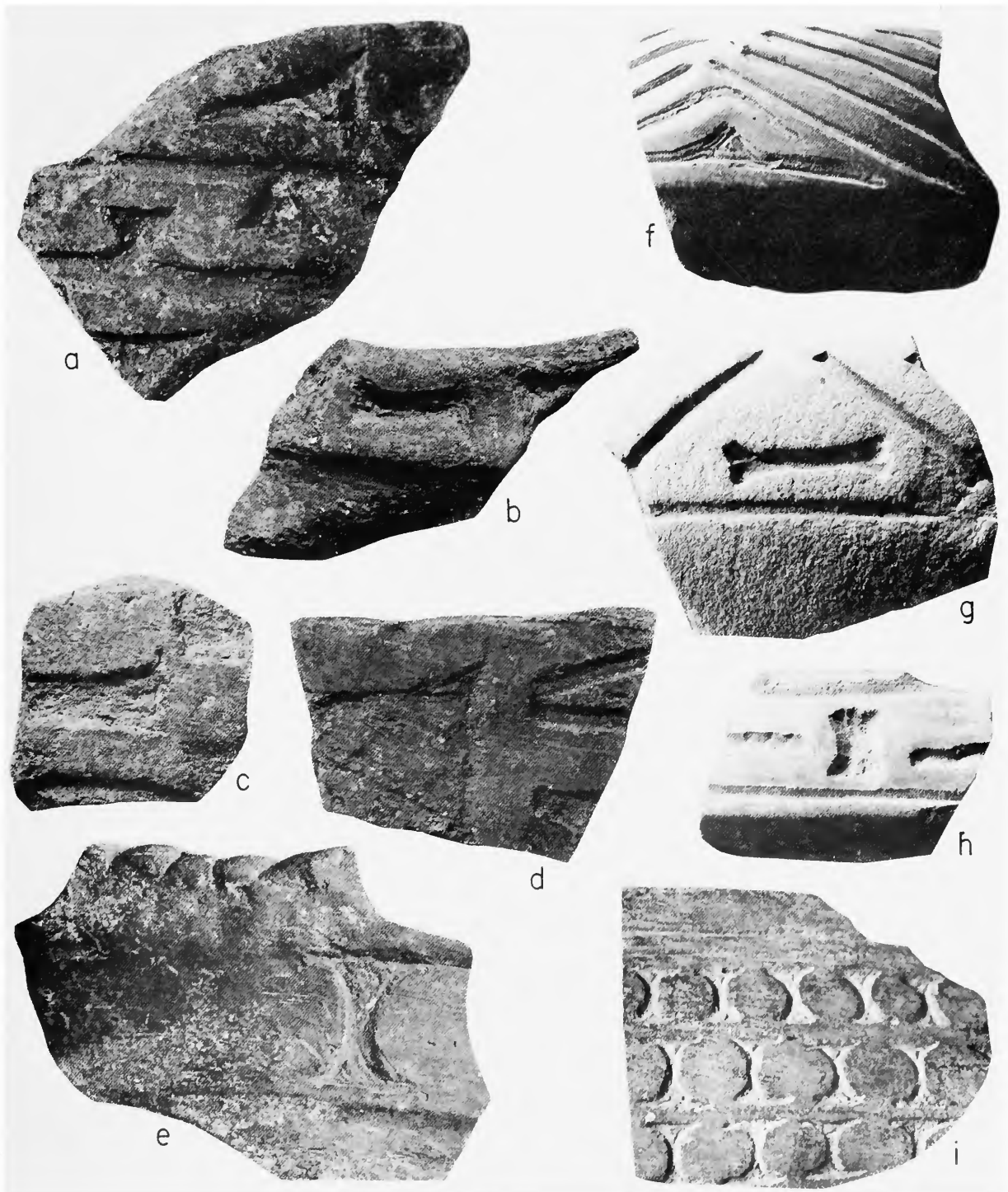

PLATE 177

Jomon and Valdivia Phase sherds with excised decoration in similar technique and motif. *a*, *d*, Nampukuji. *b*, Nishi Ataka. *c*, *e*, Izumi. *f–i*, Valdivia Phase sites.

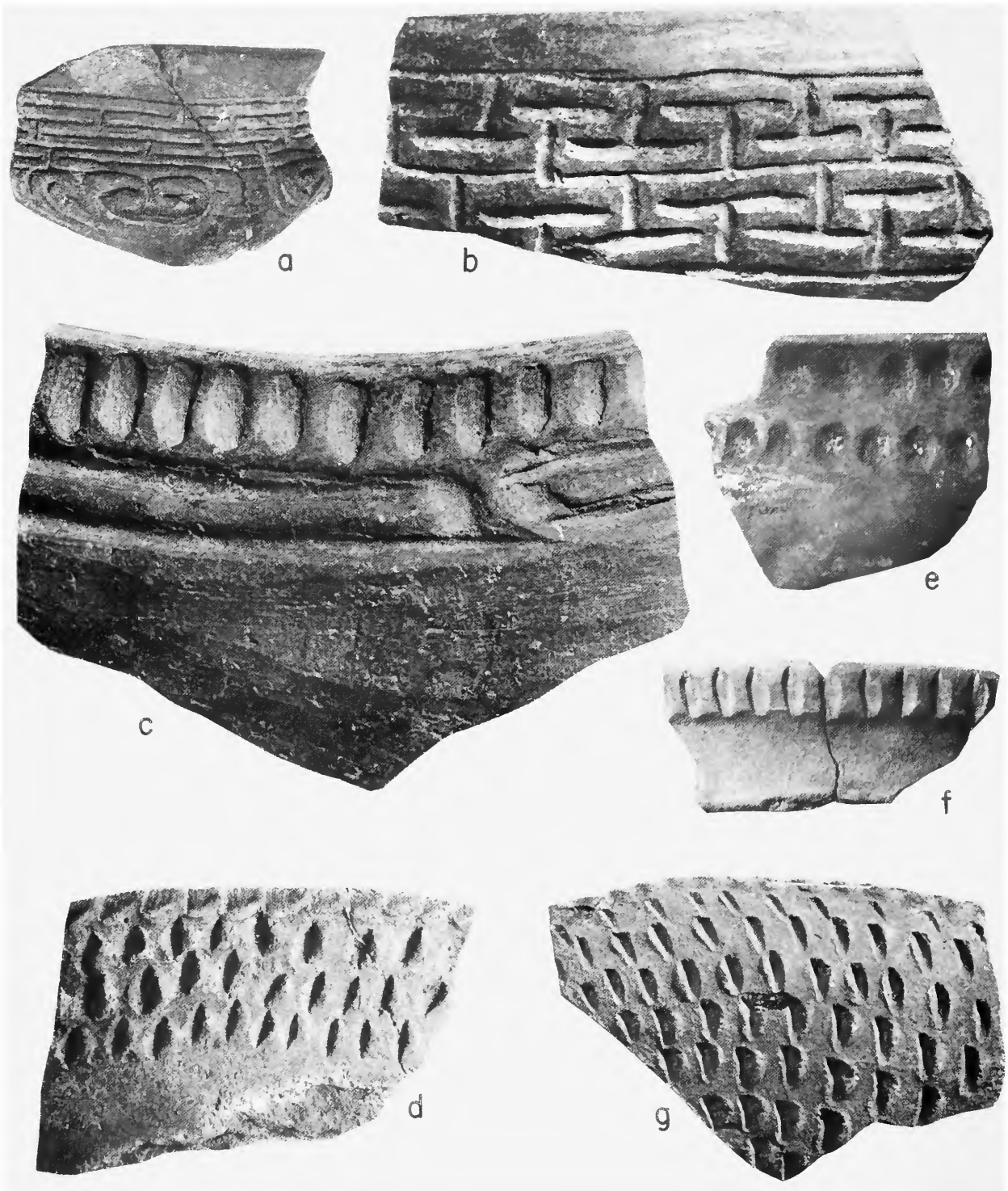

PLATE 178

Jomon and Valdivia Phase sherds with similar types of decoration. *a*, Oomiyama. *c*, Ataka. *d*, Shirahama. *b*, *e*–*g*, Valdivia Phase sites.

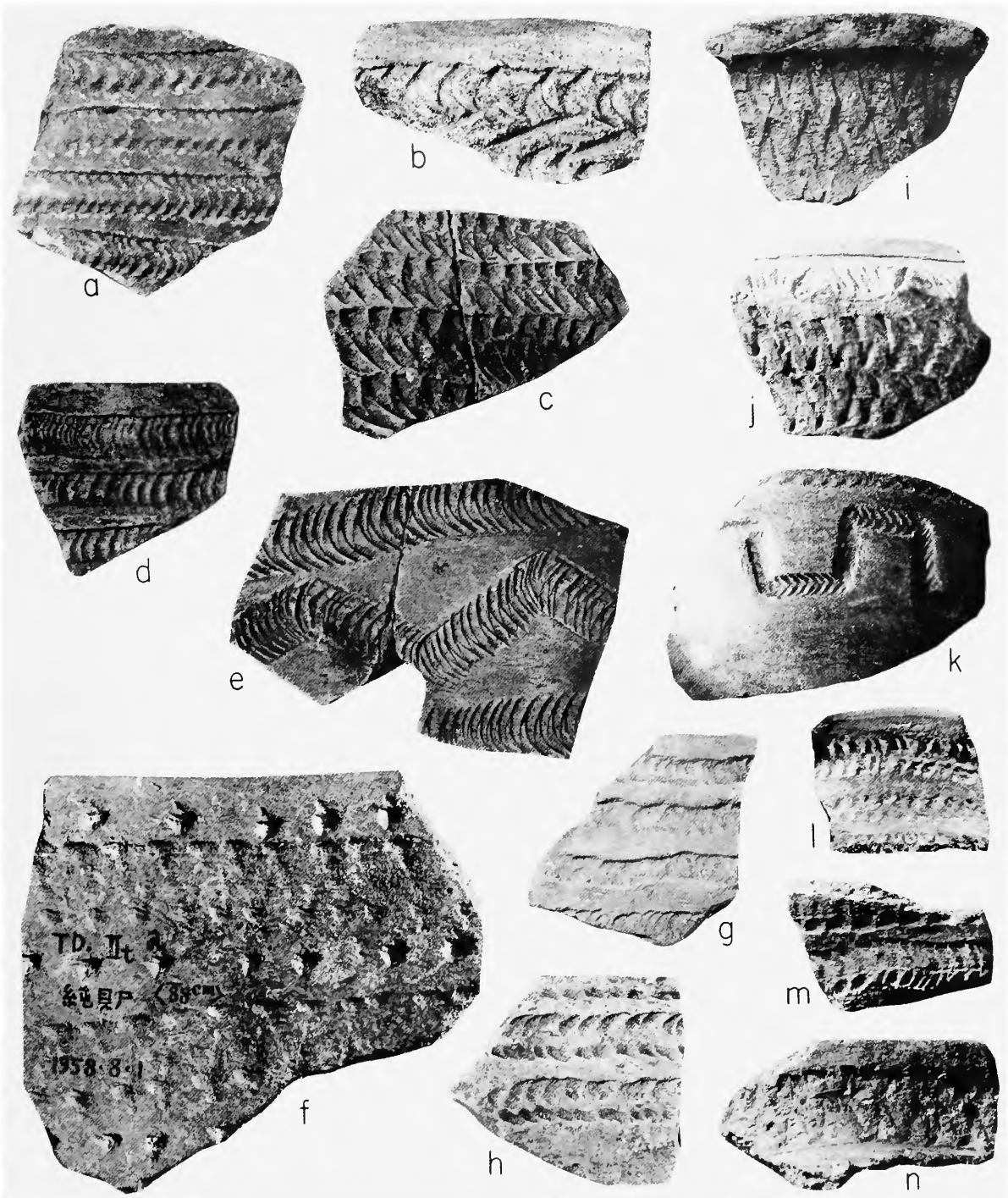

PLATE 179

Jomon and Valdivia Phase sherds with similar decoration by rocker stamping. *a*, *c–e*, *g–h*, Kitashikawa. *b*, Moroiso. *f*, Todoroki. *i–n*, Valdivia Phase sites.

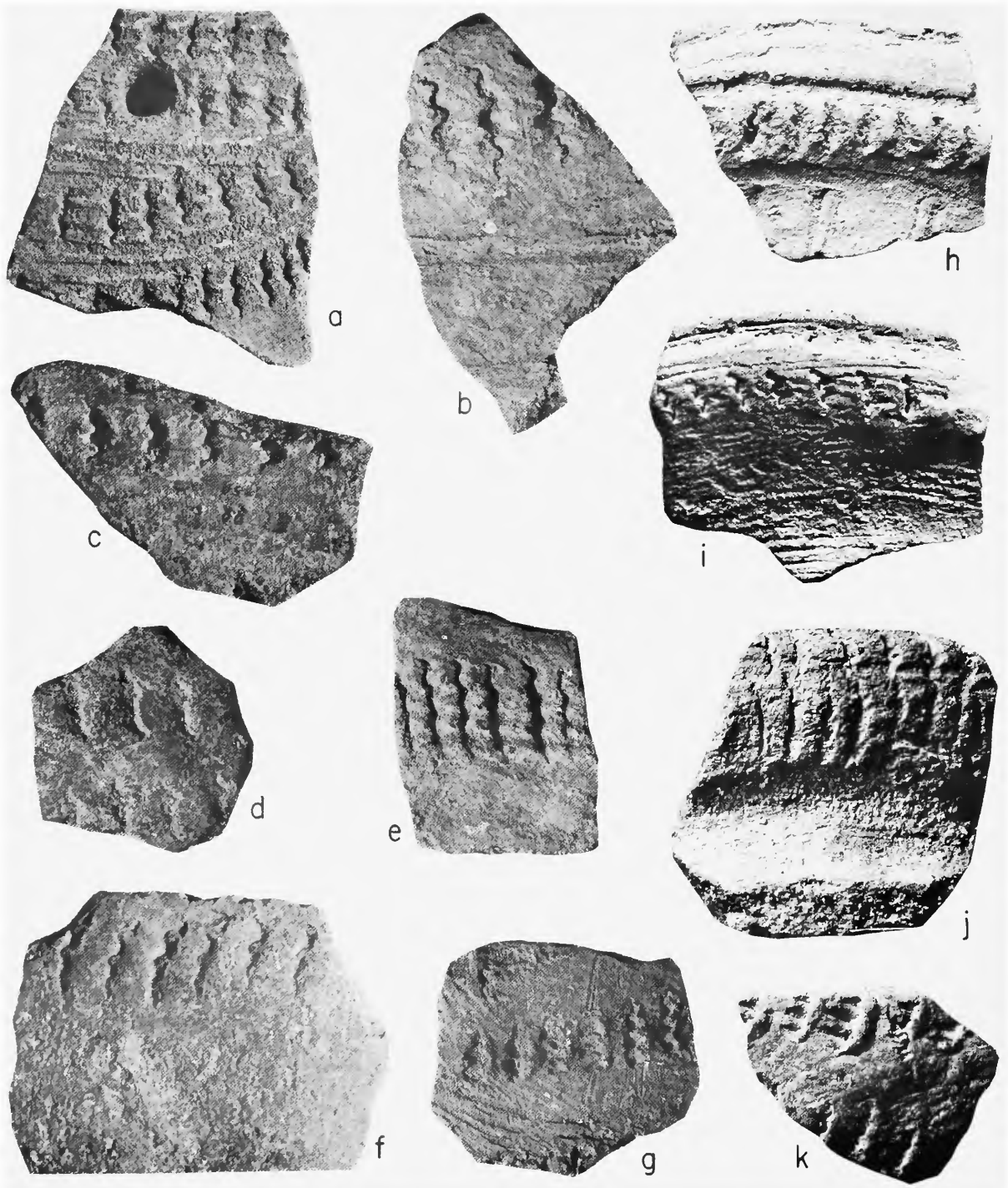

PLATE 180

Jomon and Valdivia Phase sherds with shell stamped decoration. *a–e, g*, Todoroki. *f*, Sobata. *h–k*, Valdivia Phase sites.

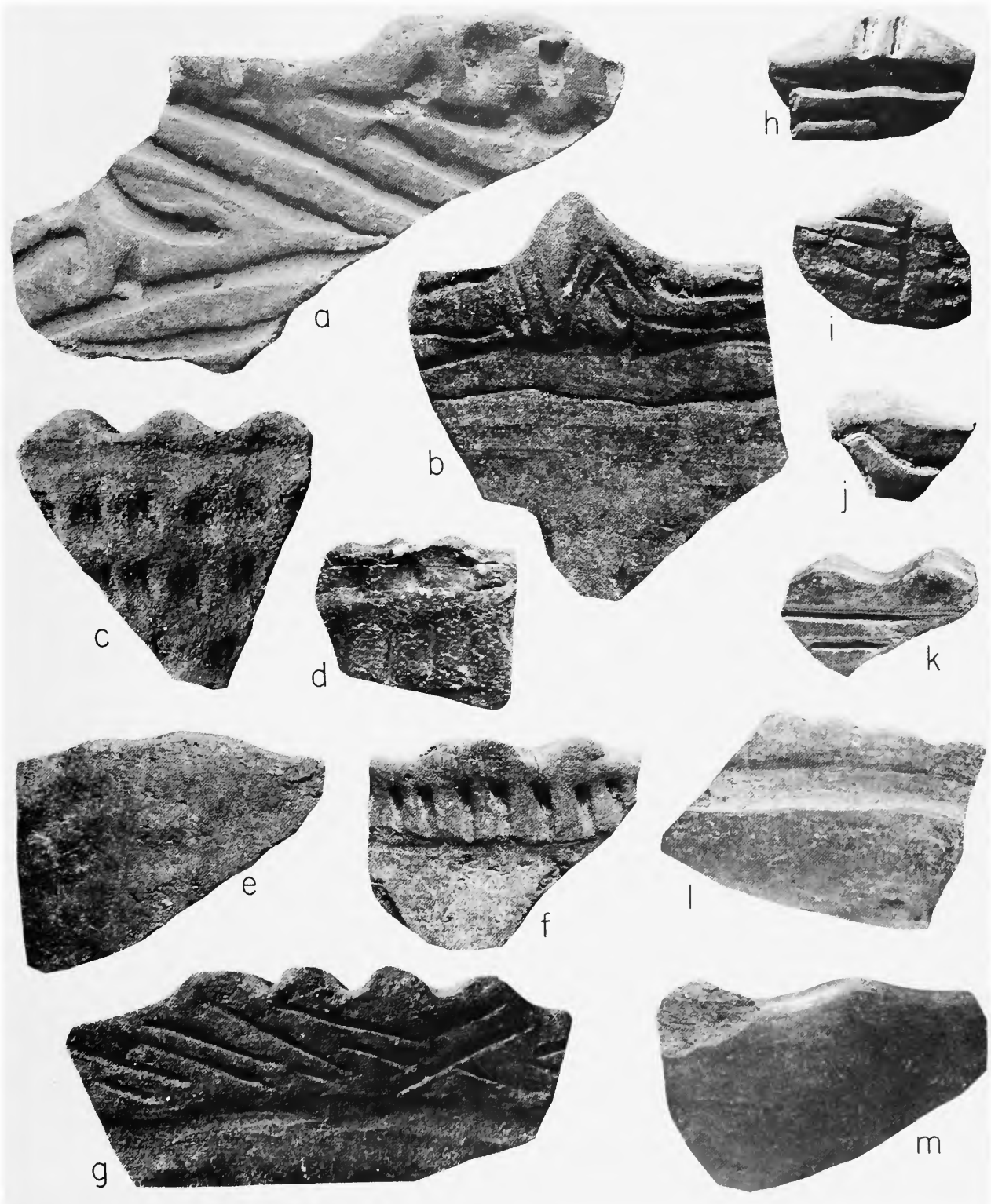

PLATE 181

Jomon and Valdivia Phase sherds showing similar lobed rim treatment. *a*, *c*, Ataka. *b*, *e–f*, Izumi. *d*, Mie. *g*, Napukuji. *h–m*, Valdivia Phase sites.

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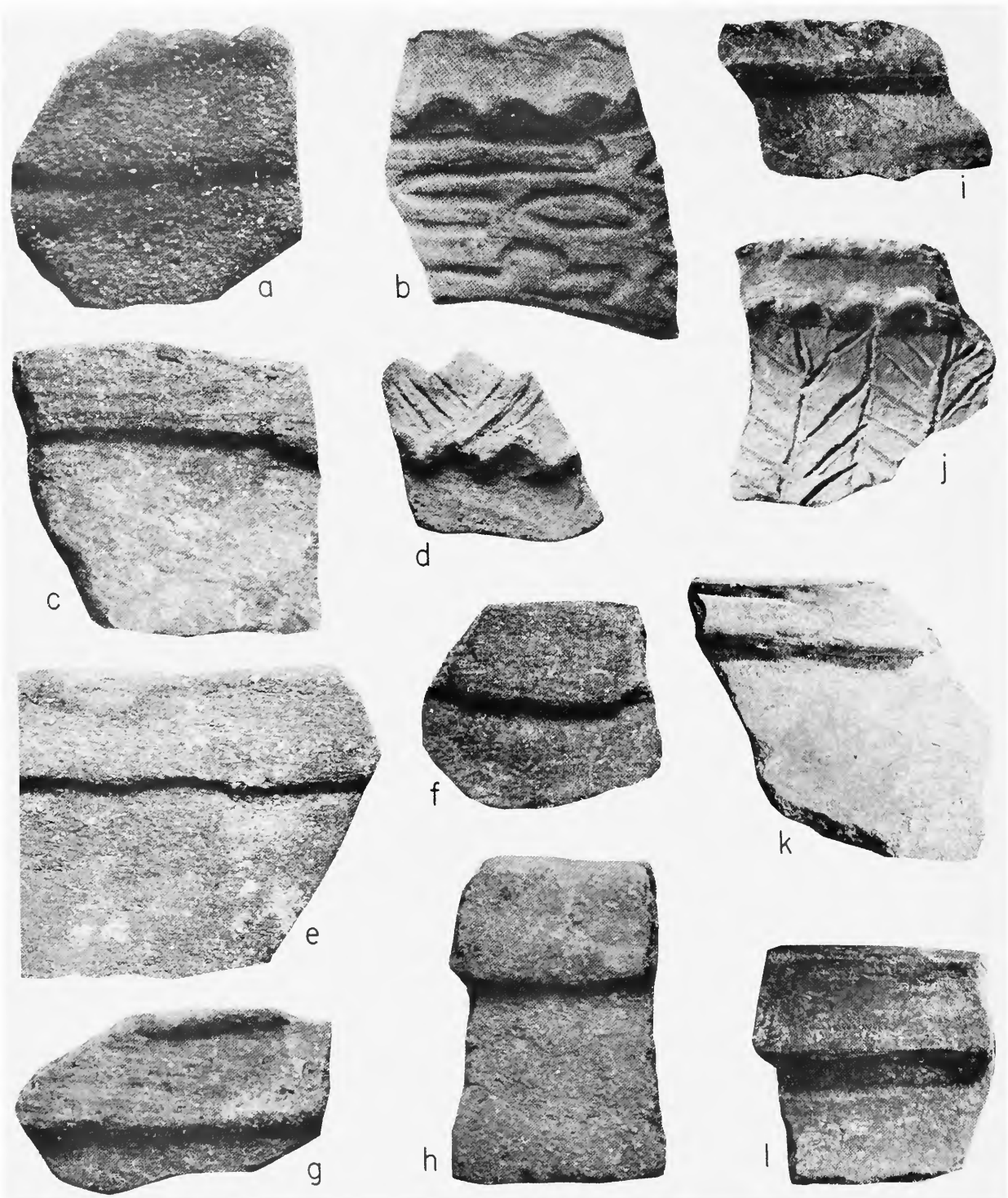

PLATE 182

Jomon and Valdivia Phase sherds with folded-over plain or finger-pressed rim treatment. *a*, Mie. *b*, Iwasaki (after Kidder, 1957, pl. IV–4). *c*, *e–h*, Izumi. *d*, Kasugacho. *i–l*, Valdivia Phase sites.

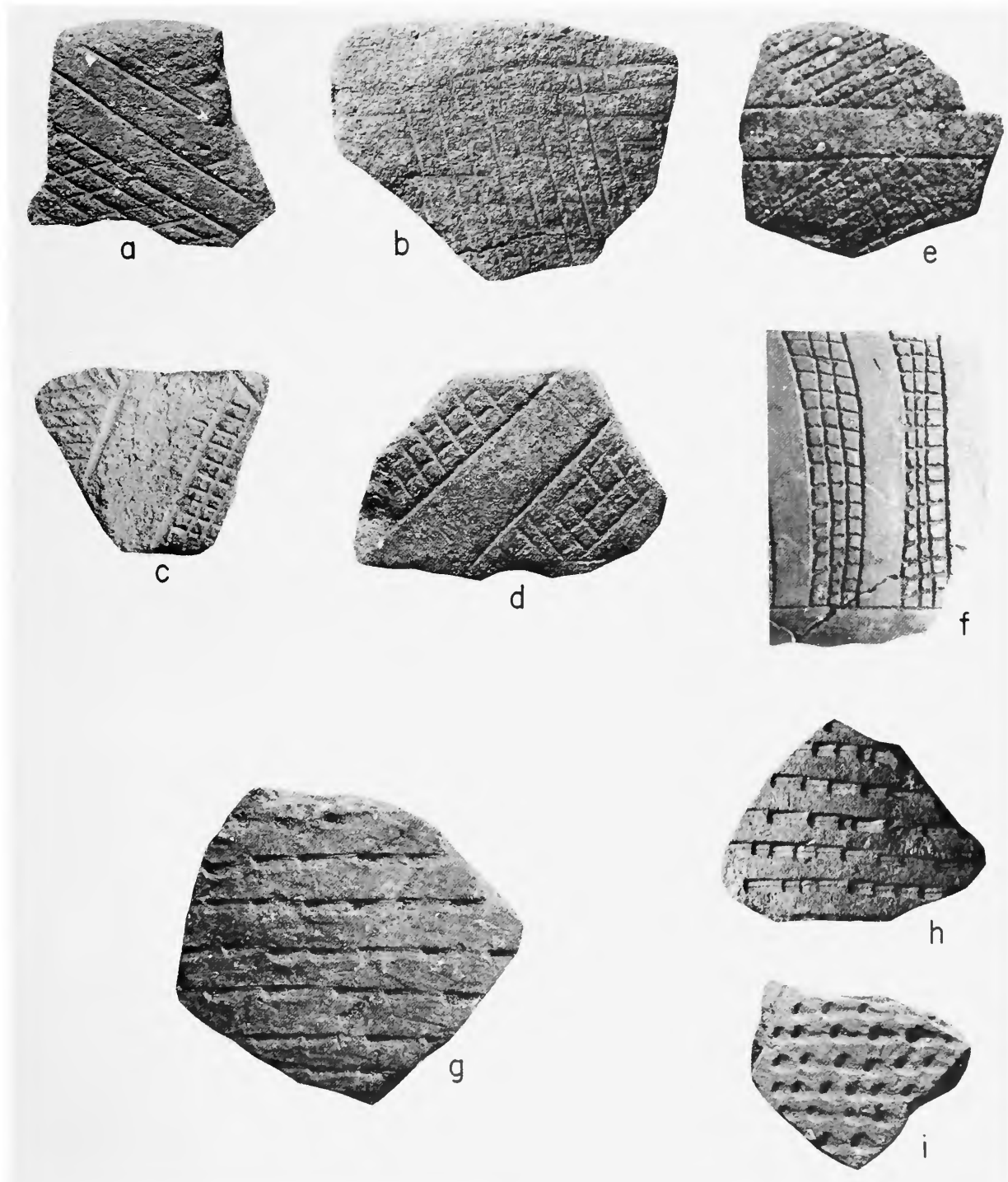

PLATE 183

Jomon and Valdivia Phase sherds with similar fine-line incised and drag-and-jab punctate decoration. *a–d, g*, Mito. *e–f, h–i*, Valdivia Phase sites.

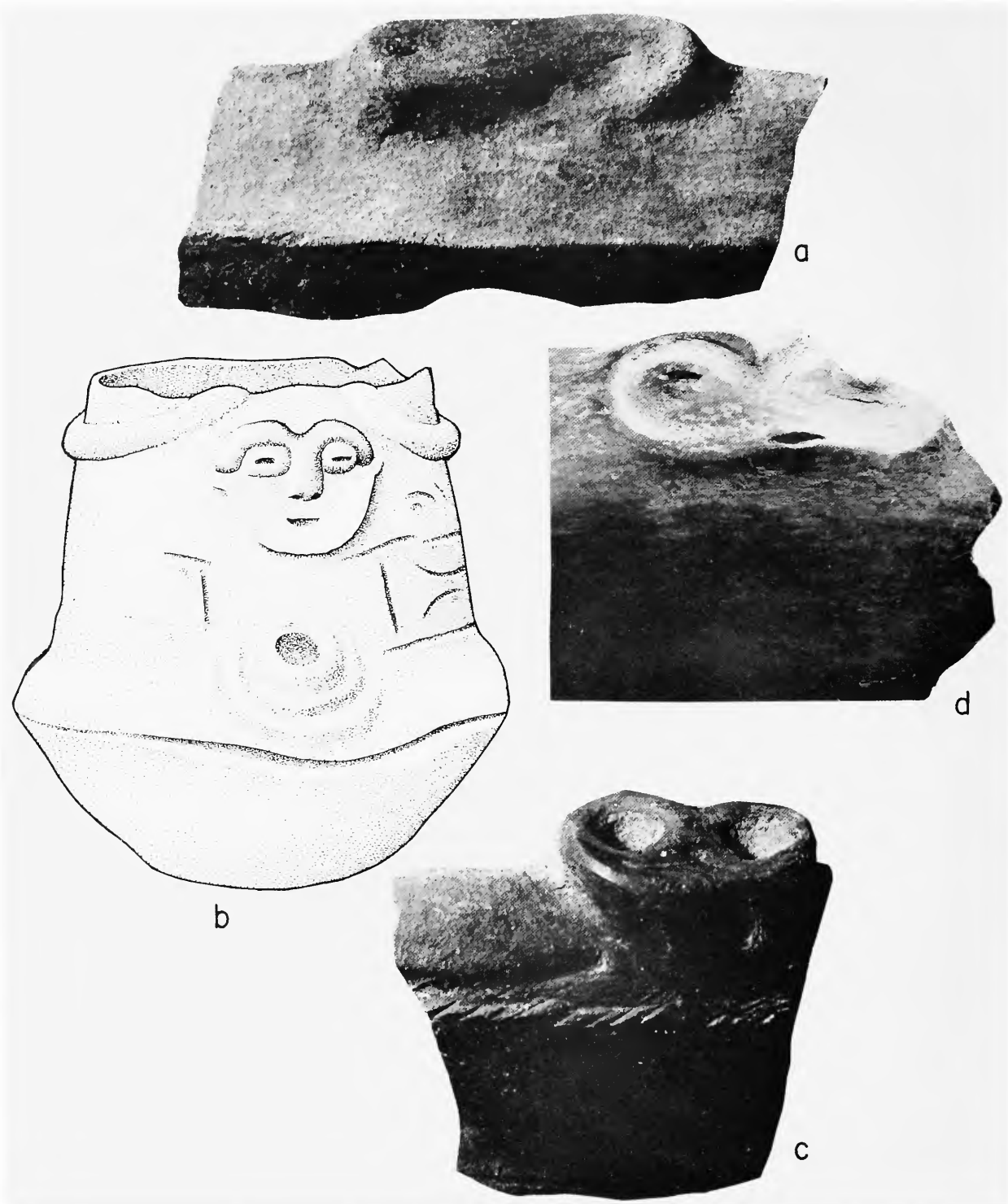

PLATE 184

Jomon and Valdivia Phase pottery with similar relief decoration in the form of a stylized face. *a*, Okubo. *b*, Ooi (after Esaka, 1960, fig. 191). *c*, Omori. *d*, Valdivia Phase sites.

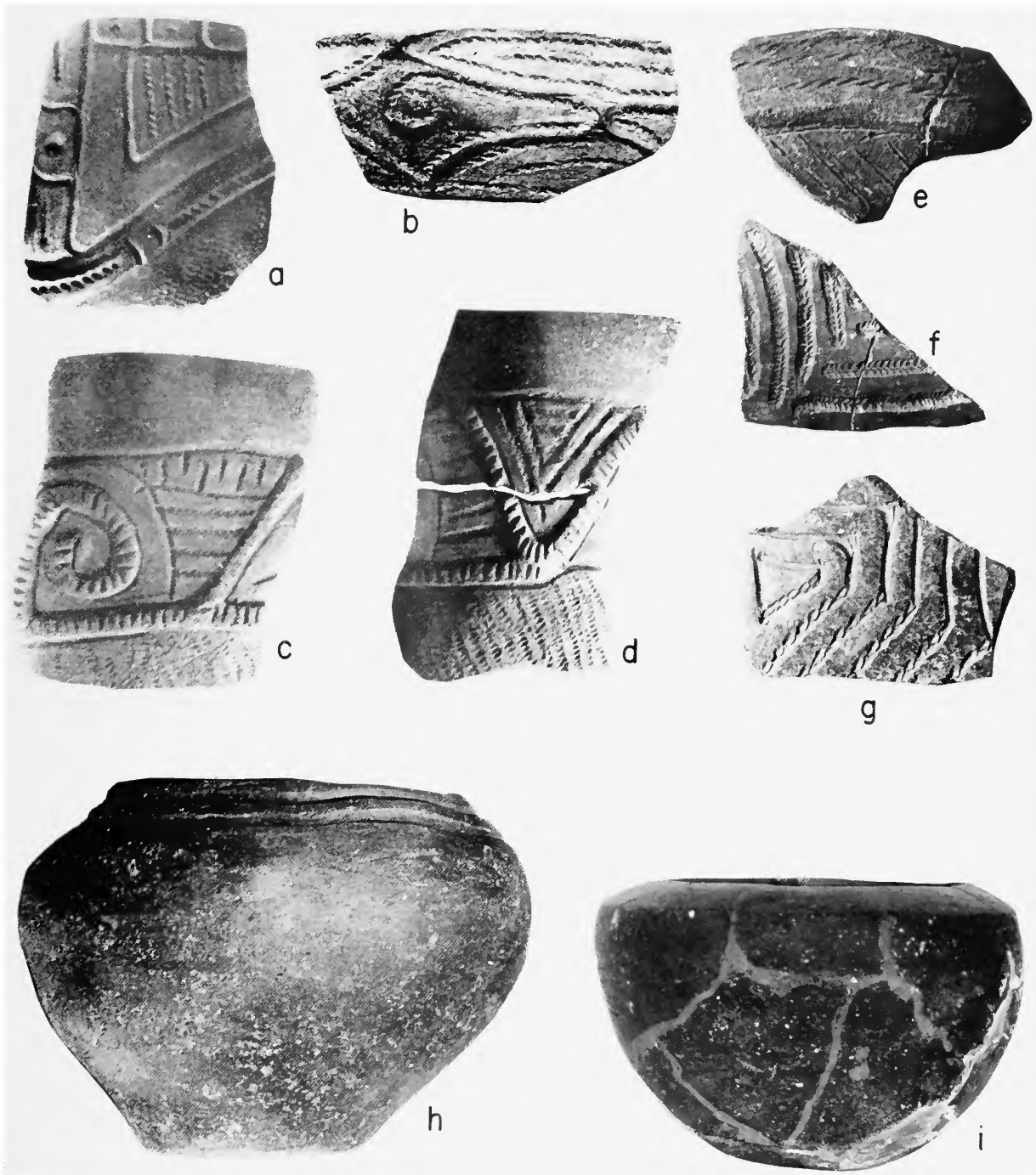

PLATE 185

Jomon and Valdivia Phase sherds with similar decoration by cord impression, and Jomon vessels resembling Valdivia Phase examples. *a, c–d,* Ubayama (after Groot and Sinotô, 1952, pl. X–3, 7–8). *b,* Ichioji (after Kidder, 1957, pl. VI–5), *e–g,* Valdivia Phase sites. *h,* Oomiyama, maximum diameter 17 cm. *i,* Shimotakaido, height 12.2 cm. (courtesy of Meiji University).

PLATE 186

Jomon vessels of typical Valdivia Phase shapes. *a*, Nakahosawa, mouth diameter 21.5 cm. *b*, Sobata, mouth diameter about 11.5 cm.

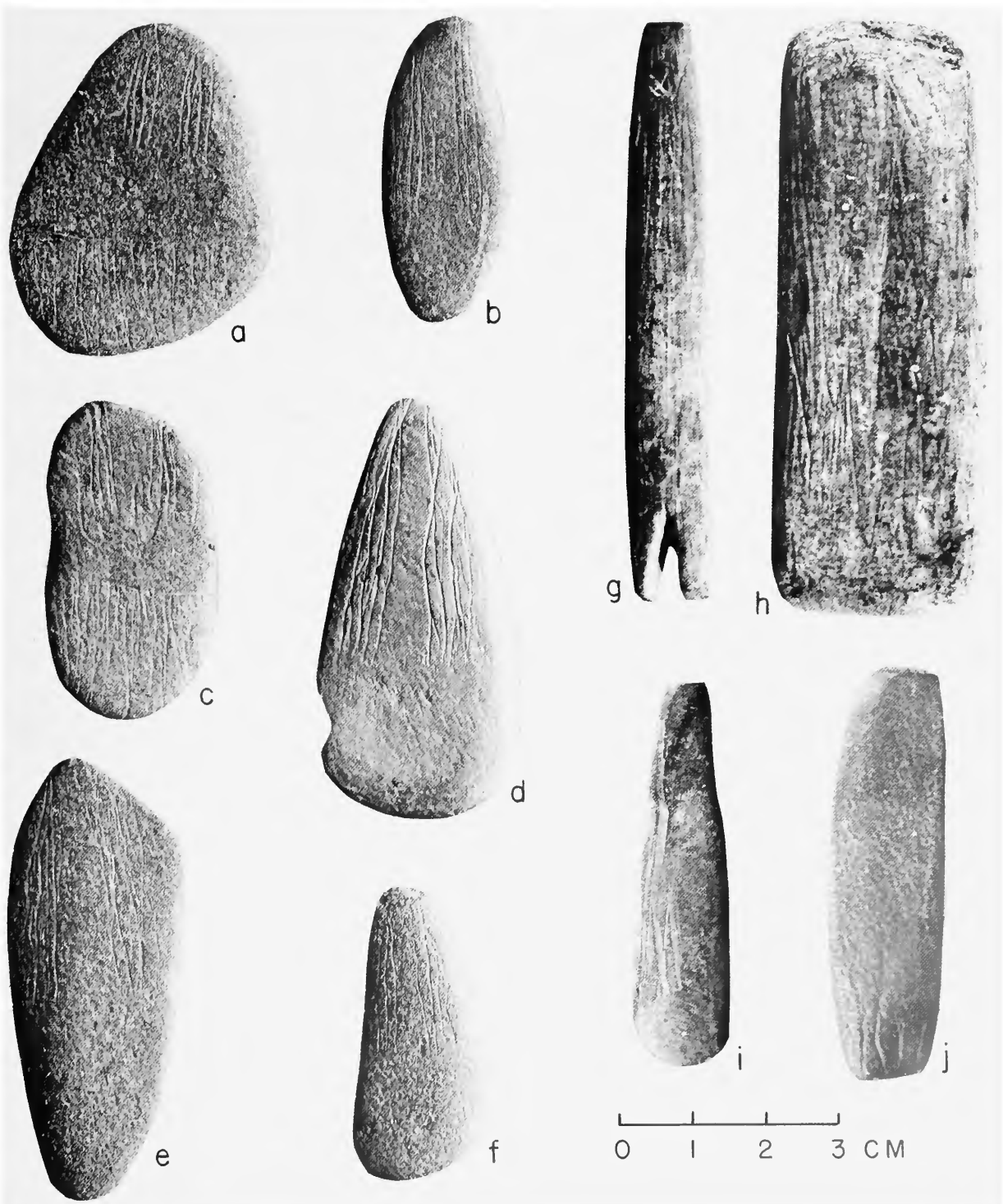

PLATE 187

Pre-Jomon and Valdivia Phase stone figurines. *a–f*, Kamikuroiwa (courtesy of T. Esaka). *g–j*, Valdivia Phase sites.

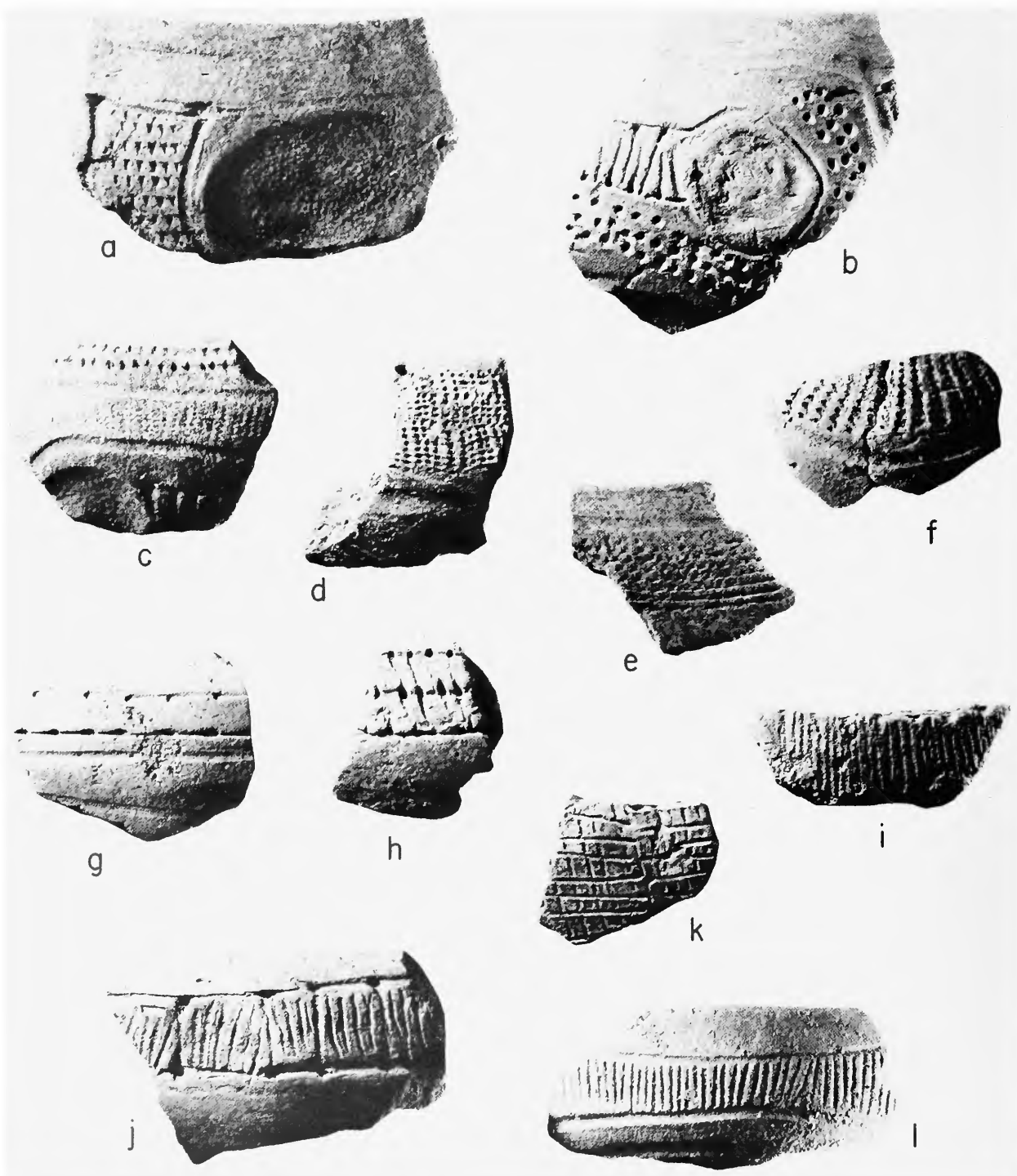

PLATE 188

Decorated sherds from Puerto Hormiga. *a–c*, Finger grooved. *d–e*, Multiple drag-and-jab punctate. *f*, Shell stamped. *g–h*, Drag-and-jab punctate. *i–k*, Incised. *l*, Zoned parallel hachure (photos courtesy of G. and A. Reichel-Dolmatoff).

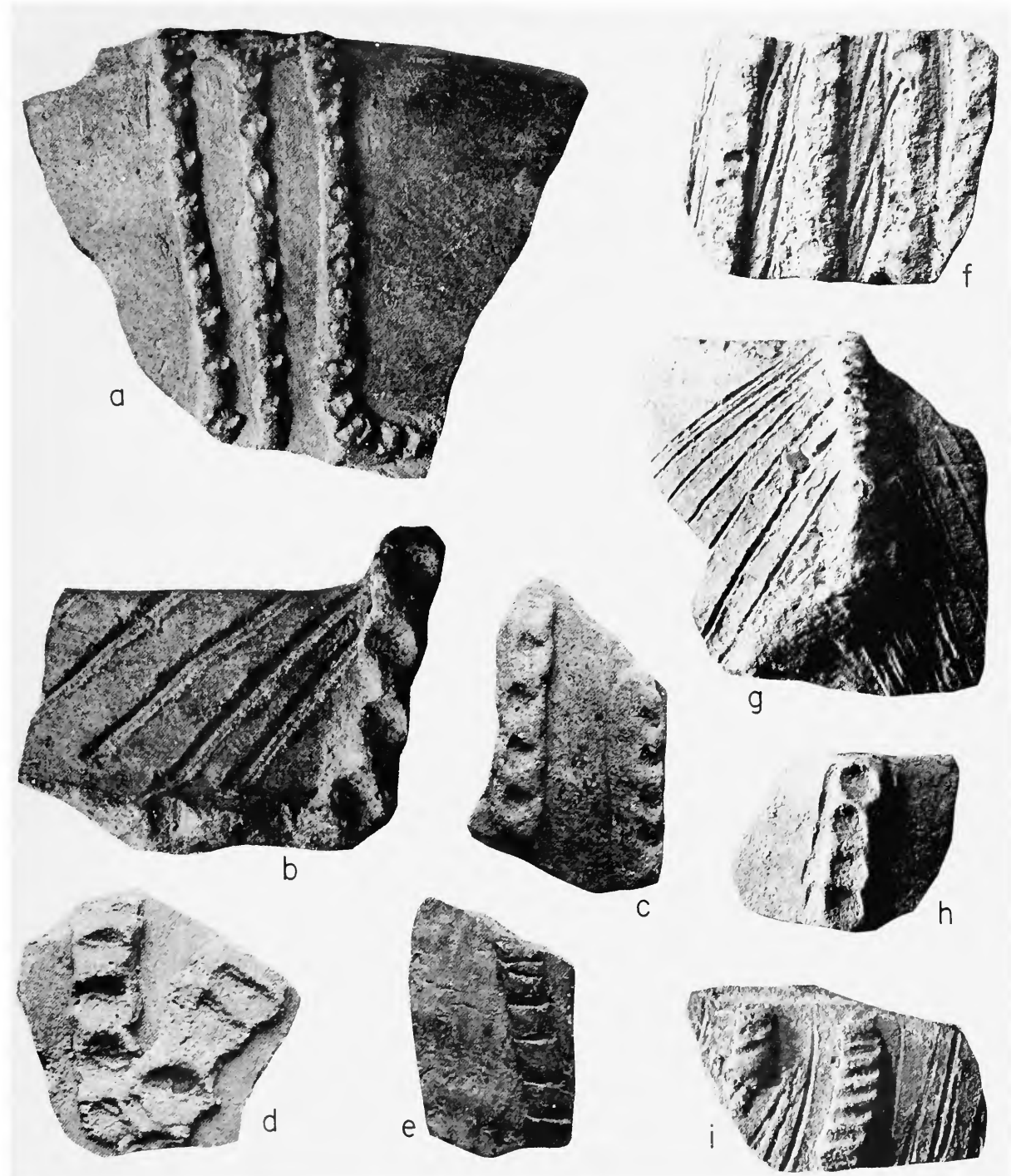

PLATE 189

Jomon and Valdivia sherds with similar decoration by nicked and finger-pressed applique ribs. *a–e*, Kasugacho. *f–i*, Valdivia Phase sites.

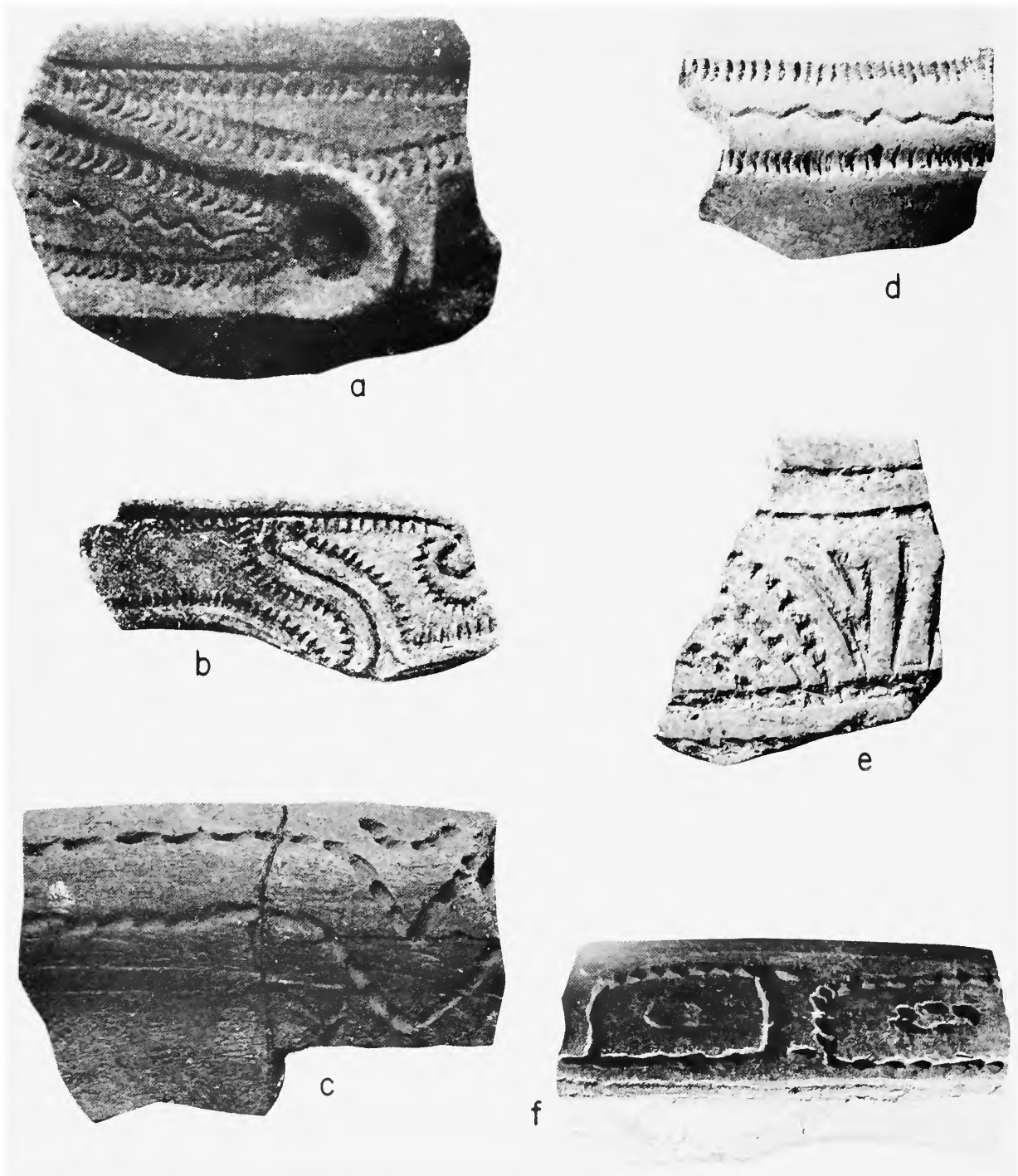

PLATE 190

Jomon and Valdivia Phase sherds with similar nicked broad-line incised decoration. *a*, Katsusaka (after Kidder, 1957, pl. I–5). *b*, Togarushi (after Kidder, op. cit., pl. V–4). *c*, Kasugacho. *d–f*, Valdivia Phase sites.

PLATE 191

Decorated sherds from Kotosh. *a–b*, Tiered jar. *c–e*, Zoned elongated punctate. *f–k*, Zoned circular punctate. *l–m*, Ring and dot and dot ended incision. *n–s*, Zoned parallel hachure. (After Izumi and Sono, 1964, pls. 52a, 62b, 76b, 77a, 83b.)

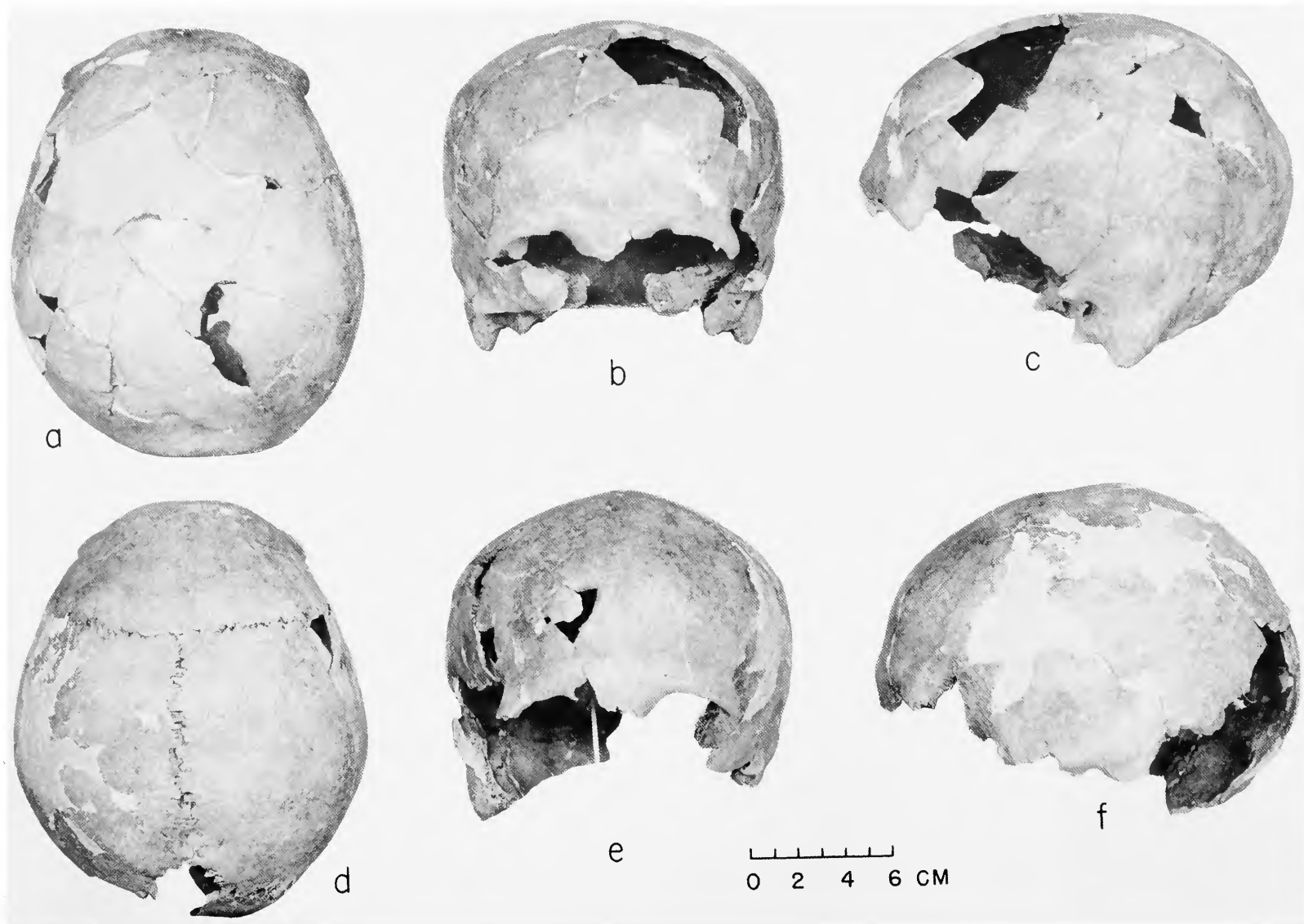

PLATE 192

Skulls from the Valdivia Phase. *a–c*, BV–1; G–54, Burials 1–7. *d–f*, BV–2; G–54, Burial 10.

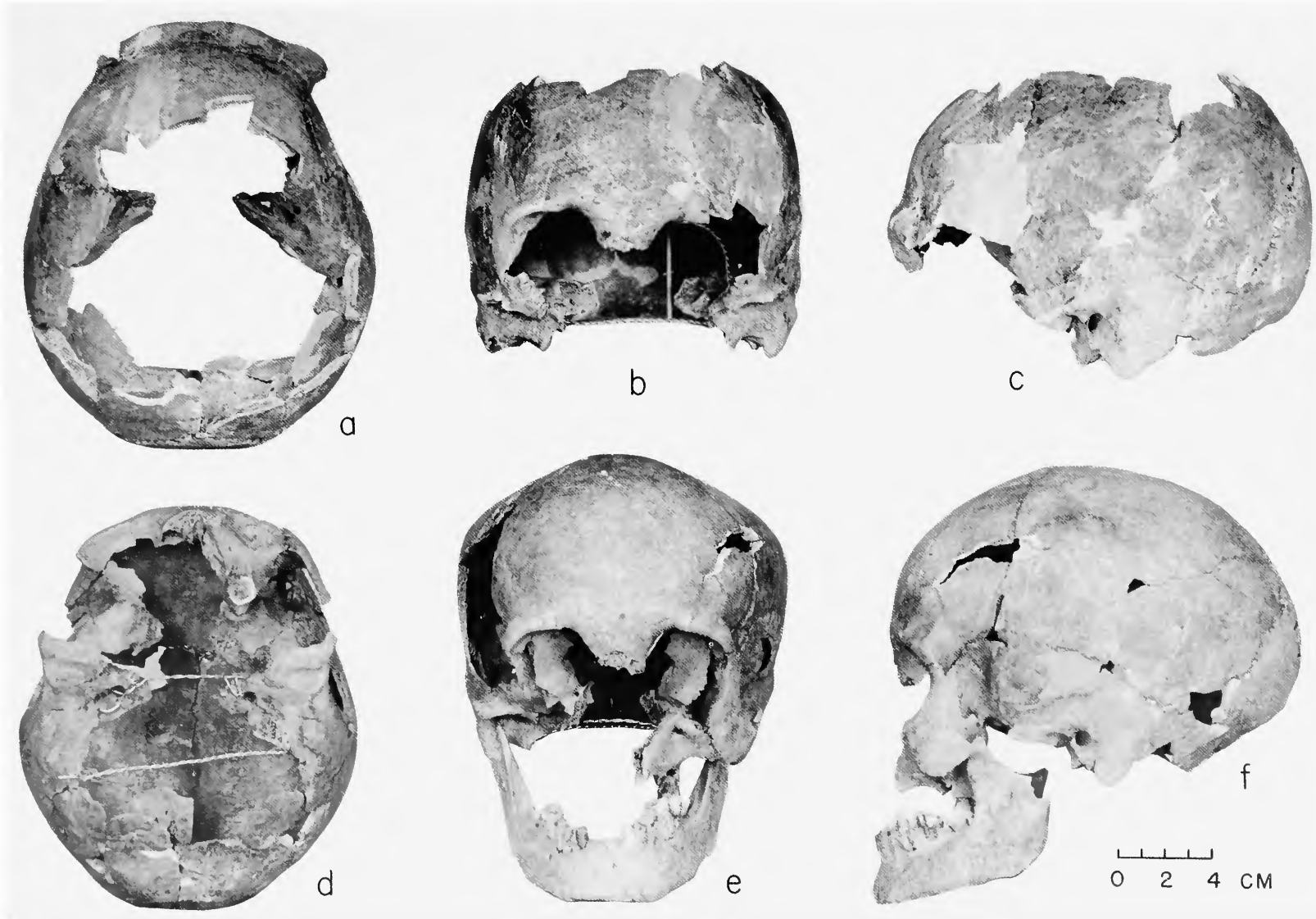

PLATE 193

Skulls from the Valdivia Phase. *a–c*, BV–4; G–54, Burial 10. *d–f*, BV–6; G–54, Burial 9.

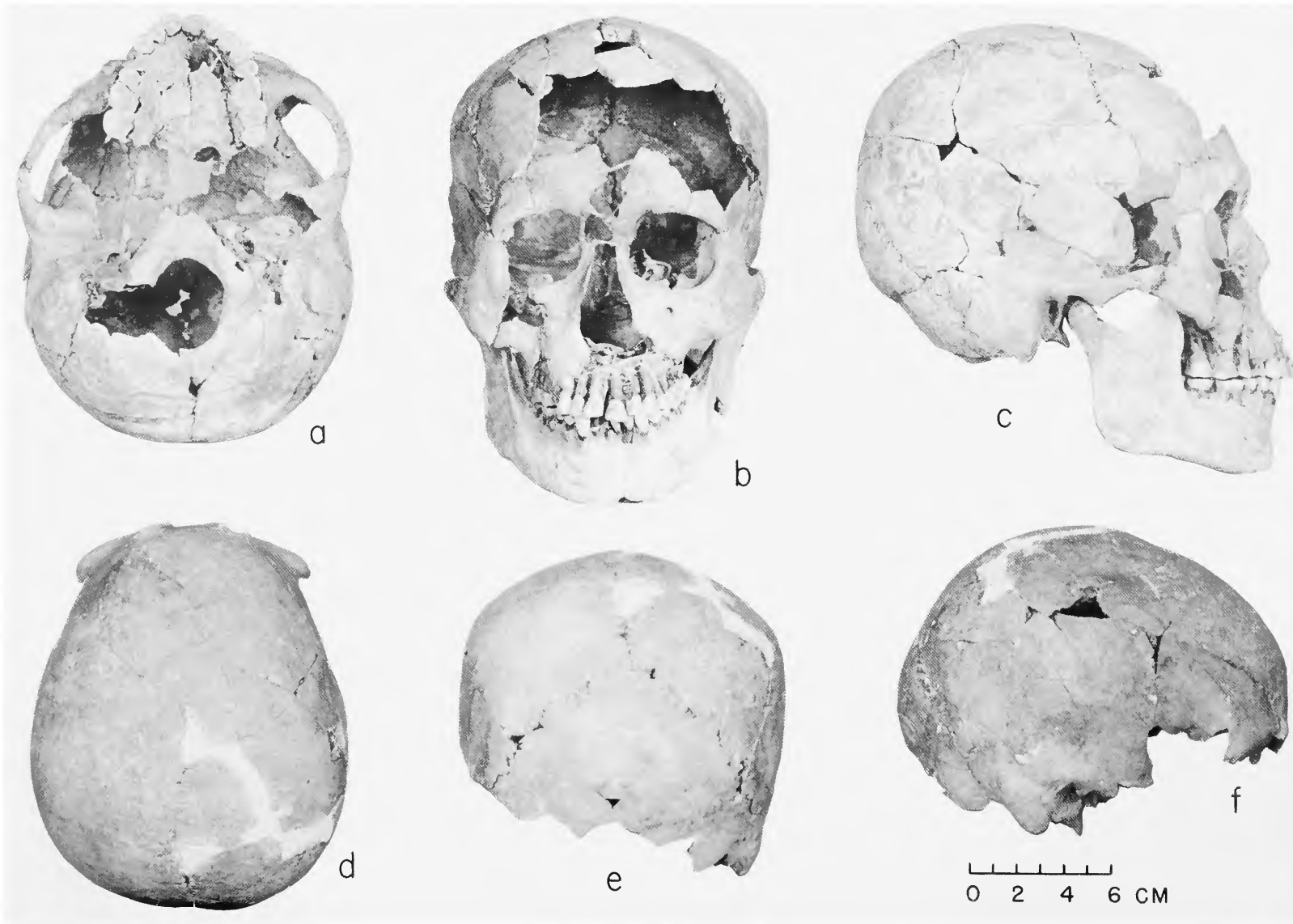

PLATE 194

Skulls from the Valdivia Phase. *a–c*, BV–3; G–54, Burial 13. *d–f*, BV–8; G–54, Burials 1–7.

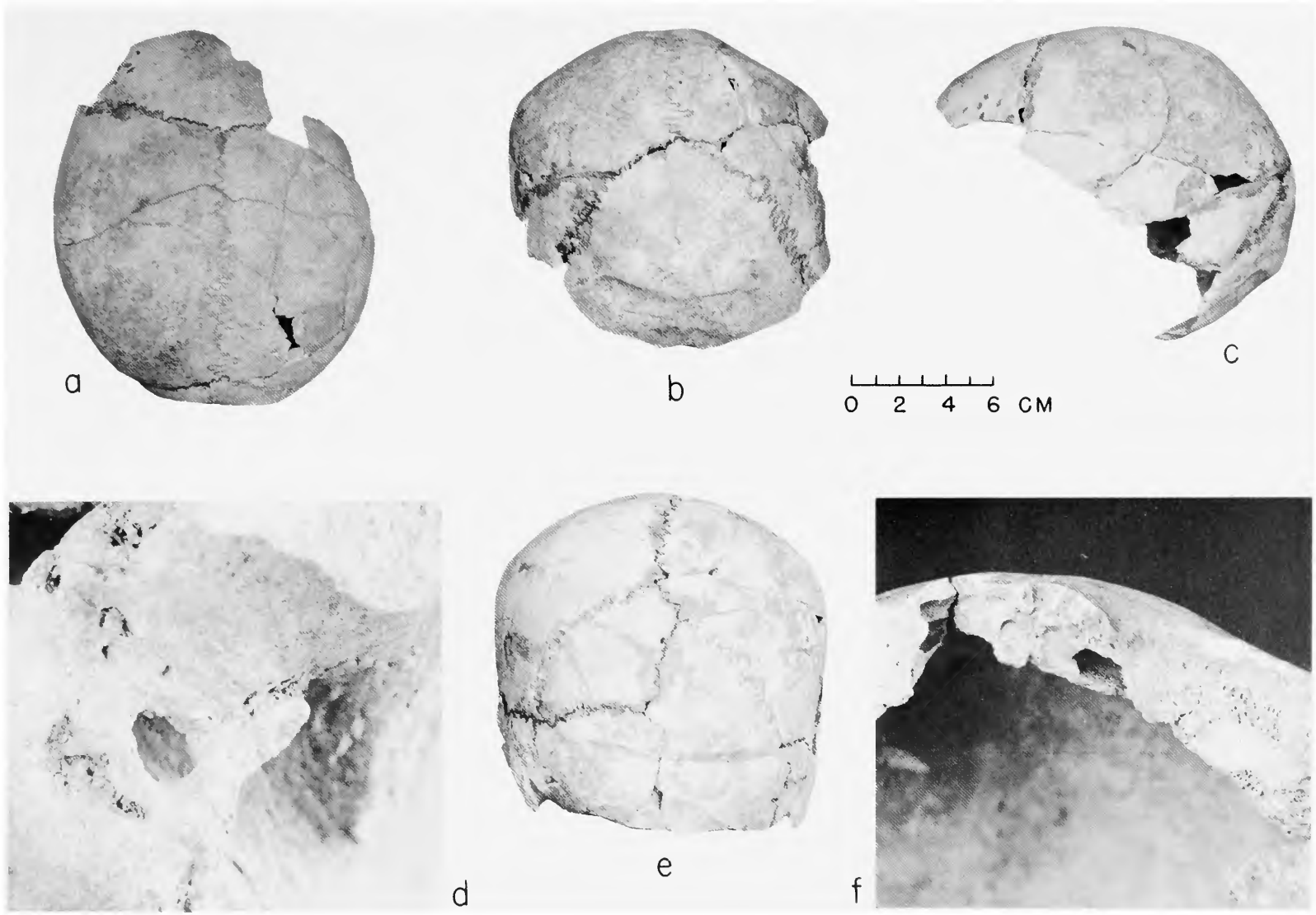

PLATE 195

Skulls from the Valdivia Phase. *a–c*, BV–7; G–54, Burial 8. *d*, BV–6, perforation of the floor of the auditory meatus. *e*, BV–3, lateral Inca bone. *f*, BV–2, spongy hyperostosis.

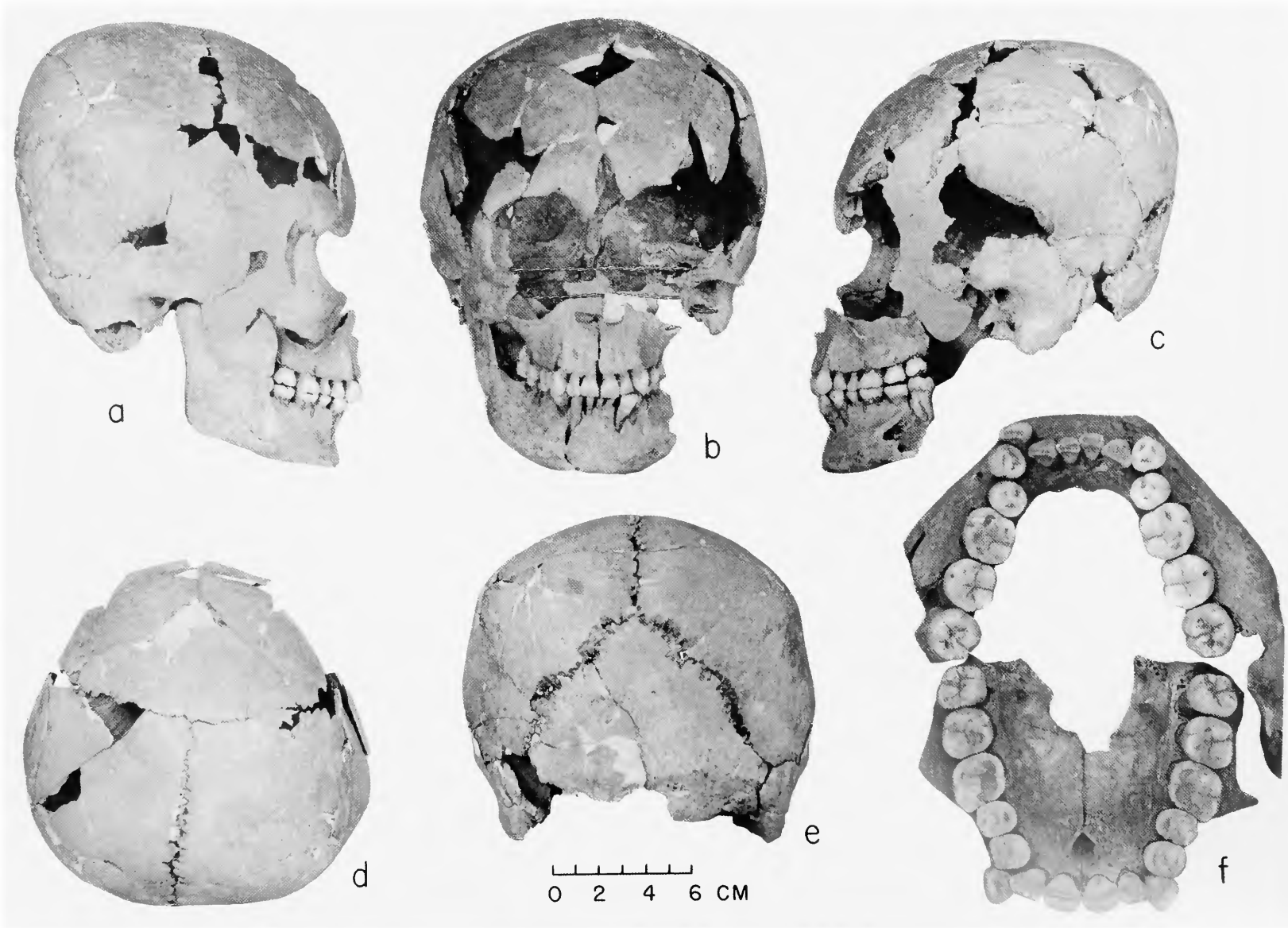

PLATE 196

Skull of the Machalilla Phase, showing tabular erecta flattening and crowding of canine teeth.

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