

## THE HUMAN BEAST OF BURDEN.

By ORIS T. MASON.

I never see a great passenger or express train approaching a station without thinking of the long and tiresome experiences through which the human mind has passed upward to this concrete climax of inventions.

I take my stand as near as safety will allow, that I may drink in the eddies of the boiling atmosphere with the aroma of civilization which it represents.

There is something wonderful in the iron horse—his glaring headlight, irresistible momentum, extreme docility. On the platform of the locomotive stands the controlling mind, the engineer, one hand upon a lever, which sets in motion all this ponderous mass at the rate of even a mile a minute, as Cicero says, "*quadam inclinatione corporis.*" His other hand rests upon the air-brake, by means of which he controls the momentum of 500 tons, reducing it at will to absolute rest. Who has not imagined, as he whirled along on one of these trains, that he could hear the measured hoof-beats of this horse of progress striking the ties or the iron rails? If we consider all the industries and motives involved in this man's activity, the myriad trades and occupations invoked in the manufacture of train and track, the multitudinous avocations accommodated by and stimulating his movements, the infinite variety of freight, animate and inanimate; bags of letters, the messengers of every want and emotion; an endless caravan of passengers of every class of humanity on every possible errand, representing all commercial designs, social and civil structures and functions, we shall have an example of the climax of human endeavor in its most highly organized condition relative to a long series of inventions, of which this is only the introductory chapter. Besides these there are thousands of other occupations, in which carrying is neither directly nor remotely interested, wherein man's handiwork has preceded, initiated, and kept up the higher utilization of animals and of natural forces.

But we are not concerned at the present moment so much with the tedious and varied manipulations by which the railway train has been manufactured from the forest and the mine (that would be its ontogeny) as with the millenniums of change through which a common human

back-strap or head-band has passed upward through inventive creation into the train and track, the latest common carrier (which constitutes the phylogeny of the railway).

At the lower end of this line of inventions and experiences, neglecting all the mental burdens which often weigh heavier on us than our packs, as we pass downward ignoring wagon trains, mule trains, caravans, couriers, pack-horses, dog travois and sleds, reindeer sledges, donkeys, llamas, and other beasts of burden, we come at last to the primitive common carrier, the pack-man himself, and also the pack-woman, for men and women were the first beasts of burden.\*

Primitive commerce and all the carrying and running involved in primeval arts connected with food, shelter, clothing, rest, enjoyment, and war were accomplished on the heads or foreheads, shoulders or backs, or in the hands of men and women; and civilization, while it has invented many ways of burden-bearing, finds also an endless variety of uses for the old methods. How many thousands of our fellow-creatures are still in this condition of mere beasts of burden? It is, for instance, only a few years since the invention of the passenger and freight elevator began to supplant that train of "hod-carriers," who have been since the beginning of architecture carrying upward to its completion every wooden and brick structure in the world.

To get something like an adequate conception of the enormous amount of labor performed by human backs, calculate the weight of every earth-work, mound, fort, canal, embankment, wooden, brick, metal, and stone structure and fabrication on earth. These have all been carried many times and elevated by human muscle. In the light of this contemplation, Atlas, son of Heaven and Earth, supporting on his shoulders the pillars of the sky, is the apotheosis of the human son of toil, and the gaping wonder of archæologists over the hand-made structures of Thebes, Palenque, Carnac, and Salisbury Plain subsides to the level of a mathematical problem. Indeed, the great majority of earth-works, mounds, menhirs, cairns, cromlechs, and dolmens now to be seen witnessed the exertions of no other artisan than the human carrier. †

In the *Internationale Archiv für Ethnographie*, Plate IX, is a street scene in Singapore. The first thing that arrests the attention is that everybody is carrying something or is harnessed to something. Commenting at the left hand occur the following:

- (1) Two coolies carrying a lady in a hammock.
- (2) Two coolies carrying a live pig in a bamboo cylinder suspended to a pole.
- (3) A lady carrying a fan and a reticule.

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\* Innumerable examples of women as burden-bearers may be cited. See Schoolcraft, *Archives*, vol. VI, plate opp. p. 560; J. G. Wood, *Unciv. Races*, vol. I, p. 330, *et seq.*

† Cf. Lucien Carr, *Mounds of the Mississippi Valley*, p. 90, for a calculation of the time required to build an earth mound. Reference is made to the coal-carriers in St. Thomas, and to a paragraph by Isaac McCoy in the *History of the Baptist Indian Missions*, p. 27, for the capabilities in this line of a single tribe of Indians.

(4) A coolie carrying on his right shoulder a pole; from one end dangles a box, from the other a basket. Indeed, there are three men hitched in this fashion in the foreground.

(5) A man dragging a small truck loaded with bundles.

(6) A coolie carrying a furnace on the end of a stick resting on his shoulder, as a peddler does his pack.

(7) A coolie drawing a jinrickasha.

(8) A Chinese gentleman carrying a fan and a cane.

Considering the activity now displayed in transporting men and productions from one part of the earth to another, it will not be a valueless contribution to science if we trace the natural history of those early occupations and industries, the improvement of whose apparatus and methods stimulated the pristine inventors to make their burdens lighter, to enable the human carrier to bear the load with greater ease, to render his pack weight proportionate to the length of his journeys, and to adapt his occupation to the ever new exigencies of his environment.

It is a common saying that we must go to nature for our supplies. Equally true is it that we go in vain, unless we descend to the condition of the brutes, if we expect nature to supply us with aught else than that whereon we may exercise the inventive faculty. Indeed, there are innumerable examples of animals transporting materials to distant places in order to utilize them. The beaver, the bird, the lamprey eel, the bee, the ant are all carriers.\* Many animals also modify natural objects for the purpose of using them. But the two ideas of modifying a natural object for the purpose of making a carrying tool seem to concur only in the human mind. We are the only animals that modify nature to produce a carrying device. Again, these creatures all carry their implements and weapons with them as part of their natural endowment; they do not have to invent them. But the farmer, the artisan, the professional man, even the laborers go about weighted down, with their tools, apparatus, books, or even their carrying implements as ponderous often as the trunk and tusks are to the elephant.

There are two sets of ideas involved in harnessing the human *jument*, which may be studied in part separately, in part together. They are *conveyance* and *transportation*, or the carrying of the man and the carrying of things. The former may be older, for devices in which to carry infants may have been the first in the order of invention. The passenger and the freight train express the two ideas exactly, because each, while encroaching on the function of the other, has modifications for its own ends. The subject of mere locomotion involving snow-shoes, canes, staves, alpenstocks, stilts, crutches, and the like will not be here considered, because they are only aids to locomotion and involve little that relates to the beast of burden.

The cradle-board and other devices for carrying infants will also be

\* For comparison of the engineering skill of beavers and ants with that of the mound-builders, cf. Lucien Carr, "The Mounds of the Mississippi Valley," p. 66.

the theme of a separate chapter, inasmuch as other ideas are involved, but the methods of human conveyance on the backs of bearers among people not highly civilized will receive brief mention.

Many other industries have been created, stimulated and modified by the carrying trade. Every one will have a dozen suggested by the mere mention of the subject. One has lately come to the writer's notice, which will serve as a very primitive example. The crudest agriculture in the world is practiced by the Pimas and contiguous tribes in southernmost California to procure gourds for the transportation of seeds and water. The women, accompanied by a body-guard of men, go, in the spring time, to the bluffs or rocky slopes, where a little rich, moist earth fills the crevices, and therein, by the help of a sharpened stick, they insert their gourd seed. In the autumn the women return to these spots to gather the large gourds hanging from their natural trellis, and from them supply their households with a variety of utensils. So the carrier is patron to the farmer.

In the same way has the carrier stood friend to the potter. Among the Pueblos and other pottery-making peoples hundreds of jars are made to be carried on the head or to be swung from the shoulder in a yoke. The potter molds his vase at the order and convenience of the carrier.

Basketry has also lent its services largely to the carrying industry, and in turn has assumed a multitude of shapes and textures demanded by this occupation alone.

In the National Museum, at Washington, gathered from many parts of the world, are a great variety of devices designed exclusively to facilitate the carrying of burdens by mankind. There are many others in various parts of the world quite as important.

We may approach our task from different points of view, guided by a variety of ruling concepts. It is possible to consider the subject geographically. I was delighted to find this fact recognized by Plato:\*

"CLEINIAS: Look at the character of our country. Crete is not like Thessaly, a large plain, and for this reason they have horses there and we have runners on foot here. The inequality of the ground in our country is more adapted to locomotion afoot."

The word "geography" as here used applies to all natural advantages, to materials used in constructing appliances, and to objects carried.

Or we may view the subject ethnically, in relation to tribal patterns, customs, and the prejudices of clan, class, or sex.

Or it may be regarded nationally, with reference to the regulations concerning carriers under the same government and treaties relating thereto between different political bodies.

A philogenetic method would lead us to scrutinize the various ways of carrying in relation to the influence of one invention in giving birth to another or in some way modifying the form of another, either in the same category or in other categories.

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\* Laws N. Y. (1873), Scribner, vol. iv, p. 156.

An interesting method of study would be by crafts, and it would enlist the co-operation of many searchers. For instance, we might ask the fur trader of Hudson Bay territory to tell us all the ways of carrying peltry that his land had seen, from packing up to the Red River cart. In like manner the emigrant over the earth, the peddler or merchant, the woodman, the miner, the fisherman, the farmer could each tell us a wonderful story, beginning with a very simple process and winding up with a story worthy of the Arabian Nights; or, finally, our thoughts could be arranged progressively in relation to the phenomena, including both what some call natural evolution and also technical elaboration or design.

One of the most interesting chapters in the history is that which portrays the methods of hitching up this animal of burden, the parts of the body utilized, the harness adopted, and the adaptation of these to the burden, the country, and, in short, all the exigencies of the case. With this one idea in mind look carefully over the great works devoted to the ancient monuments of Egypt, Assyria, Greece, and Rome, or turn the leaves of pictorial journals and books of travel, and the variety of ways by which man has grown equal to his burden will be astonishing.

As the study of railroading includes the engine or motor, the train or burden, the road and the signal, no less does the consideration of the original freightman or pappoose-carrier involve the person, the load, the trail, and the primitive signal. Indeed, the germ of the latest passenger and freight train was in the first human burden-bearer.

The task of duly appreciating rude inventions is not easy, and some of the statements herein made may seem trivial. Living in the enjoyment of so many privileges in the matter of conveyance and transportation, we shall find it hard to realize the former condition of things unless we transport ourselves to savage and barbarous lands or out-of-the-way country places. In a thriving city one no longer thinks of walking. The cheapest hand laborers ride to their work in cars of palatial splendor drawn by horses, steam, or electricity. Men and women flit around on cycles. It is considered vulgar to carry a parcel. The servant girl buys a few cents' worth of tawdry stuff and has it brought to her in a parcel-dispatch wagon that is covered with forty coats of lacquer. Everywhere the old régime is changed in our civilization. We get an inadequate conception of the early history of human backs by contemplating the service that nature is at present rendering to the comfort and convenience of our race.

It would hardly be worth while to mention the clothing and adornment of mankind as a load to be carried, were it not for the fact that in some cases, such as the brass wire of the Africans and the mail of the mediæval knight,\* as much as one hundred pounds are borne by a single individual. Counting all humanity, it is safe to say that two millions of tons of apparel and personal ornament are constantly worn to supply

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\* Cf. Meyrich, or Hewitt, or Demmin.

artificially what nature has given gratis to other animals, either in the way of hair or wool to keep them warm, or plumage to increase their attractions.

It is impossible to enumerate every form of burden-bearing, but to show the almost endless variety in which inventive genius has displayed itself in loading the human body, the following enumeration is introduced:

#### METHODS OF BEARING BURDENS.

1. *In the hand.*—This method is universal. In the house, at the station, on the street, wherever one turns, light parcels are flitting in every direction, which in the aggregate amounts to an enormous mass, carried principally in the right hand. At the other end of human history the act repeats itself. For we can scarcely frame a conception of man primeval without a club or stone weapon or rude spear in one hand, and here again the right hand has been selected to do the work.\*

2. *In both hands.*—It is really easier to carry in both hands than in one, even though the load be larger. So it is a common sight to see a man or a woman dividing the luggage into two parcels, bearing two buckets or baskets, sometimes held apart with a hoop. In raising a load to the shoulders both hands are used. It is amusing to watch the potters on the Egyptian monuments—to see the multiplicity of attitudes they assume in the application of the two hands to burden-bearing.

3. *On the fingers.*—This is a kind of fine art in carrying. In the old descriptions and pictures of royal cup-bearers the salver is delicately poised on three fingers. The climax of this plan is the summer-resort waiter's feat of bringing the food of half a dozen individuals borne aloft on the ends of his fingers in a huge tray.

4. *With a baldric.*—The modern tourist hangs his opera-glass, satchel, haversack, etc., to a strap passing over one shoulder and under the opposite arm. The hunter carries his game-bag in a similar manner. Among hurdy-gurdy players and fruit-peddlers the strap hangs on the back of the neck and the load rests against the stomach. The hands are then free to make music, handle the merchandise, or even to help in carrying the load. The baldric is now a military ornament especially, and may never have had extensive use among savages.

5. *Hung to a belt.*—Combining the belt with the baldric, the soldier carries his weapons. It is common to see small objects hung to a belt before, behind, or on either side. This is not an easy way to carry a heavy burden; yet among semi-civilized peoples it is the place for transporting treasures—in short, the first step in the insurance of carrying treasures. Also, the broad sash of many peoples serves admirably for holding children, victuals, weapons, papers, and things not to be-exposed.

\* The writer has examined a great many savage weapons and tools that will fit only one hand. The proportion of left-handed is not more than one in fifty for men, and he has never seen a left-handed woman's implement.

6. *On the arm.*—This might be called the retail method of carrying. One sees every moment about the farm boys and men using this method of carrying, and on the busy street multitudes of men, women, and children are ever flitting to and fro with loads. These vary from a few ounces to several pounds, and are borne under the arm, on the forearm, on both forearms. In the stores it is the same thing. The arm seems to be the vehicle for retail conveyance. To vary this style a little we must increase the load and basket and watch the market people as they trudge along with 50 pounds of food hung on the elbow, resting on the hip, and the body bent to get the center of gravity poised exactly. The writer has never seen in any book of travels a savage man with a load hung to his arm like a great hook and himself twisted around so as to throw a part of the weight upon his hip. This must be a product of civilization.

7. *Hung from the shoulders.*—This is the favorite device of farmers and others who carry small loads in a bag. One of the indelible recollections of country life is of the farm hand carrying grain, plaster, and other things about the premises in a sack suspended from his shoulders. The same man on Saturday afternoon trudges homeward from the mill and the store with the week's provisions for his family carried in the same manner. The peddler of small wares, the laborer moving with his little property, the hunter returning with his game, the woman of southern climes with her child, all are examples of the importance of the shoulder in the economy of transportation when used merely as an accessory to the back. The universal sack of the negro population of the rural districts in the Southern United States as a receptacle for everything, is a good example of this method of carrying, which has come down to us from the remotest antiquity. Travelers state that a Peruvian miner will ascend 100 or more feet of a rude ladder with 300 pounds of ore in a skin bag hung from his shoulder.

8. *On the shoulder.*—The shoulder alone plays a leading part in transportation. There is no lack of examples of women pursuing this method. The miller takes a sack of grain on his shoulder, places his palm on his hip, and moves on to his hopper, or he reverses the process with a sack of flour from the mill to the farmer's wagon.

In great shipping houses lines of porters carry sacks of grain to the ship in the same way.

Again, the hod-carrier, antecedent of all modern elevators, with 75 to 100 pounds of brick or mortar on his back, has been for ages all over the world transporting upward the material of the builder.

Look, moreover, at the coolies of the Orient. More than a million Chinese make their living as professional carriers. In the cities are the porters and others who carry rice, etc., on the shoulder in sacks or burdens upon a pole, half the weight at either end.

Writes a friend:

“The average load of a coolie is 100 pounds, and with this he travels

30 miles. Kinkiang is an important place for the export of tea. The tea districts are situated about 60 miles from the town, and the coolies bring in the chests in two days, each man carrying a load of 100 pounds. The weight of a load and the distance over which a coolie travels may be different in the north and south. I have not been able to make inquiries elsewhere but at this port."

In Shanghai 140 pounds is an ordinary burden. For long distances 100 pounds is the load and 20 miles the ordinary day's journey. The bearer has a staff in his hand and rests *ad libitum* by balancing his burden on top. One hundred pounds 20 miles equals a ton a mile per day. Now, if there are a million coolies, there are each day in China 1,000,000 tons of freight moved 1 mile on the backs of professional carriers. The ancient Egyptians practiced this mode of carrying extensively.

9. *On the scapulae.*—The grain carriers or lumpers who load vessels with wheat or corn may frequently be seen with a full sack resting on top of their backs. They run up a plank to the hatch, toss the sack in the air, mouth downwards, and catch the lower corners so as to save the sack and dump the grain into the hold.

The English porters and furniture men have a knot, padded with something soft, which they place around the forehead and on the scapulae. They are then ready to take on the largest pieces of furniture, such as bureaux, sideboards, etc. The higher form of this art of carrying on the scapulae is the Holland yoke, a device which enables the bearer to bring the hands into play.

10. *On the back.*—The back is the natural resting place for the burden. The lowest savages know this, and inventive genius early began to devise apparatus for harnessing this part of the body. In Africa, on the Andes, in Mexico, throughout the civilized world, the peaceable carrier bears on his back the commerce of the race. The load is held in place either by the forehead strap, the breast strap, the shoulder strap, or by two or more of these combined. Bock, in his "Head-hunters of Borneo," represents a carrier using both the head band and the shoulder straps as in knapsack carrying. In war the soldier fastens his knapsack to his back and shoulders, leaving his arms free to do their work. There are many patent devices for distributing the soldier's load over the shoulders, breast, back, and hips. For obvious reasons his hips are left free. Children play at pick-a-pack, passengers are landed in shallow ports, persons of means pass over difficult places in the manner described by Cassius:

I, as Æneas, our great ancestor,  
Did from the flames of Troy upon his shoulder  
The old Anchises bear, so from the waves of Tiber  
Did I the tired Cæsar.

The burdens of Kurdish women are thus graphically described:

"Soon we came to a place where the road was washed away, and we were obliged to go around. We saw a woman there with a loaded



donkey which could not pass with its load; the woman took the load on her own back and carried it over, and then led the donkey over. She also carried a load of at least 100 pounds, and she had a spindle in her hands. Thus she went spinning and singing over the rugged way which I had passed with tears and pain. \* \* \* In the evening they spin and make sandals; when they lie down, they place under their heads the ropes to bind the heavy loads of grass and wood which they bring down from the mountains. After midnight they go up to get loads. \* \* \* In the early morning I often saw the women, looking like loaded beasts, coming down the precipitous mountain path, one after the other, singing and spinning as they came. \* \* \* I saw women with great paniers on their backs and babies on top of these or in their arms, going four days over that fearful Ishtazin pass, carrying grapes for sale and bringing back grain. Men said the women must suffer much more before God could forgive Eve's sin.

"A few years ago a woman from Jeloo came to my home in Geogtapa. Her husband, who was almost a giant, sickened in Gawar, and she told me she had carried him on her back all the way, four days' journey. He died in our house. I did not believe her then; now I do, for my eyes have seen what loads these women carry."\*

11. *On the head.*—This process is usually called toting, and is especially characteristic of women† of the lower classes and of negroes.‡ The traveler may see the dairy-maids anywhere in Europe carrying 25 pounds of milk on the head, women in Iceland carrying loads of unsavory cod-fish on their heads, and Italian peddlers of all sorts use the head for a carriage. In the southern part of the United States 50 pounds is the "toter's" steady load. Men and women constantly bear that amount. A slater's assistant mounts a ladder with 50 pounds of slate on the head. The farm woman totes a tub of water holding 10 gallons, the whole weight being 100 pounds. The head-ring is seen among the Zañi Indians as a means of keeping the load on the head and relieving the pressure. Pads of various kinds replace the ring where toting is for long distances.§

12. The forehead and the bregma are also parts on which to hang harness. In civilization the yoke has passed from the forehead of the ox to his scapulæ. Comparing the head-strap of all our Indian tribes with the neck-yoke of the Holland woman, it is permitted to see the same

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\* Woman's Work for Women, November, 1888, p. 296.

† See illustration of Kafir women carrying fagots in Wood's "Unciv. Races, vol. 1, p. 91.

‡ "All along the road we met numbers of men, women, and children going to the Badagry market, with palm-oil, corn, yams, fowls, fire-wood, etc., which they carried in heavy loads on their heads, according to the universal custom of this country, though the Golahs and others in that region carry burdens on their backs." (Bowen, Cent. Africa, p. 103.)

§ Wood mentions the Bechuana habit of "bogale," or drilling young girls in carrying loads of wood long distances and jars of water without spilling a drop. (Unciv. Races, 1, p. 26.)

process of improvement antedating the domestication of the ox, and possibly suggesting his harness.

13. *In pockets.*—This method of conveyance is scarcely worth mentioning from the civilized point of view; yet, when we consider the endless variety of small merchandise carried in the pockets of men and women, and remember that all these pockets are for no other purpose than to serve as instruments of transportation, we can not omit including it. We must remember also that the Oriental, especially the Corean, has pockets in his sleeves having the capacity of a half bushel. The Turk and the Arab stow away as much as this in the ample folds of their robes, and any boy who has stolen fruit can add his testimony.

14. *Men combined.*—Two men bearing a log or burden on their shoulders, four or six men carrying a bier or stretcher,\* sailors hoisting to the rhythm of a song or “ōhyeā,” two or more men with a palankin borne among them, a set of bearers in Madagascar and elsewhere with relays, a company or a regiment of men carrying an immense stone in India, as figured by Count Wurmbrand, a lot of men setting up a barn frame or telegraph pole, all illustrate the utility of combined effort to transport a heavy mass. There is no doubt that the great works of modern times, whose existence and utility depend entirely upon the co-working of thousands to make and to maintain them, were foreshadowed and completely outlined in the days when hand-work alone was the force employed. Herodotus ascribes the beginning of the first canal between the Nile and the Red Sea to Neku, and the completion to Darius, the Persian. A hundred and twenty thousand Egyptians lost their lives in Neku’s reign.† Peons entering some Mexican city or slave trains from the heart of Africa often reveal a long row of men and women co-operating in carrying a great weight. The same is true of the pulley, answering to a compound hod, by means of which one man transports a single weight much too heavy for one.‡ In an account of Cheops’ causeway, “some were required to drag blocks of stone down to the Nile; others drew them to the range of hills called Libyan; a hundred thousand men eat bread constantly, and were relieved every three months by a fresh lot.”§ In Munich those who carry large sacks use an implement like **M** to grasp, as it hurts the hands to lock fingers under the end of the sack. They stand face to face and grasp the rounded sides of this wooden buckle, slide it under the sack, lift it up, and steady it with the free hand, which carries it along and gives it a toss in unloading.|| In this country men carry pianos by means of a

\* Rawlinson’s Herodotus, II, 77, figure. The transportation of the disabled with reference to conveyance by human bearers. By James E. Pilcher, M. D., Ph. D. J. Mil. Serv. Inst., IX (1888), 222-242.

† Rawlinson’s Herodotus, II, 158, with notes.

‡ Rawlinson’s Herodotus, II, 124.

§ Rawlinson’s Herodotus, II, 277; III, 377.

|| Theo. A. Mills. See Prescott, Conquest of Mexico (Philad., 1874, I, 145) for the transportation of the calendar stone from the mountains beyond lake Chalco, a distance of many leagues, over a broken country intersected by water-courses and canals.

shoulder-strap and a peg that goes into the hole left by unscrewing the legs. Two men can carry a piano thus.

15. *Hauling*.—The simplest form of traction among men may be seen in the small boy dragging his wagon or sledge. With the arms alone for traces the primitive man dragged his game over the ground or ice to his distant home. Even two or more might co-operate in this primeval team. The next step would be the use of a line, perhaps of raw-hide, perhaps of fiber. Along the edge of some quiet water they walked, those pristine tow-men, dragging their rafts or rude boats from the pebbly beach. Here began that immense industry now carried on in the canals of the world.

The ways of fastening one's self to this traction or tow line are many.\* The simplest is the grasp of the hand. Others may be seen bending to their work with the line over the shoulder, around the waist, or tied to a becket or bricole. A curious variety of this tracking is seen on Russian rivers, where an anchor is carried up-stream in a small boat and dropped. The cable passes back to a windlass or a heavy barge, by which the great mass is moved up to the anchor. A delightful specimen of helpless modern invention is a picture in Baker's "Ismailia."† Steamer No. 10 has balked among the rank vegetation of a canal, and she is being hauled along by a hundred or more naked Africans dragging at a cable. In the Southern States formerly the great shad-nets were drawn ashore by a gang of fifty to one hundred negroes, who wore each a becket with a Turk's-head knot, which the seine-hauler knew how to attach or detach in a second.

A species of tracking practiced on the Upper Missouri and other northern rivers in the fur-trading period before steam-boat days, has been called to the writer's attention by Dr. Washington Matthews, U. S. Army. It is called *cordeling*.‡ The goods of the trader are loaded upon a boat and the craft dragged by a tow-line along the margin of the stream. These articles were traded for furs until the boat had gradually exchanged its freight of civilized wares for peltry. Then the craft was easily floated back to St. Louis, its starting point. Mention is made of this process by Lewis and Clarke, Prince of Wied, Brackenridge, and other travelers of the pre-steamboat days.

Before *cordeling*, even, there was a method of ferriage of the most primitive character practiced on the Missouri River. The bull-boat was a contrivance used as a primitive ferry. It was made as follows: A

\* Hinds's Labrador, vol. 1, pp. 77, 94.

† New York, 1875, opp. p. 53.

‡ "The British fur companies held the trade of these Indians until 1807, when Manuel Lisa ascended the river in keel-boats to the Mandan villages and beyond. Until 1832 goods were brought up the Missouri River chiefly in keel-boats, or Mackinaw boats, which were *cordeled*, or towed by men with great labor against the rapid current of the river. Two summers at least were always occupied in dragging a boat from St. Louis to the head of navigation, the crew sustaining themselves chiefly by hunting." Ethnography of the Hidatsa, p. 30.

number of elastic poles were firmly inserted in the earth in a circle the size of the gunwale of the boat, and a horizontal pole was lashed to these a few inches from the ground. The tops of these poles were bent inward, each opposite pair being firmly and neatly lashed together at a height from the ground to correspond with the depth of the craft. This done, a buffalo-bull hide, depilated and thoroughly soaked, was drawn down and stretched over the frame, and the edges secured to the horizontal pole which served the purpose of a gunwale. The ends of the poles were then cut off, the vessel turned over, any little crevices were stopped, and the ferry-boat was ready to launch;\* and this is the way the apparatus worked: Whenever an Indian wished to cross a river in his bull-boat he placed therein his luggage and babies, and fastening a rawhide line to his gunwale, he swam across the river with the other end attached to his body. Behind the craft swam his wife or daughters, pushing the boat as much as possible against the stream. Indians have told the writer that oblong bull-boats were formerly used, before the days of steam, whenever longer journeys were to be taken. The practice would be perfectly in keeping with the birch-bark canoe journeys of the tribes north and east, where the vessel was only an improved bull-boat, in which birch-bark took the place of rawhide.

According to Herodotus (I, § 1) Cleobis and Biton were honored by Solon with the second place of happiness among men. "There was a great festival in honor of the goddess Juno at Argos, to which their mother must needs be taken in a car. Now, the oxen did not come home from the field in time, so the youth, fearful of being too late, put the yoke on their own necks and themselves drew the car." Without dreaming of their distinguished company hundreds of rag-pickers, small-truckmen, and peddlers are pulling and pushing wagons and carts about the streets, sometimes alone and often hitched by the side of dog or donkey.†

16. *Throwing or tossing*.—An immense amount of material is moved by various methods of throwing, with or without tools. It is a process of rapid transit in which the material alone moves without the necessity of a track of any kind. Doubtless many will remember the old fashion of passing buckets of water at a fire before the invention of engines. The negroes in southern cities move many thousands of watermelons and other produce from the vessels to the warehouses or wagons, often hun-

\* Cf. Lewis and Clarke's Travels, London, 1817, vol. 3, p. 348.

† The Egyptian sculptures abound in representations of human traction in every attitude in which it is possible for a man to be attached to a rope. See Rawlinson's Herodotus, II, 72. See also in Rawlinson's Five Monarchies, New York, 1871, p. 402, from Layard, a spirited picture of men moving a human-headed bull. We have here in one picture men drawing sledges, others drawing hand-carts filled with ropes, and others fixing rollers, working levers, holding props and guys, carrying rollers, relays coming to relieve their fellows, taskmasters with clubs, and the boss on the front of the sledge marking time for those at the ropes. All the draft-men have bricoles or beackets as individual harness.

dreds of feet, by tossing them from one to another, standing ten feet apart. It is a simple step from this to the shovel, the fork, the hoe, or the rake, used on every farm and in connection with almost every business in the world.\* In the oldest forms of embankment the laborers doubtless carried the dirt in sacks or baskets. To this day the fellaheen of Egypt follow the primitive method.† But in all military operations, canal and railroad work, excavation in cities, the shovel is the vehicle of transportation, and the navy, or his technical representative, is the beast of burden.

17. *Caravans*.—It is only a step from the single carrier to the organized train under the direction of a leader performing in common a task which would be dangerous to one, or in which mutual help is needed. No one supposes that the caravans of historic times were invented at a single effort. The caravansaries, the wells, the armed guard, the joining of forces at difficult places, are complicated affairs which are the resultants of many trials of much simpler character.

In the old slave-hunting days in Africa the same method was practiced with slaves. A lot of negroes would be captured and driven to the coast for sale, but to save freight each individual was loaded with ivory, gold-dust, and other commodities. On arriving at the coast the trader sold out the whole concern and returned to repeat the process.‡ In Southern Mexico and Central America the trade from the interior is brought to the coast on the backs of peons marching *en train*e under a leader.

18. In all the early accounts of settlements in our country trails are not only mentioned as the veritable war-path, but commercial trails were also known. This introduces us to the whole subject of roads, the series being paths marked by stakes or blazed trees, unkept roads, highways, turnpikes, plank roads, paved streets, tramways. In these rude trails or paths are many obstacles—declivities, streams, chasms. To overcome these, inventive genius has devised bridges, fords, steps, graded ways, tunnels, etc., part of the outcome of the packman's industry.§

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\* Dr. Samson reports a curious combination of the spade with traction. "In spading up the ground a fellah pressed the spade into the earth, while a woman on each side, by means of a rope attached to the handle, raised the spade with its load and turned it over."

† "I saw in the Delta of Egypt a common occurrence, young women and girls digging in the canals, shoveling the black, dripping mud with a bit of wood and their hands into palm-leaf baskets, putting the dripping baskets on their heads so that their hair and faces were all matted with slime, toiling up the sides of the canal to empty their loads, while a taskmaster with a whip would cut their bare legs as they passed if in weariness they loitered."—*Dr. G. W. Samson*.

‡ See reference to selling boat and cargo in Herodotus, vol. I, p. 194.

§ Mommsen's "Rome," New York, 1869, I, 177. For an excellent account of the swinging bridges of Peru, cf. Squier, *Incidents of Travel*, etc., New York, 1877, 544-547.

19. *Relaying*.—An important element in transportation is resting and relaying.\* In most rude carrying-devices the greatest effort is put forth in rising from the ground or in getting the load in place. The organ-grinder and the coolie carry staves, on which they rest their load when they are fatigued. The Damara girl lifts her load from her head and holds it aloft on both hands while she proceeds on her journey. The soldier shifts his weapons; the Malagasy bearers replace one another under the poles of the *filanzana*, or carrying-chair, without interrupting their journey. The Montezumas had relays of runners between the sea and the city of Mexico, so as to receive fish and other lowland products in a fresh condition.

20. *Couriers*.—From this inquiry must not be omitted the courier, swift messenger of tidings, earthly prototype of Hermes, who was succeeded later by horses, dromedaries, carrier-pigeons, ships on the sea, steam-cars on land, and, last of all, the telegraph. His modern survival is the district and telegraph messenger boy. I have seen somewhere the picture of a naked Kaffir running at full speed, bearing in one hand a pair of assegais and in the other a rod split at the upper end to receive a letter, carried thus to keep it from being soiled by contact with his naked body.

In ancient Mexico, says Prescott, "communication was maintained with the remotest parts of the country by means of couriers. Post-houses were established on great roads, about two leagues distant from each other. The courier, bearing his dispatches in the form of a hieroglyphic painting, ran with them to the first station, where they were taken by another messenger and carried forward to the next, and so on until they reached the capital. These couriers, trained from childhood, traveled with incredible swiftness, not four or five leagues an hour, as an old chronicler would make us believe, but with such speed that dispatches were carried from one to two hundred miles a day."<sup>†</sup>

There is no doubt that all of these various devices have had their influence in shaping and deforming the human body. Students of craniology and anthropometry should have their attention called to the fact that among savages the use of carrying-pads, straps, and other devices about the head commences just as soon as the child can walk, with little loads at first in small baskets, wallets, nets, frames, or what not, when

\* Hinds's "Labrador," vol. 1, p. 43.

† Conquest of Mex., Phila., 1874, vol. 1, p. 43. For an exciting account of couriers with lighted torches proclaiming the new cycle, *id.*, 130, compare C. A. Muray, *Travels in North America*, New York, 1839, vol. 1, p. 193, who says that an Indian of his party traveled a hundred miles in four and twenty hours. Prescott also alludes to Plutarch's account of the Greek who brought the news of victory to Platea, 125 miles, in a day; to pedestrian capabilities of man in a savage state collected by Buffon; to Marco Polo's account of couriers in China in the thirteenth century; to Anderson's account of Government couriers in China in 1796. (Conq. of Mex., Phila., vol. 1, p. 44, note.) "Nothing in the world is borne so swiftly as messages by the Persian couriers." (Herod., *Urania*, 98.) In this case horses were used as in the pony mail formerly in use across the plains, but the man or courier went on.

a forehead strap for the top of the head is employed. Even though these marks may not be hereditary, they can not escape the notice of the craniometer.

It should not be overlooked that this human pack animal possesses the greatest versatility. In the case of your train, hundreds of men load the cars, carrying burdens on back and trucks; men manipulate the senseless and purposeless thing looking so proud and capable; men unload the train, and, indeed, put the fiery steed to bed. Not so in primitive culture; the man-beast feeds, waters, and carries himself, gathers and adjusts his own load, changes himself into propeller, trackman, carrier *ad libitum*, besides adapting himself to a multitude of subsidiary occupations not here under consideration. Indeed, the man is engineer, engine, freight-car, truck, wheelbarrow, horse cart, dray, tow-path, mule, etc., all combined.

The mean effect of the power of a man unaided by a machine, working to the best possible advantage and at a moderate estimation, is the raising of 70 pounds 1 foot high in a second for ten hours in a day.

Two men working at a windlass at right angles to each other can raise 70 pounds more easily than one man can raise 30 pounds.

Mr. Bevan's results with experiments upon human strength are for a short period:

	Pounds of force.
With a drawing-knife.....	100
With auger, both hands.....	100
With screw-driver, one hand .....	84
With bench-vise, handle .....	72
With chisel, vertical pressure.....	72
With windlass .....	60
With pincers, compression.....	60
With hand-plane.....	50
With hand-saw .....	36
With thumb-vise .....	45
With brace-bit, revolving .....	16
Twisting with the thumb and fingers only, and with a small screw-driver.....	14

By Mr. Field's experiments in 1838 the maximum power of a strong man exerted for two and one half minutes is 18,000 pounds raised 1 foot in a minute.

A man of ordinary strength exerts a force of 30 pounds for ten hours in a day with a velocity of  $2\frac{1}{2}$  feet in a second, equal to 4,500 pounds raised 1 foot in a minute, equal to one-fifth of the work of a horse.

A foot soldier travels in one minute in common time ninety steps equal 70 yards; in quick time, one hundred steps equal 86 yards; in double-quick time, one hundred and forty steps equal 109 yards.

He occupies in the ranks a front of 20 inches and a depth of 13 inches without a knapsack; the interval between the ranks is 13 inches.

Average weight of men, 150 pounds each; five men can stand in a space of 1 square yard.

A man travels without a load on level ground during eight and one-half hours a day at the rate of 3.7 miles an hour or  $31\frac{1}{4}$  miles a day. He

can carry 111 pounds 11 miles in a day. Daily allowance of water for a man, one gallon for all purposes.

A porter going short distances and returning unloaded carries 135 pounds 7 miles a day. He can carry in a wheelbarrow 150 pounds 10 miles a day.

The muscles of the human jaw exert a force of 534 pounds.

Dr. Dwight observes: "Indians will travel with a facility, a celerity, and a freedom from fatigue unknown to the people of Europe. Their couriers or runners are said to go at the rate of 100 miles a day. Two Choctaws followed my father 500 miles to steal from him two valuable horses. When I asked how they could be willing to take so much trouble for such an object, he observed that they had no other business, and that roving was their favorite enjoyment."\*

The number of pounds that a man is able to lift or carry a short distance hardly enters into this investigation, but rather belongs to feats of strength and agility. A naval officer tells of a Swede who, wishing to show his captain how nicely he had polished a brass cannon, took it on his shoulder and carried it upon the bridge. The weight could not have been less than a half ton. The following example of woman's strength, by Captain Healy, involves also the idea of ingenuity and the conquest of natural forces: A woman volunteered to bring in her boat a stone for an anchor to his launch which required two strong men to lift; weight guessed to be 800 pounds [that is too high]. She first filled her boat with small branches of spruce; then, choosing a part of the bank where her boat-rail would be on a level with the ground, rolled the stone over on the pliant boughs. Afterwards the spruce boughs were removed one by one, to allow the stone to slip to its place in the boat.† [From Capt. Healy's account I infer that she first filled her boat with water and used the buoyancy of the water to help her in moving the stone. He says that they understand this.]

As to the amount one man can carry, Prof. Asaph Hall, of the United States Naval Observatory, communicates the following:

"When I was nineteen years old I could carry a barrel of flour from the wagon into the house without putting it down, a distance of 3 rods, and up six stone steps; but I could not do this with a barrel of cider. If we put my carrying strength equal to  $x$ , we have therefore, barrel of cider  $7 \times 7$ , barrel of flour. It was the custom in Litchfield County, Connecticut, forty years ago, to use 112 pounds for a hundredweight. A common test of strength among the young men was to string ten half-hundredweights on the shanks of a fork for a lift. There were many men who could lift 560 pounds."

#### THE PROFESSIONAL CARRIER.

A new epoch in the history of the human beast of burden commences with the appointment of professional bearers or professional common

\* Hodgson's North America, vol. 1, p. 250.

† M. A. Healy, Cruise of the Corwin, 1887, p. 49.



carriers. It is brought about by the differentiating process of advancing society. As soon as a body or caste of men are allowed to give their whole time to a pursuit their efficiency is quadrupled; the unsuccessful drop out of line; advantages are handed down; powers of perception and skill are strengthened; all sorts of devices for packing, padding, shifting the load, resting, relieving, relaying, combining effort, are thought of as measures of self-protective necessity. The professional carrier is more likely to have been the inventor of the beast of burden, having to suffer more in his own back and legs by reason of his daily burden. The Bajuli of the Romans were professional porters: "Ferri proprie dicimus quae quis suo corpore bajulat; portari ea, quae quis in jumento secum ducit; agi ea, quae animalia sunt. Gaj. Dig., 50, 16, 235, etc. Bajulos dicebant antiqui, quos nunc dicimus operarios." Fest., p. 29. In late Latin, a bearer at a funeral. Ammian., 14, 7. The Greek equivalent is *Βάτακτης*.

#### PEDDLERS.

This chapter would not be complete without a passing mention of the peddler as a beast of burden who enters on his work as a professional for the purpose of commerce. The coolie, for instance, is a carrier pure and simple. He takes up his burden at the instance of another and lays it down for the same reason. The peddler combines employer and employed, retail buyer and seller, with common carrier. Col. C. C. Jones says: "The primitive merchantmen engaged in this traffic were held in special repute, were generously treated, and had at all times safe conduct through the territories, even of those who were at war with each other."\* The peddlers of the Middle Ages held a conspicuous place in the social order, special laws were enacted on their behalf, and they enjoyed immunities not accorded to warriors and statesmen. Julius Cæsar attributes the bravery of the Belgians to the absence of peddlers, "minimeque ad eos mercatores saepe comment, atque ea, quae ad effeminandos animosi pertinent, important."

#### THE PREHISTORIC CARRIER.

Although we have no evidence in the remains of early prehistoric man that carrying apparatus of any kind was employed, yet the existence of mounds, earthworks, and walls of many sorts of material far from its original source, of relics in old camp sites, indicating that the former occupants lived very much as do those tribes from which the specimens hereafter to be described have been collected, attests the use of similar harness and methods of conveyance and transportation. Indeed, nothing is more probable than that the first men and women on earth bowed their backs and foreheads to those loads which their de-

\* Cf. C. Rau. "Die Tauschverhältnisse der Eingebornen Nordamerika's." Archiv. f. Anthrop., v. (Antiq. So. Indians, 64, 243.)

scendants have borne unremittingly and will continue to carry in spite of, and forsooth because of, the progress of invention.

The whole world is covered with megalithic monuments in the erection of which it is extremely doubtful whether any living beings were used except men. In the Easter Island are immense platforms on which stand images weighing from three to twenty tons. These have been hewn out in the crater of a volcano and moved in some instances several miles over a region as rough as it can be. On the monuments of Egypt are exhibited teams of men hitched to long cables dragging a sledge on which sits an enormous statue. Rollers were used and greased tracks, but we look in vain for the pulley. The immense buildings on our own continent from Central Mexico to Southern Peru were the sole work of man. Without a draft animal he brought together the material for his splendid palaces and temples, and put every stone in place with his own hands. We may go further than this. Long after horses, camels, oxen, mules, and donkeys were used as beasts of burden the wagons and wheel conveyances were so clumsy as to be practically useless in transporting heavy loads. All over Asia, and indeed in many parts of Europe, the inconvenience of clumsy carriages kept rapid transport in the hands of human bearers.

To one who believes implicitly in the universal domination of invention throughout all human activities, the temptation is great to pass beyond the study of the human bearer to those intermediate stages between the same and the shifting of the load to vehicles and the backs of animals. As interesting to the technologist as to the naturalist are those intermediate forms that now and then appear to confirm his theories of creation.

The forces of nature, the wind, the water-fall, the expansion of steam, the electric current would form another series, the last in the climax, in which the wind acts directly like a hand; the water, through machinery, as a hand turning a crank; the steam, through change of form and the element, like a hand winding a spring; the electricity, through chemical changes, like a hand discharging a gun.

#### THE ESKIMO CARRIER.

Let us commence the special application of our subject at the farthest north, the land of almost perpetual ice and snow. What time the Eskimo freight-man is not moving about in open waters moving chattels and merchandise from place to place in the lightest of all boats, the seal-skin pontoon or oomiak, he appears as a draft-man, dragging the dead seal or other game over the ice by means of a rawhide line. He has invented an infinite variety of toggles, made chiefly of walrus ivory in shape of seal, walrus, bear, and other game. These are grasped in the hand firmly, the rawhide line passing out between the ring and the middle finger. The short piece of rawhide attached thereto is a loop which is connected by an easily detachable arrangement to the drag-

line of any length. It is rare to see an Eskimo carrying anything, except a mother bearing around a baby in her ample hood. It is a beautiful illustration of the play between environment and the industry to mark the absence of all carrying devices, and at the same time the greatest expenditure of invention and energy upon traction apparatus where the safety of the carrier would be endangered by the very medium which offers the greatest facility in the world to the draft-man. Nothing but this perfect harmony could have induced the Eskimo to expend so much time and energy. Parry, in his second voyage, gives a figure (plate opp. p. 274) of a man carrying a kyak by placing his head in the manhole and resting the gunwale on his shoulders. This is indeed the first step to the portages in the birch-bark country farther south.

In the study of the human burden-animal we must not forget that material had to be moved in very early times vertically as well as horizontally. For instance, a great walrus is killed out at sea or near the shore, and the carcass must be lifted out of the water. It has dawned on the mind of the Alaskan Eskimo that by cutting slits in the hide of the animal and placing paddles or other wooden bars between the rocks above, a very respectable tackle may be improvised with the aid of the ever present rawhide line (Fig. 1). Friction is overcome by means of

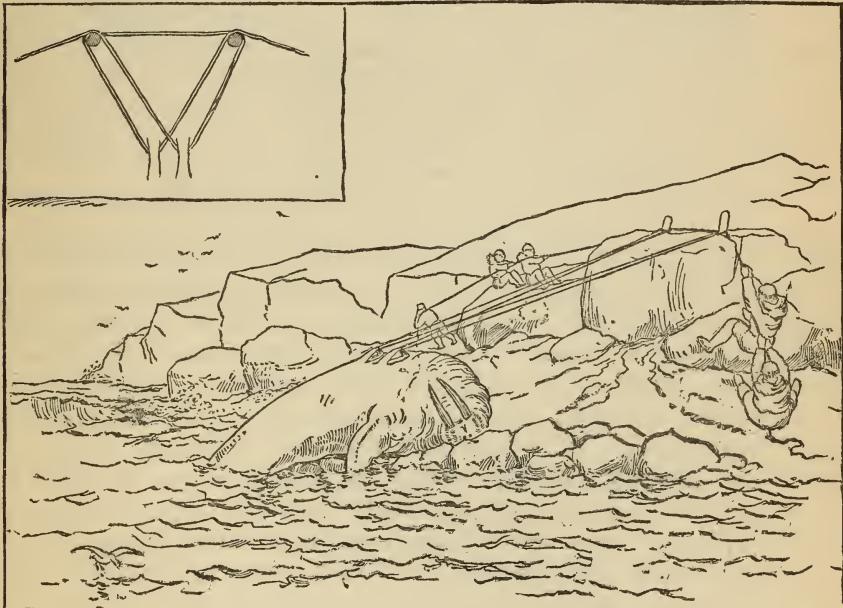


Fig. 1.

THE PRIMITIVE PULLEY. ESKIMO LANDING A WALRUS BY MEANS OF A RAWHIDE LINE (AFTER A DRAWING BY HENRY W. ELLIOTT).

abundant grease, and five or six sturdy fellows, by dint of surging and pulling, succeed in landing the monster, weighing many times as much

as any one of the Eskimo hunters. This art may have been suggested by the tackle used by the Russians on their ships.

In many places along the sloping beaches and quiet waters the Eskimo has learned to track or tow his loaded oomiak. Again, on land he is often compelled to draw loads without the aid of a sledge. For these purposes he has invented a breast-board of wood. The specimens in the National Museum are from Nunivak Island and Oogashik, on the Alaskan peninsula. These localities have between them the shallows and inlets of Kuskokvim and Bristol Bays. The board is made of drift-wood and has the curve to fit around the breast at the shoulders (Fig. 2). Unfortunately no description of the manner of use accompanies the spec-

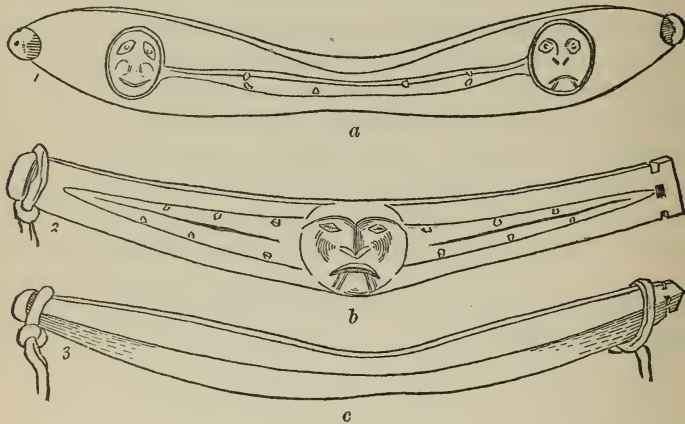


Fig. 2.

BREAST YOKES USED IN HITCHING THE ESKIMO TO HIS LOAD.

a. (Cat. No. 127326, U. S. N. M., from Oogashik, Alaska. Collected by S. Applegate. b and c. (Cat. Nos. 16251-2), from Nunivak Island. Collected by Dr. W. H. Dall.)

imens, so we must remain in doubt as to the way in which the primitive draft-man hitched himself up. In the northern regions traction of sledges is performed by dogs, either alone or assisted by men. There is no doubt, however, that the sledge was in use before the dog was domesticated. The material and style of the sledge vary much according to the region. Dr. E. R. Young, who spent many years in the Saskatchewan regions, says that a great deal of sledging is done by men. He has even seen dogs disabled riding on a sled drawn by men. In the east it is ruder than in the west. In Labrador, where timber can be procured, the sledge differs little from that of the school-boy. Only the uprights at the back enable the driver to steer. Farther north bits of old wrecks or sections of whale-jaw do duty for runners. The method of putting a coating of ice on the bottom of the runners is very ingenious and effective.

Parry's description of those in Igloodik is as follows :

"The Eskimo sledges vary in size, being from  $6\frac{1}{2}$  to 9 feet in length and from 18 inches to 2 feet in breadth. Some of those at Igloodik were of larger dimensions, one being 11 feet in length and weighing 263

pounds, and two or three others above 200 pounds. The runners are sometimes made of the left jaw-bones of a whale, but more commonly of several pieces of wood or bone, scarfed and lashed together; the interstices being filled to make all smooth and firm, with moss stuffed in tight and then cemented by throwing water to freeze upon it. The lower part of the runner is shod with a plate of harder bone, coated with fresh-water ice to make it run smoothly and to avoid wear and tear. This coating is effected with a mixture of snow and fresh water, about a half inch thick, rubbed over until it is smooth and hard upon the surface. When the ice is only in part worn off, it is removed by taking some water in the mouth and spirting it over the former coating.

“ We noticed a sledge which was curious on account of one of the runners, and a part of the other, being constructed without wood, iron, or bone of any kind. For this purpose a number of seal-skins were rolled up and disposed into the required shape, and an outer coat of the same kind was sewed tightly around them. This formed the upper half of the runner; the lower part consisted entirely of moss, molded while wet into the proper form, and being left to freeze, adhering firmly together to the skin. The usual shoeing of smooth ice completed the runner, which for six months of the year is as hard as wood. The cross pieces which form the bottom of the sledge are made of bone, wood, or something they can muster. Over these is generally laid a seal-skin as a flooring, and in summer a pair of deer’s horns are attached to the sledge as a back, which are removed in winter to enable them, when stopping, to turn the sledge up, to prevent the dogs running away with it. The whole is secured by lashings of thong, giving it a degree of strength, combined with flexibility, which no other mode of fastening could effect.” (Parry’s Expedition, 514, 515.)

Of the natives of Point Barrow, Lieutenant Ray says: “The sleds which they use for this purpose are made from drift-wood fastened with whale-bone and rawhide lashing; they are about 10 feet long, 2 feet wide, and the runners 8 inches wide and  $1\frac{1}{2}$  inches thick, straight on top, and have no rail; they are shod for ordinary use with strips of bone cut from the whale’s jaw-bone, and sometimes with walrus ivory; but this would not do in hauling a heavy load over the snow, where there is no beaten trail, so they are shod with ice in the following manner: From the ice on a pond that is free from fracture, they cut the pieces the length of a sled-runner, 8 inches thick and 10 inches wide; into these they cut a groove deep enough to receive the sled-runner up to the beam; the sled is carefully fitted into the groove, and secured by pouring the water, a little at a time, and allowing it to freeze. Great care is taken in this part of the operation, for should the workmen apply more than a few drops at a time the slab of ice would be split and the work all to do over again; after the ice is firmly secured the sled is turned bottom up and the ice-shoe is carefully rounded with a knife, and then smoothed by wetting the naked hand and passing it over the surface until it becomes per-

fectly glazed; the sled when ready for use will weigh over 300 pounds, and they load them with the carcasses of from seven to nine deer, weighing over 100 pounds each. Men, women, and children harness themselves in with the dogs to haul these loads to the coast, often the distance of 100 miles and over, seldom making more than 8 or 10 miles each day." (Report of the Expedition to Point Barrow, Alaska, Lieut. P. H. Ray, p. 28.)

The Eskimo sled is framed of spruce, birch, or whalebone, strongly bound with thongs, and the runners shod with smooth strips of whale's jaw-bone. This sled is heavy and fit only for traveling over ice and snow.

Indian sleds of the interior are lighter, the runners being of thin, flexible boards.

Sleds used by voyageurs of Hudson Bay are of different construction. Three boards, each about 1 foot in width and 12 feet in length, thinned and curved into a semicircle at one end, are placed side by side, and firmly lashed together with thongs. (Bancroft, I, 52.)

#### SLEDGE ISLAND.

This sledge is about 20 inches in breadth and 10 feet in length, a sort of rail-work on each side, and shod with bone, and put together with wooden pins or with thongs or lashings of whalebone. (Cook's Voy.)

#### KAMTSCHATKA.

The length of the body of this sledge is about  $4\frac{1}{2}$  feet and the breadth 1 foot. It is made in form of a crescent, of light, tough wood, fastened together with wicker-work, and, among the principal people, is stained with red and blue, the seat being covered with furs or bear-skins. It has four legs about 2 feet in height, resting on two long flat pieces of wood of the breadth of 5 or 6 inches, extending a foot beyond the body of the sledge at each end. These turn up before, somewhat like a skate, and are shod with the bone of some animal. The carriage is ornamented at the fore part with tassels of colored cloth and leather thongs. It has a cross-bar, to which the harness is jointed, and links of iron or small bells are hanging to it, which by the jingling are supposed to encourage the dogs. (Cook.)

#### YUKON RIVER.

The snow-shoes used in this district are about  $4\frac{1}{2}$  feet long, are rounded and bent upward in front and pointed behind. They are made of birch wood and covered at either end with a fine netting of gut. The lashings are strips of rawhide. (Whymper.)

The sledge consists of a plank, one end of which has been softened by steam and bent in prow-like form. The material does not exceed one-half an inch in thickness and the width varies from 10 to 14 inches. Thongs keep the curved ends in place. It is especially adapted to soft

snow. Runners are occasionally added, the freight held in place by lashings.

When a canoe or other heavy burden requires to be transported over the land, the Indian has discovered that however much a piece of reindeer-skin may be used it will stretch a little more when again strained with the weight it is to support. The skin of a seal will not, when dry, sensibly lengthen after it has sustained a load for a length of time. This valuable quality renders the skin of the seal a matter of consequence to the people, who are unable to procure it for themselves, and must necessarily rely upon their Innuït neighbors to furnish it in exchange for other value.

The strap is employed to sustain the weight carried on the shoulders while the person may be traveling on snow-shoes, or when carrying a burden over a portage to the next landing place. It is generally placed over the forehead and shoulders, the muscles of the neck supporting the entire strain, while the hand carries the gun, spear, or staff.

Turner says that he has seen the Ungava natives place a barrel of flour on their shoulders and carry it up a hill-side so steep as to require one not burdened to pick his steps with care.

Day after day, with plenty of food or none at all, whether pack on back, trapping in the woods, treading out a path with snow-shoes in the deep snow for the sleigh dogs, or running after them at a racing pace from morning to night, when there is a well-beaten track, they will travel 50 or 60 miles a day for a week together without showing any sign of fatigue. (Northwest Passage, Fitzwilliam, p. 43.)

"The Indian packers over these mountain passes usually carry 100 pounds, although one I had walked along readily with 127 pounds, and a miner informed me that his party employed one that carried 160 pounds. The cost of carriage of a pack (100 pounds) over the Chilkoot trail for miners has been from \$9 to \$12, and the Indians were not inclined to see me over at any reduced rates, despite the large amount of material required to be transported, some two tons. By giving them two loads, or doubling the time over the portage, a slight reduction could be had, not worth the time lost in such an arrangement, and I made contracts with enough of them to carry my effects over at once. Mr. Spuhn was also very energetic in his efforts to secure for me better terms, but without avail, and after I had crossed the trail I in no way blamed the Indians for their stubbornness in maintaining what seemed at first sight to be exorbitant, and only wondered that they would do this extremely fatiguing labor so reasonably." (Lieutenant Schwatka, Reconnaissance in Alaska, 1883.)

Fig. 8 of the Reconnaissance is a view on Payer Portage, and represents a Chilkat Indian, with two ammunition boxes, going over the portage. The amount some of these packers will carry seems marvelous, and makes estimates for pack-mules or trails therefor seem superfluous. Their only packing gear is a couple of bands, one passing over the fore-

head, where it is flattened out into a broad strip, and the other over the arms and across the breast; the two meet behind on a level with the shoulder, and are there attached to lashings, more or less intricate, according to the nature of the material to be transported.

“If a box or stiff bag, the breast-band is so arranged in regard to length that when the elbow is placed against it (the box) the strip fits tightly over the extended forearm across the palm of the hand bent backwards. The head-band is then the width of the hand beyond this. At least I saw a few Indians arranging their packs and their harness according to this mode. The harness proper will not weigh over a pound and the lashing according to its length. The strip across the head and breast is of untanned deer-skin about 2 inches wide, with holes or slits in the ends protected from tearing out by spindles of bone or ivory.” (Recon. in Alaska, p. 23.)

“It seemed marvelous beyond measure how these small Indians, not averaging I think over 140 pounds each, could carry 100 pounds up such a precipitous mountain, alternately on steeply inclined glacial snow and treacherous rounded boulders, where a misstep in many places would have hurled them hundreds of feet down the slope or precipices.” (Reconnaissance in Alaska, p. 18.)

“The Indian then chased the goat, almost keeping up with him, down into the valley where we camped, and up the steep mountain slopes of the eastern side, equally as high as those mentioned, and all this immediately after he had carried over 100 pounds across the trail.” (Reconnaissance in Alaska, p. 17.)

“The things were then divided into bundles or packs of as even weight as possible, giving some 50 or 60 pounds to each man. Arranging these packs is a matter of no little difficulty, for the Indian has a great objection to altering his load after he has started, so that you have to give the men carrying the provisions, which grow lighter daily, a heavier load at starting than those who have the canteens or tent to carry. They generally stop for some five minutes' rest every half-hour. This they do with surprising regularity. They generally squat near a ledge of rock on which they can rest their burden without removing it. They carry everything the same way, viz, with a band over the forehead, the pack resting on their shoulder-blades or a little below.” (Mayne's British Columbia and Vancouver Island, p. 100.)

Col. Cecil Clay says that the commonest methods used in carrying from the St. Lawrence to the jumping-off place northward and from Labrador to the Pacific is by a “tump-line,” a long strap with a broad band in the center.

The Indians of the Ungrava district are often compelled, by particular conditions of weather, to travel afoot, and while on a journey of this description they must carry the articles necessary to their comfort or the articles they desire to barter and those they receive in return upon their backs. In order that the arms may be free and aid their



progress, the bundles are made as compact as their nature will permit, and slung across the shoulders transversely or suspended over the neck, and the arms passed over the thong supporting the weight behind.

A piece of netting, made of deer-skin twisted and then netted, having thongs run through the outer meshes, draws the net tight over the bundle, which is slung as indicated above.

The method employed by the Makah Indians in carrying burdens when afoot is to strap or tie the load together, whenever practicable, in a compact form, and then, by means of straps or belts that they weave themselves from rags, the "pack" is carried resting on the back, the strap resting against the forehead. The packing strap is woven round, except when it is intended to rest against the forehead; then it is flat. In carrying a number of small parcels or berries, fish, clams, sea-urchins, small pieces of wood, and when haste in loading or unloading a canoe is desired, they use a basket, also woven by themselves, of different patterns, resting on the back and held by a strap around the forehead. They carry cord-wood in the same manner, the sticks lying transversely on the basket.

The baskets intended for heavier articles are woven of the twigs of a tree that resembles *lignum-vitæ*, the sides intended to rest against the back being flatter and broader than the others. For berries, dried fish, and lighter articles, the baskets are woven of the inner fiber of cedar bark. It may be needless to say that all this work is done by the women.

The native name for the heavier basket is "kah-ow-utz," and for the lighter "bu hquee." Their name for the packing-strap is "de-de-quad-ut," derived from de-ahp (hanging) and quad-ut (handle), the combination or derivation meaning "hanging handle."

The Makahs do not "track," there being no rivers of any size in the country, and the nature of the country forbidding travel along the banks of such as there are for any distance, the timber being very dense and extending to the very edge of the stream. The canoeing is principally on salt water.

#### CARRYING LOADS.—INDIANS NEAR STILLWATER, MONTANA TERRITORY.

The men and women carry loads in a similar way. He or she takes a reata, or rope about the size of your finger, which is made out of buffalo-hair or braided elk-skin, three plait, lays it on the ground in the shape of an elongated **U**, placing the load across the legs of the letter. They generally get a little rise in the ground or a cut bank, but if on the level of a prairie they are helped to raise it by one of their number, or else work over on their side until they can get upon their knees, when they are all right. After placing their load of a hundred-pound sack of flour, or a quarter of a buffalo or steer, or a half cord of dry wood, they, with their back against it, take the curve of the rope over their head, down

across their breast and across their shoulders, and then taking the tow ends in each hand bring them up behind their back, catch the rope on top of the load by running each end under, then pulling ends over each shoulder tighten the load if loose and then raise on one side, then the other, to make it more secure, and with a heave forward she or he comes to the knees before getting on their feet. The load or burden rests on the back and shoulders. When moving the body is bent forward and the heavier the load the more the body is inclined. Have seen them carrying wood over four miles in this way, resting whenever they found a suitable place like a cut bank or a washed gully so the load will be even with the place and can be taken again in a minute or so.

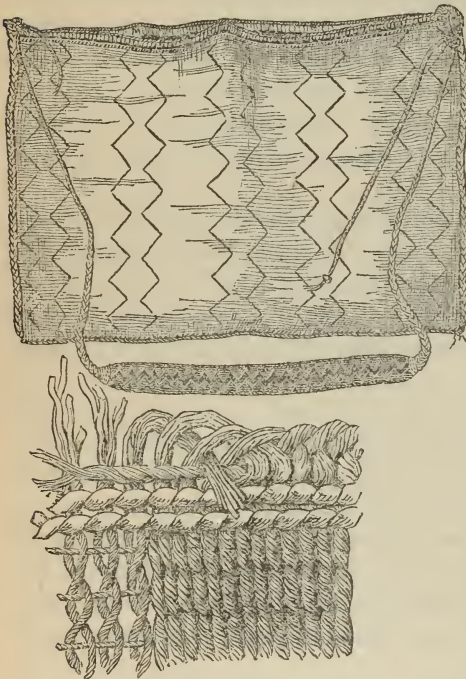


Fig. 3.

COARSE WALLET FOR BURDEN-BEARING.

(Cat. No. 127843. Quinaielt Indians. Chehalis County, Washington. Collected by Charles Willoughby.)

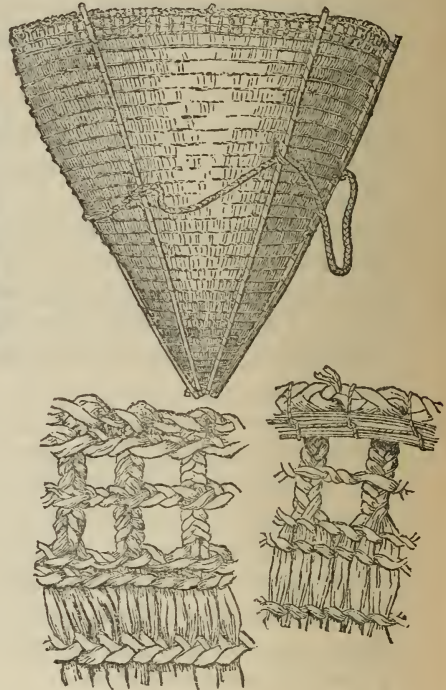


Fig. 4.

CONICAL CARRYING-BASKET, WITH HEAD-BAND.

(Collected by James G. Swan.)

Among the Salish tribes of Washington Territory, as well as those of British Columbia and southeast Alaska, twined weaving in pine root, cedar bark, rushes, and grasses is very common. These tribes all use the wallet for carrying, resting on the back, and prevented from falling as well as partly supported by the head-band resting on the forehead (Fig. 3). One specimen of wallet in the collection is a very interesting example of weaving. The warp threads are very far apart. The twine threads are coarse and loosely woven. At the top two rows of close twine run parallel with the warp. The loose ends of the weft are fastened off in true Indian style to imitate braiding.

A more elaborate example of carrying-basket from Washington Territory is cone-shaped, like those of the Utes. Strengthening rods are fastened to the outsides of the cone (Fig. 4). A braid of tough fiber passes quite around the basket and is loose enough to pass over the forehead of the bearer. The weaving is close enough to hold fine seeds, the rushes being held in place by twined weaving and by a species of braiding with one thread, which will be seen better in a cradle from northern California, in the article on Cradles in this volume. The top of the basket is explained in the enlarged drawing below the figure showing the outside and the inside of the margin.

Still further south are encountered the artistic tribes of northern California. Mr. Powers and the gentlemen of the Fish Commission have sent some beautiful examples of carrying-baskets from the McCloud fishing Indians. One here illustrated is in twined weaving, as close almost as the Sitka work. The bottom is protected frequently by a thimble of leather (Figs. 5 and 6). The ornamentation on the outside is

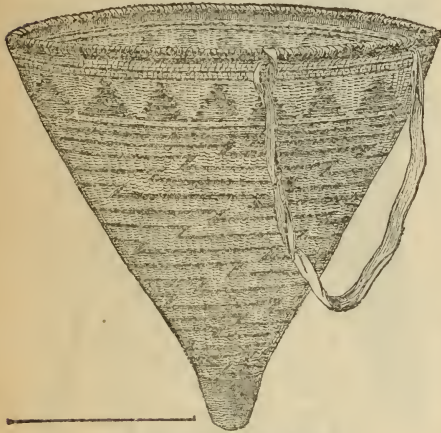


Fig. 5.

BURDEN-BASKET WITH HEAD-BAND.

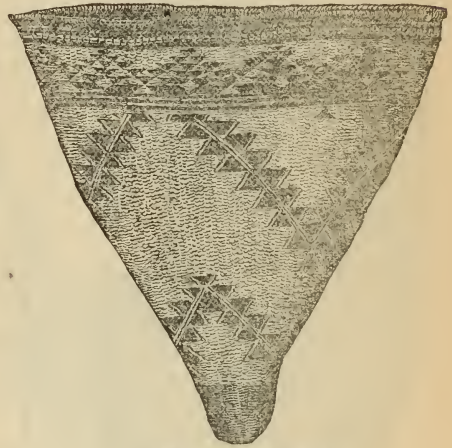


Fig. 6.

BURDEN-BASKET.

(Cat. No. 19289, U. S. N. M., McCloud River Indians, Shasta County, California. Collected by Livingston Stone.)

(Cat. No. 19290, U. S. N. M., McCloud River Indians, Shasta County, California. Collected by Livingston Stone.)

produced by an overlaying of maiden-hair fern or dyed grass, and the figure may or may not appear on the inside of the weaving. This basket is bordered by a wooden hoop sewed on by coiled work.

One of the most noteworthy specimens of carrying appliances in the National collection was collected by Dr. Palmer from the Mohaves of

the mouth of the Colorado River. The affair, as can be readily seen from the drawing, consists of two long bent poles, securely lashed together at their middles. The four ends are fastened to a hoop at equal distances (Fig. 7). Warp-threads are stretched from the intersection at the bottom to the hoop at the top. The weaving is done by a series of turns around the poles and the warp-threads in passing. This is the most interesting sample of aboriginal weaving the writer has ever seen. Collected many years ago from the Mohaves it is undoubtedly a genuine specimen of their work. Indeed, as no white man weaves in that manner, this could not possibly be an example of borrowing. The chief in-

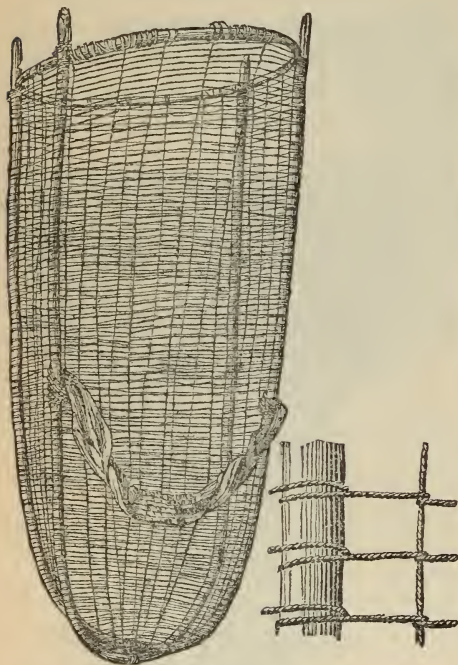


Fig. 7.

## CARRYING-BASKET.

(Cat. No. 24145, U. S. N. M. Mojave Indians, California. Collected by Edward Palmer.)

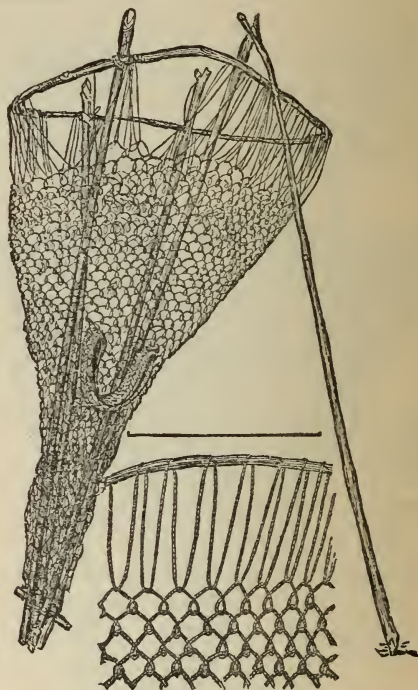


Fig. 8.

## CARRYING-FRAME, WITH HEAD-BAND AND RESTING PROPS, SHOWING THE MOST PRIMITIVE STYLE OF COILED NETTING.

(Cat. No. 126680, U. S. N. M. Pima Indians, Arizona. Collected by Edward Palmer.)

terest in the specimen, however, is not in its simple method of manipulation, but in the connection which it has with regions far remote. In Foster's *Pre-historic Races* (p. 225) is figured a piece of weaving, taken from the bottom of a mound in Ohio. There are three warp-threads, precisely as in our Mohave basket, and three weft-threads wrapped successively around each warp-thread in an orderly manner. Mr. Holmes, in speaking of impressions of textiles on pottery, draws attention to this interesting specimen from Foster. The writer has rolled out a large sheet of sculptor's clay and pressed it against the interior of this network and found that the threads held the clay in place perfectly until

it dried. On the deserts of southern Arizona one has to go a long way for food and fuel. It is a common thing, says Dr. Palmer, to see a Mohave woman coming in with this great basket stacked full of mesquite-bean pods, to be broken up and ground into meal when they are dry. The head-band is made of coarse rags, made into a pad at the center for the forehead.

Contiguous to the Mohaves, and belonging to the same Yuman stock, are the Pimas. (By some writers the Pimas are relegated to a separate stock.) Their arts are similar to those of the Mohaves. In the example of carrying-basket figured four rude sticks form the uprights. The netting is formed by a continuous coil of yucca-fiber thread caught into the coil beneath it. When this material is pressed flat it has the appearance given by the drawing (Fig. 8). The head-band and the staff (which also serves to support the carrying-basket when the porter is resting) complete the outfit. The form of stitch here seen looks like

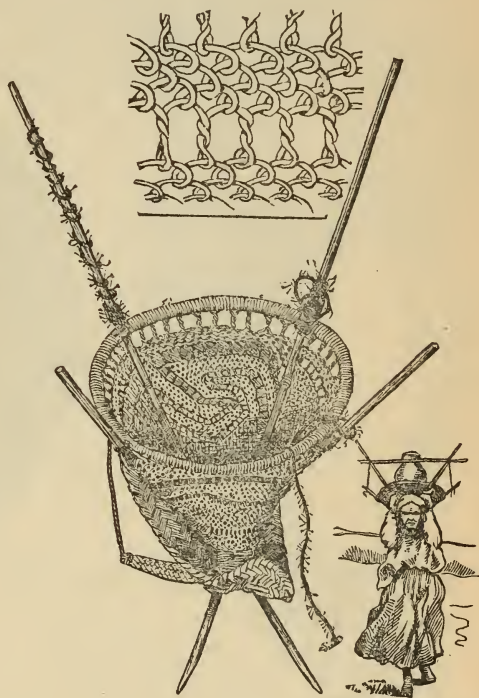


Fig. 9.

## CARRYING OUTFIT.

(Cat. No. 76033, U. S. N. M. Pima Indians, California. Collected by Edward Palmer.)

the boundary between the hard coil of the California and interior basketry on the one side, and the more elaborate net-work of Mexico and Central America. From the same region Dr. Palmer has collected three specimens of a still more elaborate device for carrying. It consists of a frame-work of four sticks, two of which project downward for legs. These sticks are attached to a hoop, which holds them in place above, but they extend some distance above the hoop, like standards on a wagon, to hold a top load of all sorts of light material. There is a pad of cane fabric attached to the portion of the apparatus next to the back, and a broad head-band also, which can be used on occasion (Fig. 9). The net-work of these baskets is very delicately wrought. In reality the coarse yucca thread is coiled, as in the last example, but all sorts of straight or zigzag bands are produced by making a whole turn in the thread before passing downward through the next stitch of the underlying coil. This work is done with a needle and thread, as one may see the carrying nets and bags made in Central

America or the snow-shoes furnished with sinew among the Eskimos. The latter use a double-pointed needle, with the thread hole in the middle, but the natives of Central America and Mexico employ a needle of wood or bone about 4 inches long and one-tenth inch in thickness. Around the uprights of this specimen are ropes for lashing on the load, and a staff, with a crutch at top, serves the double purpose of a cane and a rest.

In a former paragraph allusion was made to the correlation of primitive agriculture with transportation. At the borders of Mexico gourds raised by rude processes begin to appear as vessels. In the example here figured a long gourd, holding a gallon or more, is inclosed in a net-work of yucca twine, laid on in coils, with half hitches above, and with the standard open net-work below (Fig. 10). A bandolier of common rag furnishes the carrying-strap. This specimen was collected from the Pimas by Dr. Palmer.

The Diegenos belong to the Yuman stock, and dwell about San Diego, California. A rude carrying basket or wallet, collected by Dr. Palmer, is made of sticks in open work, held in place by a series of twined weft (Fig. 11). The handle is a common bale of string. There is noth-

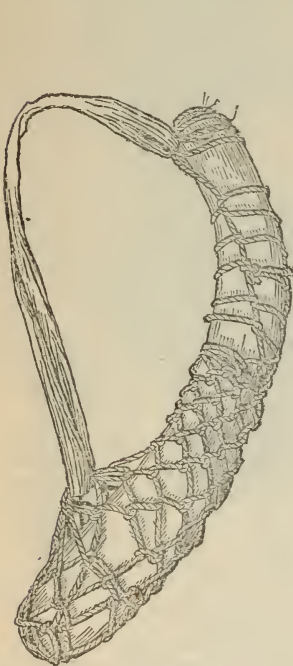


Fig. 10.

CARRYING-GOURD.

(Cat. No. 76947, U. S. N. M. Pima Indians, Colorado River, Arizona. Collected by Edward Palmer.)

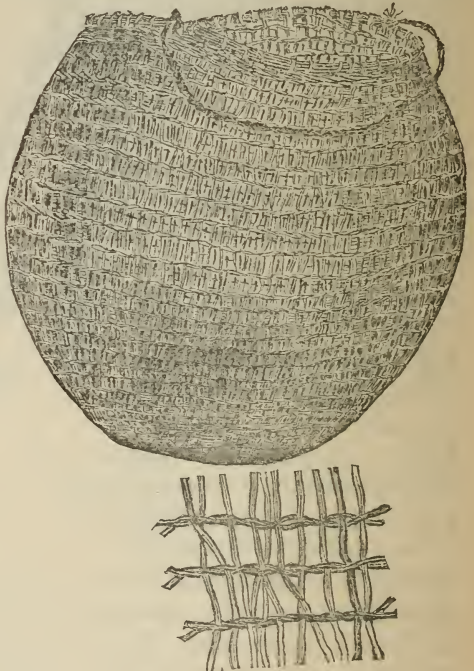


Fig. 11.

BASKET FOR CACTUS-FRUIT, ETC.

(Cat. No. 19742, U. S. N. M. Diegenos Indians, San Diego, California. Collected by Edward Palmer.)

ing striking about the specimen, excepting the occurrence of twined weaving so far south. It will be remembered from former studies that this style of textile gives place to the coil in northern California. In

the Great Interior Basin the Shoshonian stock have carried it much further southward, and even to the Pacific Ocean in southern California.

The Shoshonian stock, especially the central tribes in Utah, are agriculturists in a crude fashion. The women gather the seeds of fifty or more plants, fan out the chaff in a basketry tray, elsewhere described, grind the seeds on a flat slab with a muller, and of the meal make cakes or mush. The gathering-basket in which this harvest is collected and transported is shown in the accompanying figures (12, 13). This

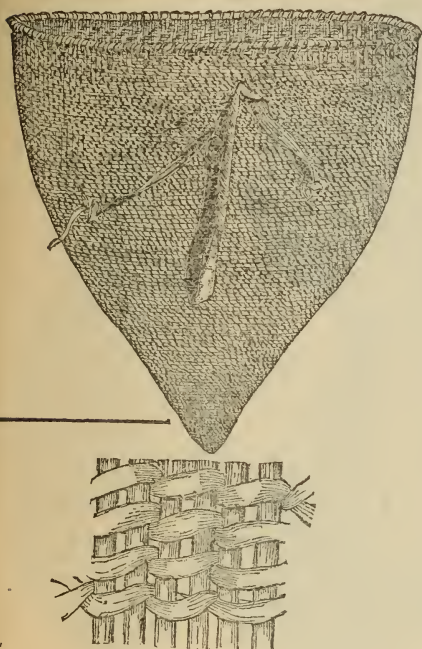


Fig. 12.

HARVESTING-BASKET, USED BY ALL TRIBES IN COLORADO, UTAH, AND NEVADA.

(Cat. No. 14664, U. S. N. M.)

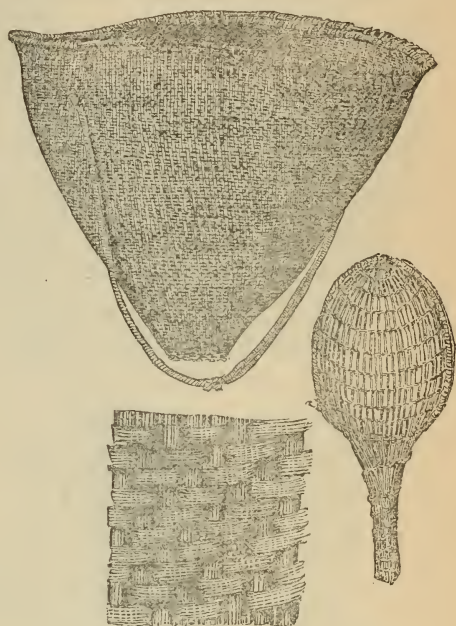


Fig. 13.

UTE TYPE OF HARVESTING-BASKET AND FAN, USED BY ALL OTHER TRIBES; ALSO IN THE GREAT INTERIOR BASIN.

(Cat. No. 42155, U. S. N. M. Collected by James Stevenson.)

conical receptacle is held with the point on the ground and the rim close to the plants. The female harvester holds the gathering-basket with her left hand, and by means of a coarse fan held in the right hand beats the seed into the receptacle. The carrying-strap of soft buckskin is passed across the forehead to hold the basket high on the back. Thus burdened the Ute pack-woman trudges home to change her craft from the burden-bearer to the miller and the baker. The carrying-basket of the Utes is made in twined weaving. The pattern is varied according to the number of warp-sticks included within each turn. The simplest incloses each rod separately; another style takes in two, and the twines are always between the same pairs of warp twigs. A third style imitates diagonal or twill by including a different set of rods on each round. This has been described in another place. (Smithson. Rep. 1884, Pt. II.)

The Utes have no pottery except what they have borrowed. Not to be defeated, however, in a matter so necessary to their happiness, their ingenuity has been equal to the occasion. Both the Utes and the Apaches make bottles and jars of twigs (Fig. 14) holding from half a pint to many gallons. These they calk with hot pitch until they are perfectly water-tight. On the side of this primitive demijohn lugs or



Fig. 14.

SAN CARLOS APACHE WOMAN CARRYING WATER IN A WICKER JAR LINED WITH PITCH.

(From a photograph in the U. S. National Museum.)

loops are fastened, and a soft buckskin head-band served through these enables Aquaria to bring often from a great distance water, seeds, and other necessities.

The use of the carrying-net is not common in America. Major Powell brought from Utah in 1874 a large collection to illustrate the life of the tribes there. The Utes, and indeed the tribes south of them, employ the net to catch rabbits and other small game. They know also how to turn the net into a carrying appliance. (Fig. 15.) One of the devices is here shown. The knot here used is the standard mesh-knot found all over the world, and it is interesting to find it here among the savages of Utah.

In northwestern Arizona are the Moki Pueblos. The westernmost of these, Oraibi, is celebrated for its basketry. In addition to the twined



and coiled work, which they practice in common with their neighbors and blood kindred, the Utes, though with vastly greater taste and skill, they have somewhere learned the art of making true wicker-work. (Fig. 16.) This is indeed rare west of the Rocky Mountains. Two specimens are here figured, the one coarse and holding over a bushel, the other fine and having the capacity of a peck. Both of them are carried by means of a head-band. The wicker is based on a warp of rigid twigs, in bunches of twos or threes. The woof is made up of twigs passing alternately over and under the warp. In fact, it would be more correct to call the bent twigs the warp, because they are alternately raised and

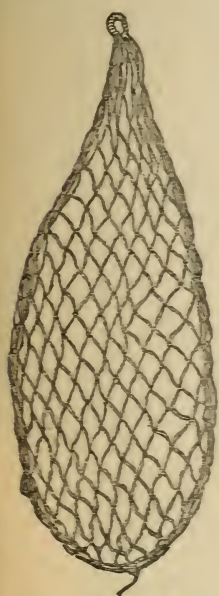


Fig. 15.

## CARRYING-NET.

(Cat. No. 11244, U. S. N. M. Ute Indians, Southern Utah. Collected by Major J. W. Powell.)

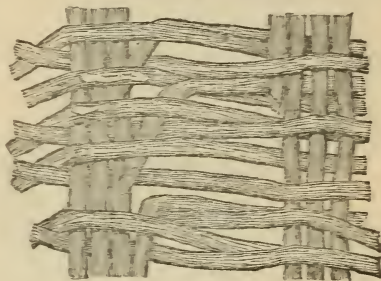
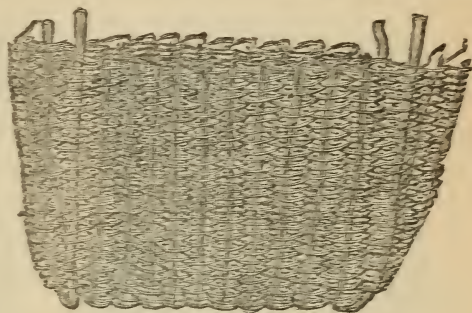
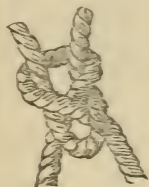


Fig. 16.

## "CARRYING-CRATE" OF ZUÑI AND OTHER PUEBLOS.

(Cat. No. 22971, U. S. N. M. Collected by Major J. W. Powell.)

lowered as if with a weaver's harness, while the straight twigs pass along the openings just as the warp does in common weaving. The method of fastening off the wicker twigs is shown in the detail of the coarser pattern. (Figs. 17, 18.) Baskets of this very pattern are found at Zuñi, but the opinion obtains that the basketry of this region belongs especially to the Shoshonian and the Apache-Tinné stock. Barter is going on all the time, and it is difficult to follow tribal characteristics under such circumstances.

The Zuñi and most of the Rio Grande pueblos are famous for their pottery. The pack-men and the pack-women here distinguish themselves, especially for the ease and grace with which they carry water and other burdens on the head. Here comes in the head-ring or burden-pad, specimens of which are figured (Figs. 19, 20). They are made either by wrapping a bundle of soft bast or grass into a ring, as in the top

figure, or by weaving a ring of yucca fiber neatly around a mass of the shredded fiber. This ring is placed upon the head and the round-bottomed jar upon that. When the jar is set down the ring still is made to support it and keep it in an upright position. Many jars have a concavity beneath, which really seems to be an afterthought. It is only a seeming, however, as there is no evidence either way. In comparison with the Zuni water-carrier is shown an Italian girl in Palermo performing the same feat. It is only a short step from this figure to the caryatid, in which architecture glorifies in marble one of the humblest occupations of humanity. (Fig. 21.)

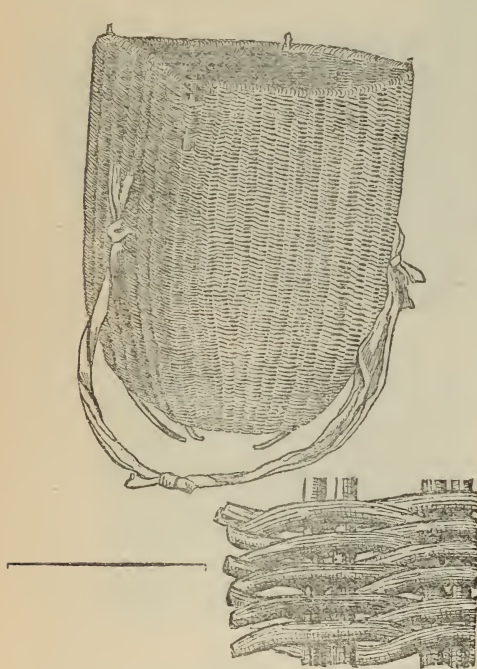


Fig. 17.

SMALL FRUIT-PICKER'S BASKET.

(Cat. No. 70937, U. S. N. M. Moki Pueblos, Arizona. Collected by James Stevenson.)

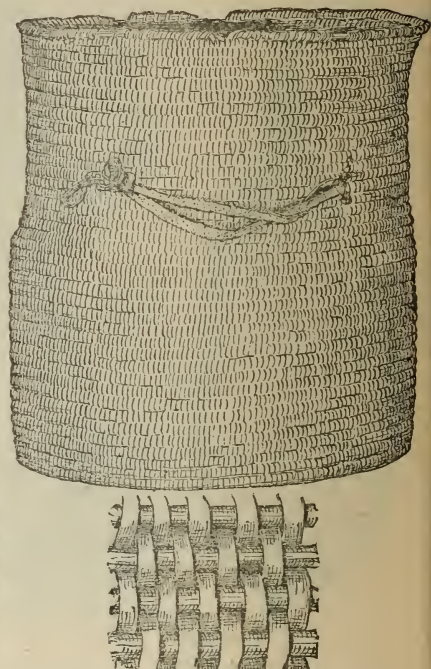


Fig. 18.

FRUIT-BASKET.

(Cat. No. 22993, U. S. N. M. Moki Pueblos, Arizona. Collected by Major J. W. Powell.)

The Pueblo Indians, like the Eskimo above described, use the breast-strap in dragging loads. They have the clumsy wooden Spanish cart and the diminutive burro, but there are occasions when the man or the woman is regularly hitched up to drag a load up the precipitous mesas, where even a burro could not climb. The breast-strap is made of yucca fiber woven in diagonal patterns, and forms a very efficient harness. This strap, however, is even more likely to be rested across the forehead than upon the breast. (Fig. 22.)

The Apaches are extremely artistic in their manufacture of appliances for burden-bearing. The carrying basket, here figured, is made of rods sewed together by the coiled process. Ornamentation is effected by the

manner of stitching, by using different-colored material, and by sewing on strips of soft, white buckskin, to the lower end of which are attached the small hoofs of deer or bits of tin rolled up. (Fig. 23.) The method of carrying burdens among the Apaches is shown in the next figure, of a woman bearing the cradle frame hung to the top of her head. Note here the position of the strap high up on the head, as suggesting the inquiry whether various uses and abuses of the head may not have contributed to its deformation. (Fig. 24.)



Fig. 19.

ZUNI WOMAN SUPPORTING A JAR OF WATER.  
(From a photograph in the U. S. National Museum.)

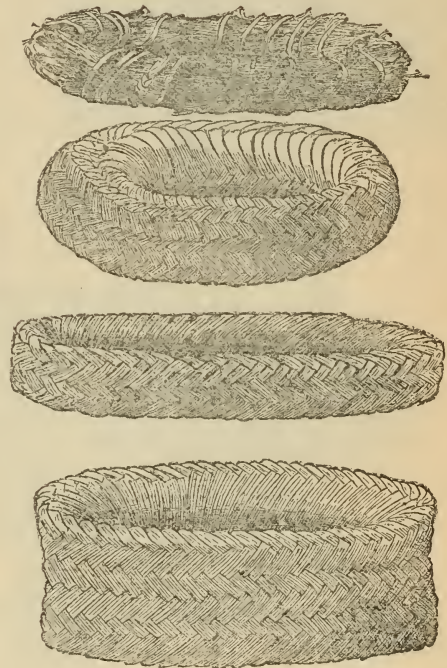


Fig. 20.

HEAD OR MILKMAID'S PADS.

(Cat. No. 40466, U. S. N. M. Pueblo Indians, Arizona and New Mexico. Collected by James Stevenson.)

Before passing southward it is well to consider the habits of the Indians east of the Rocky Mountains. No less than their western neighbors were they formerly accustomed to carry heavy burdens. For this

purpose they used baskets, hampers, wallets, par-flèche cases, skin bottles, skin wallets, and every other receptacle hitherto described. (Figs. 25, 26.) In some of the mounds that have been carefully examined little striæ showed that about a peck of earth constituted the separate loads of dirt which were doubtless scraped up near by and carried on the head or back in baskets to the mound. The first settlers found the aborigines carrying on a respectable commerce, and using inventions that were truly labor-saving machines.



Fig. 21.

ITALIAN WOMAN SUPPORTING EMPTY  
JAR.

(From a photograph in the U. S. National Museum.)

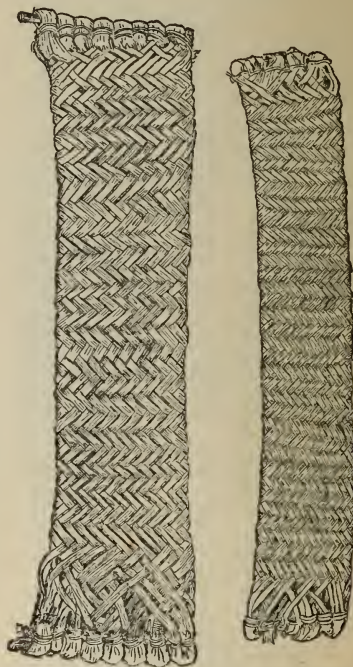


Fig. 22.

BREAST STRAPS.

(Cat. No. 70962-4, U. S. N. M. Zuñi Indians, New Mexico. Collected by James Stevenson.)

Fortunately a beautiful example of a carrying apparatus was gathered forty years ago from the Arikara and Mandan area. (Fig. 26.) Its composition is worthy of our closest study. Four bent poles constitute the frame-work, two of them with a wide interspace, the other two narrow, like an ox-yoke bow. The two wide bows are placed nearly parallel and about 10 inches apart at top and 4 at bottom. The narrow ones cross these at right angles nearly, only they are spread a little at top. They are also as far apart as the length of the basket demands. These two narrow bows descend 6 inches to afford a rest for

the load. The carrying-strap is of rawhide. The weaving is allied to that of the Columbia River natives and the tribes northward to the

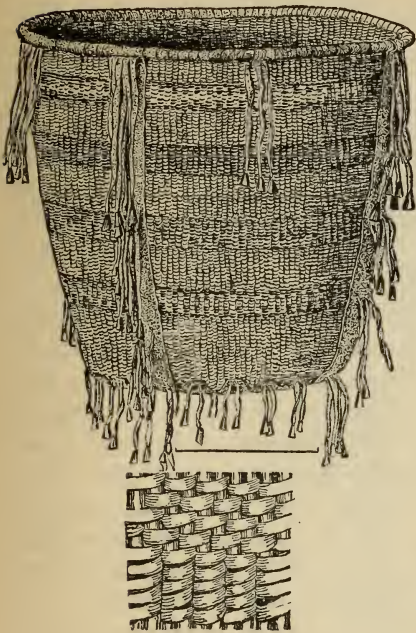


Fig. 23.

DECORATED CARRYING-BASKET.

(Cat. No. 21489, U. S. N. M. Apache Indians of Arizona. Collected by Dr. J. B. White, U. S. N.)



Fig. 24.

APACHE SQUAW CARRYING PAPPOOSE-FRAME BY MEANS OF HEAD-BAND.

(From a photograph in the U. S. National Museum.)

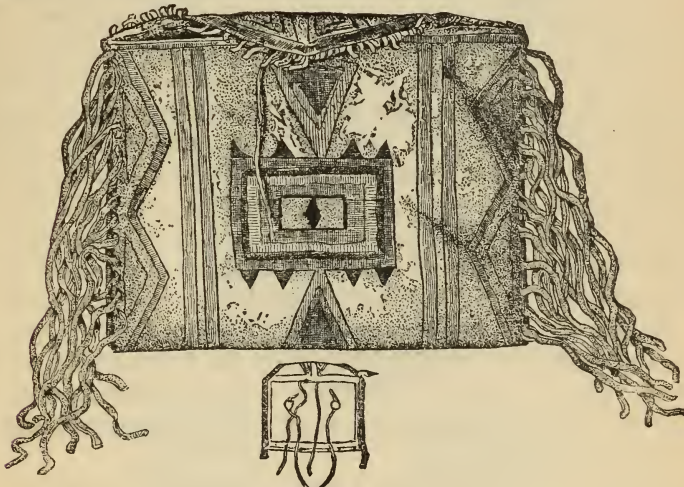


Fig. 25.

THE UNIVERSAL "PAR FLESH" CASE OF RAWHIDE, USED BY ALL BUFFALO HUNTING INDIANS.

Peel River, in British Columbia. It is indeed weaving in diaper, the warp and the weft equally important in width, flexibility, and manipulation. H. Mis. 600, pt. 2—18

ulation, narrow strips of birch or other tough bark, some of them having the dark, others the light side exposed. This gives a pretty figured effect to the surface.

Mexico is the land of carriers. The early chroniclers mention over

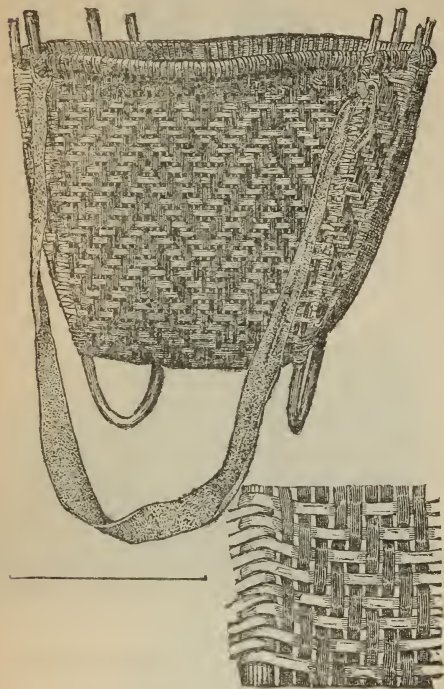


Fig. 26.

CARRYING-BASKET.

(Cat. No. 8430, U. S. N. M. Arikara Indians, Dakota. Collected by Drs. C. C. Gray and W. Matthews.)

and over the employment of professional bearers by the rulers of the ancient city. Indeed, the mountainous condition of the country has kept alive the practice of using men for beasts of burden up to the present time, when the very best substitute is the pack-mule. Travelers in modern Mexico refer to regular caravans of peons, who are to be seen entering the city from every direction, bringing to market every kind of commodity. Even the butchers send their meat around on the backs of men. The Mexican carrier is a student of attitudes, to the extent that there is not a position of his body adapted to burden-bearing with which he is not familiar.

One specimen of basket in the National Museum is made of split cane, woven in diaper. (Figs. 28, 29.) It holds about a bushel, but in some cases the top load is

greater than the contents of the basket. The strap passes beneath the basket up to the two loops midway. It extends just around the shoulders to the breast-bone in front. The head-band is also used in Central America, but the breast-strap has not appeared since we left Alaska. In the figure of the carrier here presented, quite an elaborate back-pad is shown. In the Pima specimen a pad of this sort is attached to the basket, but in the Mexican example the pad is attached to the man. It consists of a large piece of soft leather, folded several times, hung to the neck above, and held down at the bottom by a belt around the waist. (Figs. 29, 30.) The Pima carrier, therefore, has but one basket, while the Mexican is detachable from his basket, and padded for any load whatever.

The human yoke is probably a foreign invention to Mexico. It is a common sight now to see a man with a stout strip of wood on his shoulder, from either end of which depends a jar by means of a strap, as shown in the figure. These jars hold about two gallons each of



Fig. 27.

PORTRAIT OF A WASHINGTON NEGRO, SHOWING A VERY COMMON METHOD OF BURDEN-BEARING.

(From life, by W. H. Chandlee.)

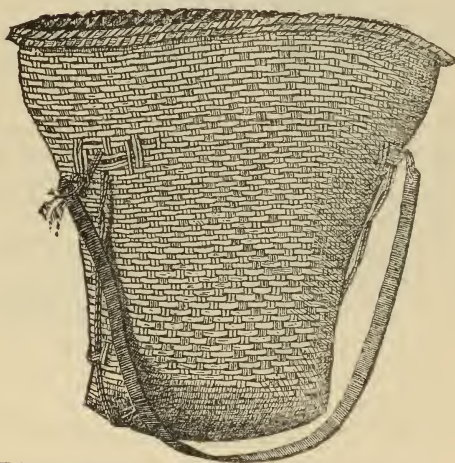


Fig. 28.

CARRYING-BASKET OF THE CARGADOR.

(Cat. No. 91508, U. S. N. M. Choctaw Indians, Mobile, Alabama. Collected by Edward Palmer.)

water, pulque, flour, beans, etc. The frame at the bottom of the drawing holds two of these jars. Other frames hold three or more. One of these frames on either side of a burro makes up a pack, when the load is easily transferred from the pack-man to the pack-mule. The pottery is made in the mountainous districts, and one may frequently see mule-trains coming along, their packs filled with pottery of this kind. (Fig. 31.)



Fig. 29.

PORTRAIT OF A MEXICAN CARGADOR STANDING ON A TRACK, SHOWING THE TWO EXTREMES OF TRANSPORTATION.

(Original drawing by W. H. Chandlee.)

Another method of hitching up mankind has crept into Mexico, namely, the wheelbarrow. The drawing here given is an exact copy of a Guadalajara potter's conception of the happy wheelbarrow man, his machine made entirely of wood, the shafts supported by a strap hung from one shoulder and passing under the right arm. (Fig. 32.)

Tylor (Anahuac, 120) says: "A crowd of women follow close in the



rear of a Mexican army, almost every soldier having some woman who belongs to him, who carries a heavy load of Indian corn and babies, and cooks tortillas for her lord and master. The number of these poor creatures who perish in the wars is very great."



Fig. 30.

PORTRAIT OF A MEXICAN BUTCHER.

(After W. H. Holmes.)

Observe the parts of the body involved.

Mrs. Polhemus, in her "Woman's Work for Woman," speaks thus of the Mexican burden-bearers: "Who are these two men coming towards us, and what do they carry? The first is bearing to the city nothing less than a load of wash-tubs. Very primitive they are, as you may see, yet clothes will come from them as white and beautiful as any you may have washed in your stationary tubs at home, with all the modern improvements. Our next friend carries a bundle of wood, picked up outside the city, and how precious those crooked sticks are you would never guess till you tried to buy them. Here comes the baker's boy, with his great flat basket, nicely balanced on his head, and filled with fresh rolls and sweetened breads for your afternoon chocolate; then comes an Indian woman with a great bundle of charcoal strapped to her back, a baby tucked into her rebozo in front, and beyond walks another, bearing on her head an earthen jar. In Guatemala this is the way they carry milk, but here in Mexico City the jar is more likely to contain water, either for bathing or drinking. On the corner stands a porter, waiting and ready for a few cents to hoist to his back your heaviest Saratoga trunk and transport it whither you will. Here comes

another Indian woman. A few peas, beans, and perhaps peppers are tied up in a blanket, which is knotted around her neck. She stops at doors, calls out her wares, and trots along till she is sold out and her blanket empty; and so, as we pass along, do you notice how much in Mexico is carried by men and still oftener by Indian women."

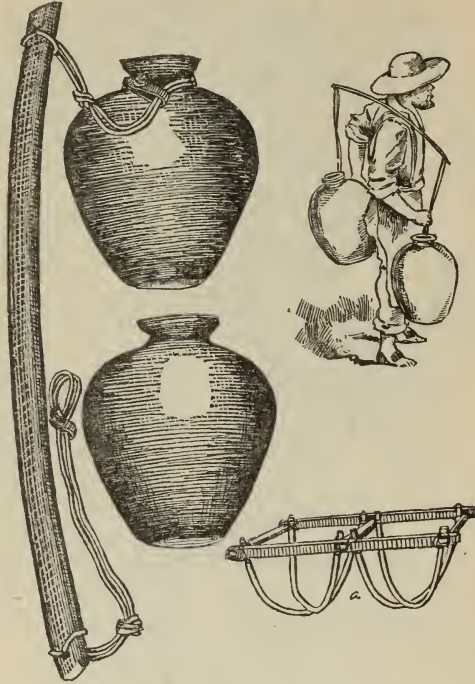


Fig. 31.

CARRYING-YOKE. A FRAME FOR SHIFTING THE JARS TO THE BACK OF A MULE.

(Cat. No. 126592, U. S. N. M., Guadalajara, Mexico. Collected by Edward Palmer.)

It is well known that the ancient Mexicans worked in the silver mines. The art of mining is about as primitive now in Mexico as formerly. The ore is placed in rude bags or baskets. The carriers work their way to the surface by means of notched poles put across a part of the shaft in a zigzag fashion, and they then give their load to the breakers, who knock the ore into pieces exactly as if they were going to macadamize a road. (Mexico Illustrated, Mark Beaufoy, p. 268.)

Mr. W. A. Croffut speaks as follows about the remarkable carrying capacity of those ubiquitous porters of Mexico, the *cargadores* :

"In every part of the country have I observed them patiently following the trails and carrying immense loads on their backs. I recollect seeing, four years ago, near a railroad station, half a dozen of them squatting on the ground, resting. One had a sofa upon his shoulders, strapped on I could not see how; another bore a tower of chairs locked into each other and rising not less than 8 feet above his head; another carried a

hen-coop with a dozen or twenty hens, and others were conveying laden barrels and various household goods. They had come, they said, from San Luis Potósi, not less than 50 miles distant. These cargadores will cover 30 miles a day for a week or more, going from ocean to Gulf.



Fig. 32.

PEDDLER WITH RUDE BARROW. MEXICO.

(After a figure in the U. S. National Museum, by a Guadalajara potter.)

“During a ride which I made over the Andes, on the Mexican National Railroad, these persistent carriers were almost always in sight from the car windows, the peons and burros following each other up and down the slopes. The vice-president of the road, Thomas C. Purdy, whose guest I was, said, as we watched these animated trains advancing on parallel lines, ‘There is our rival. That is the only transportation company we fear. If it were not for that line, this country would treble its railroads next year, and the roads would double their profits. We are combating the custom of centuries. Those fellows carry on their backs to Mexico the entire crops of great haciendas far over the mountains. I have been and sat down with a wealthy and enterprising hacendado, and explained to him that we could do his carrying in a quarter of the time and for half the cost, and have seen him refuse to change, and stubbornly stick to the old method. I was never before so impressed with the tremendous force of habit.’”

All the salt produced in Salinas is carried away on the backs and heads of men, who come for it (many from great distances) and sell it at home or in a suitable market. In Guatemala everything—with the exception of grain, vegetables, and sugar, which are transported on beasts of burden—is carried on the heads of men, there being no cart-road of any length except that from the port to the capital. The articles to be carried are adjusted into a package higher than wide, and secured by a net, called red. To the back part of this pack, near its base, is fastened

a strap of rawhide, the two ends of which are attached to another strap, called tapal, of the size and form of a large hand. The burden is placed on a stone, or some other elevated object, and the man, stooping down, puts the tapal on the top of his head, and lifting his burden trots off with it. When a paterfamilias, going on a journey, has baggage to carry, either his wife or one of his children accompanies him to carry his provisions. A professional carrier dispenses with such company and secures his provisions on the top of the load. In most instances his food consists of tortillas and a few peppers as a condiment, to which, exceptionally, some boiled beans are added. Carriers always take with them, in a little bag, some meal of toasted maize mixed with scraped brown sugar (dulce). A handful of this mixture put in hot water forms their only beverage, for they never touch fresh water, and whatever they drink must be warm. For preparing this beverage every one carries with him a small iron pot. All these articles are put in a netted bag, called matate. There are, at certain intervals on the road, places where the carriers rest during the day or at night. Such places are generally near to a brook, if there is one by the road, or to a rancho, where there are always some sticks of wood left glimmering by the previous party for making a fire and preparing the drink (pinol). The usual weight of a man's load is from 4 to 5 arrobas, an arroba being fixed by law at 25 pounds. Occasionally a man will carry a great deal more for a short distance. To protect the load from rain every carrier takes with him a kind of cloak (soyacal) made of the leaflets of a palm, stitched together in such manner as to overlap each other and form a short cone with a broad base. This cloak is rolled up and secured to one side of the load, indicating the nationality of the bearer; for by this he is at once recognized as an inhabitant of Guatemala whenever he comes to the neighboring states. This mode of carrying loads is undoubtedly the cause of the fashion in which men wear their hair, which is clipped short in front and on the top of the head, but allowed to grow to some length on the back part. A similar fashion is observed by the Hanaks, the inhabitants of the fertile plain of Central Moravia. The hair on the top of the head of a professional carrier becomes much abraded.

A specimen of carrying frame from British Honduras begins to foreshadow the apparatus used in the Andes for transporting travelers. It consists of a stout wooden frame like the seat of a child's carriage elongated, and is fastened to the back as in the Mexican basket carrier. All sorts of luggage are brought within the lines of the British trading posts on the backs of men in frames of this sort. (Fig. 33.)

The far-famed coffee-carriers of Rio usually go in troops, numbering ten or twenty individuals, of whom one takes the lead and is called the captain. These are generally the largest and strongest men that can be found. While at work they seldom wear any other garment than a pair of short pantaloons; their shirt is thrown aside for the time as an incumbrance. Each one takes upon his head a bag of coffee,

weighing 160 pounds, and when all are ready they start off upon a measured trot, which soon increases to a rapid run. (Fig. 34.) (Kidder and Fletcher, Brazil and the Brazilians, p. 29.)

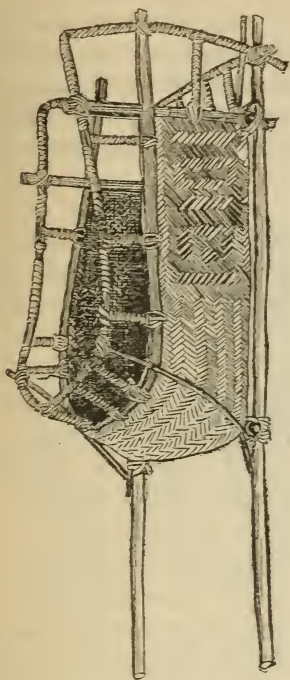


Fig. 33.

CARRYING-FRAME.

(Cat. No. 126805, U. S. N. M. British Honduras.  
Collected by U. S. Consul A. E. Morlan.)



Fig. 34.

COFFEE-CARRIER OF RIO.

(After Wilkes.)

Slaves are almost the only carriers of burdens in Rio Janeiro. They go almost naked and are exceedingly numerous. They appear to work with cheerfulness, and go together in gangs with a leader, who carries a rattle filled with stones, similar to a child's rattle. With this he keeps time, causing them all to move on in a dog-trot. Each one joins in the monotonous chorus, the notes seldom varying above a third from the key. The words they use are frequently relative to their own country, sometimes to what they heard from their master as they started with their load, but the sound is the same.

The coffee-carriers go in gangs of twenty or thirty. In singing, one-half take the air, with one or two keeping up a kind of hum on the common chord, and the remainder finish the bar. These slaves are required by their masters to obtain a certain sum, according to their ability, say from 25 to 50 cents a day, and pay it every evening. The surplus belongs to themselves. In default of not gaining the requisite sum, castigation is always inflicted. The usual load is about 200 pounds. (Wilkes.)

In Rio Janeiro as well as in the United States and the West Indies may be seen in perfection the African toting on the head. This practice does not seem to have been a favorite one among the American aborigines, if we except the water-carriers of the interior basin of the United States. In the coffee-carriers of Rio as well as among the stevedores of all our sea-ports and commercial towns, the load rests partly on the head and partly on the top of the scapulæ, there being local variations of the method running from support on the head alone to support on the scapulæ alone. The method is an exceedingly convenient one either for unloading or for emptying the sack.



Fig. 35.

NEGROES IN RIO JANEIRO, BRAZIL, ACTING AS DRAUGHT ANIMALS.

(From an old print.)

From Rio we have also an old sketch, after Wilkes, illustrating the use of man as a draft animal. (Fig. 35.) All over the world the "push-cart" is known. Nothing is commoner in Washington than the sight of a negro with his little two-wheeled cart, moving at a dog-trot, with a light load of everything conceivable. The freight of one of these carts rarely exceeds the quarter of a ton, but the draft-man moves much faster than a horse or a mule. The climax of this process of using men for draft is seen on the monuments of Egypt, where hundreds of them are hitched to a single sledge. The romantic survival presents itself everywhere in firemen's processions, the car of Juggernaut, the triumphal car.

A negro dray team in Rio consists of five stalwart Africans pushing, pulling, steering, and shouting as they make their way amid the serried throng. Now an omnibus thunders through the crowd, and a large four-wheeled wagon, belonging to some company for the transportation of "goods," crashes in its wake. Formerly all this labor was performed



Fig. 35a.

NAPO INDIAN CARRIER, OF ECUADOR.

(After Stanford.)

by human hands, and scarcely a cart or a dray was used in the city, unless, indeed, it was drawn by negroes. Carts and wagons propelled by horse-power are now quite common; but for the moving of light burdens and for the transportation of furniture, pianos, etc., the negro's head has not been superseded by any vehicle. (Kidder and Fletcher, *Brazil and the Brazilians*, page 29.)

The Napos Indians, of Ecuador, also use the head-band to support the basket; the staff is also introduced to throw a portion of the load upon the arms and turns the bearer into a veritable quadruped. (Fig. 35 A.)

In the island of Madeira is also seen the rudimentary form of loading up two or more men. The primitive palankin is simply a hammock swung on a pole, with ornamental awning and so forth to suit the rider. We will pause a moment to scrutinize this apparatus. (Fig. 36.) When-

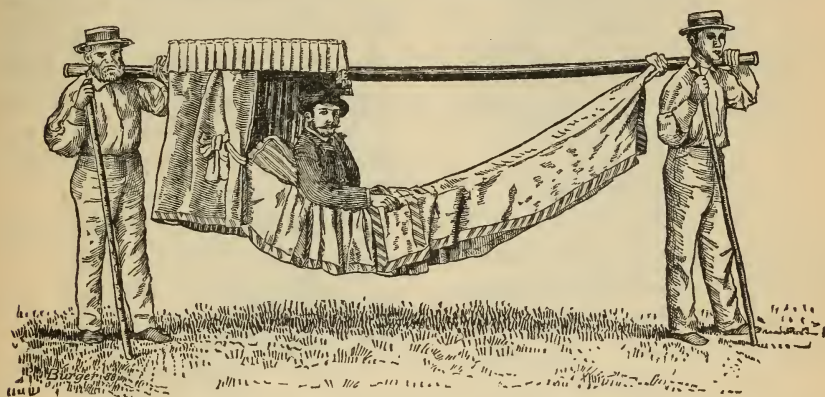


Fig. 36.

HAMMOCK CARRIAGE, WITH TWO BEARERS. MADEIRA.

(From a photograph in the U. S. National Museum.)

ever a man wishes to carry a stick of timber he finds the center of gravity and places that upon his shoulder. It is only a slight step forward to make the stick lighter and add weights on either end, as do the Mexican carrier and Chinese cooly. Revolve the pole ninety degrees so as to be perpendicular to the line of progression and we have the typical Holland yoke. We are proceeding here, as always, on the supposition that the human mind sets ever before itself the problem how to get the greatest result with the least effort. This involves in the case in hand a study of padding, fitting, resting, etc., all of which things have their local methods of treatment.

Again, suppose two men have a log or plank to carry between them, each rests one end of the load on his shoulder. This is the first step in that varied apparatus which becomes in different lands palankin, bier, filanzana, in which rank or circumstance make one set of men the carriers of another. Many of the peasantry are employed as carriers, and one is much struck by their numbers as they enter Funchal early

in the morning with sheep-skins filled with wine upon their shoulders,



Fig. 37.

WINE-CARRIER IN MADEIRA.

(After Wilkes, in Report on the U. S. Exploring Expedition.)

are bearers, and they rest themselves by supporting the load on crutch-like staves, since they can not set it down. (Fig. 36.)

A sledge, about 6 feet in length, 20 inches wide, and 6 or 8 inches high, with two strips of hard wood fastened together for runners, used to transport pipes of wine, is the only vehicle employed in Madeira. Figured (Wilkes I, p. 10.)

A drawing of the Persian water-carrier is introduced here (Fig. 38) for the purpose of tracing the head-band and the skin bag in their distribution. The pulque-gatherer of Mexico uses the skin of a hog in collecting the crude juice of the plant; the Eskimo employs the closed skin for a water-carrier as well as for a float. All over the Orient and in Africa the goat skin is the accompaniment of

looking at a distance more like a live animal than a filled skin. The skins are preserved entire, even the legs of the animal being retained. (Fig. 37.) These burdens are kept steady by a band that passes over the forehead, which supports a great part of the weight. About 25 gallons, weighing more than 200 pounds, is a load. They move rapidly and carry this load for a mere trifle. To us a remarkable feature in the population was to see a female not only thus employed, but a stout mountain lass trudging up a steep path with ease under a load that would have staggered one of our laborers even a short distance. (Wilkes.)

In the Madeira type two men



Fig. 38.

PERSIAN WATER CARRIER.

(After H. Fenn, in Century Magazine.)



the water and the wine carrier. A load of this kind rests on no particular portion of the back, adjusting itself perfectly to head, neck, shoulders, and back.

The paternity of the modern knapsack appears in the carrying-basket of Holland represented in the figure. (Figs. 39, 40.) This method of



Fig. 39.

GERMAN WOMAN CARRYING-BASKET WITH SHOULDER-STRAPS.

(From a photograph in the U. S. National Museum.)



Fig. 40.

HOLLAND YOKE, SHOWING BOTH HANDS AND SCAPULAS USED IN CARRYING.

(From a photograph in the U. S. National Museum.)

hitching up the pack-woman can not be very ancient. It is not widely spread among the aborigines of America, where the woman is the bearer and the man goes on ahead to do the fighting or hunting. To all appearances this is a sacrifice of great weight to the labor-saving scheme of joining the bearer and the warrior in one individual. Hence the soldier discards the head-strap or the breast-strap, and adopts the knapsack. (Fig. 41.)

In an example of head-strap from Africa we have a repetition of one from Montana, in which the pack-man becomes, as it were, his own driver. He puts the sack, or bundle of fagots or what not, on the two lines about the middle. He then backs up to his load, inserts his forehead into the head-band, and seizing the lines by the outer ends rolls his load upon his back. In the same manner grocers roll barrels of goods up and down the cellar skids. (Fig. 42.)

A very neat and ingenious framework for burden-bearing comes from

the Congo region. Two stout palm leaves are laid about a foot apart and the leaflets on their adjacent sides are braided together. The leaf-



Fig. 41.

PEASANT WOMEN OF RUSSIA CARRYING STONE ON A BIER.

(After George Kennan, in Century Magazine.)

lets on their outer margins are twisted into short cords and then braided into a continuous margin for the frame. (Fig. 43.) This apparatus is loaded with the greatest variety of merchandise, to be carried to and from the coast in trade.

“The Madis of Africa make admirable porters, being very careful of the loads intrusted to them, and display no little forethought and ingenuity in preserving them from injury. The rule is that no load should exceed 50 pounds in weight, and that it should be either square or oblong, the latter being preferred. They always carry the load on the head on a pad made of grass, very rarely steadying it with the hand unless going over very rough ground. They strongly object to carry loads over 50 pounds, but if pressed will take them up to 70 pounds, if the distance to be marched is not more than three days and extra food is given them. Loads of 100 or 120 pounds are carried by two men, hung on a pole, which they balance on their heads, but they do not like the work. If a very heavy load has to be carried, *e. g.*, a man, they place him on a native bed and carry him, two at a time, changing relays of men at about each mile. This they prefer to carrying by four men at once. I can testify from personal experience that it is far better to be carried by two men than four, for they go much more easily and do not run against so many trees or overhanging branches. The relief men march before those who are bearers and cry out when obstacles occur.

As regards distance they carry loads of 50 pounds 20 miles a day, for eight or ten consecutive days, without showing signs of distress, but

on the march they appear to require a great deal of water, and will sooner burden themselves with a gourd full than go without it for more than two hours at a time. If they go by a road where water is scarce, they generally take a few women or children with them to carry it. When they arrive at a stream all loads are put down, and they bathe, if the water is deep, or sit down and wash themselves, if it be shallow,

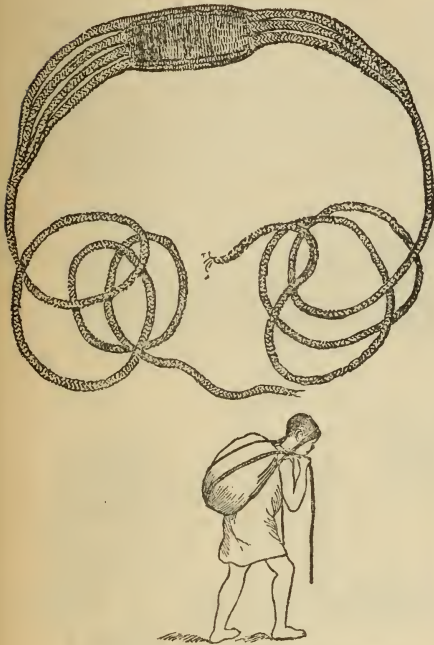


Fig. 42.

AFRICAN CARRYING-STRAP. THIS METHOD OF CARRYING ALSO PREVAILS IN NORTHWEST UNITED STATES.

(Cat. No. 4959 (?), U. S. N. M. Collected by Capt. Charles Wilkes, U. S. Navy.)

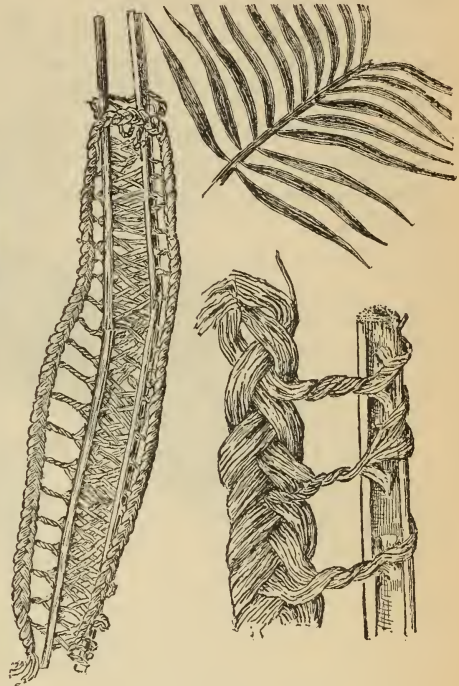


Fig. 43.

CARRYING-FRAME OF THE CONGO, MADE BY BRAIDING THE LEAVES OF THE PALM.

Cat. No. 72708, U. S. N. M. Loango Coast, West Africa. Collected by Museum für Völkerkunde, Leipzig, Germany.

and then take a long drink. The Madis can scarcely be prevailed upon to march at night, even in bright moonlight, on account of bad roads, which is strange, as their eye-sight is remarkably good. Neither will they start until the dew is entirely off the grass, or if made to do so by promises of reward, they tie bunches of grass or skins before them to avoid as much as possible being wetted by the dew.

In crossing a river of 4 or 5 feet deep they stand in the water in a double row and hand the loads from one to the other. Should the stream be very strong, they break down branches which have broad forks, and placing one end firmly in the bed of the stream lean against the fork, and so get the needed support. They march at a quick pace, but generally halt for ten or twenty minutes after each 3 or 4 miles.

In carrying the Egyptian post these men make long and quick

marches, 60 or 70 miles often being accomplished in twenty-four hours. (Proc. Roy. Soc. Edinburgh, 1883-'84, Nos. 115-118, p. 316.)

The open palankin or chair has reached an excellent differentiation in Madagascar. A traveler sits in a leather seat, made to fit the body, attached to the two bearing poles and having a stirrup for the feet. To the poles are also attached the traveler's gun, haversack, assagais, and other necessary apparatus.

The frame rests upon the shoulders of four carriers, who trot along with the load until they get tired. Extra bearers shift the load upon their shoulders without stopping. In this method of relaying the bearers are enabled to carry the traveler oftentimes a hundred miles a day. This same method of bearing and relaying is found also in Africa, and furnishes an advanced and quite complicated system of transportation. (Fig. 44.)

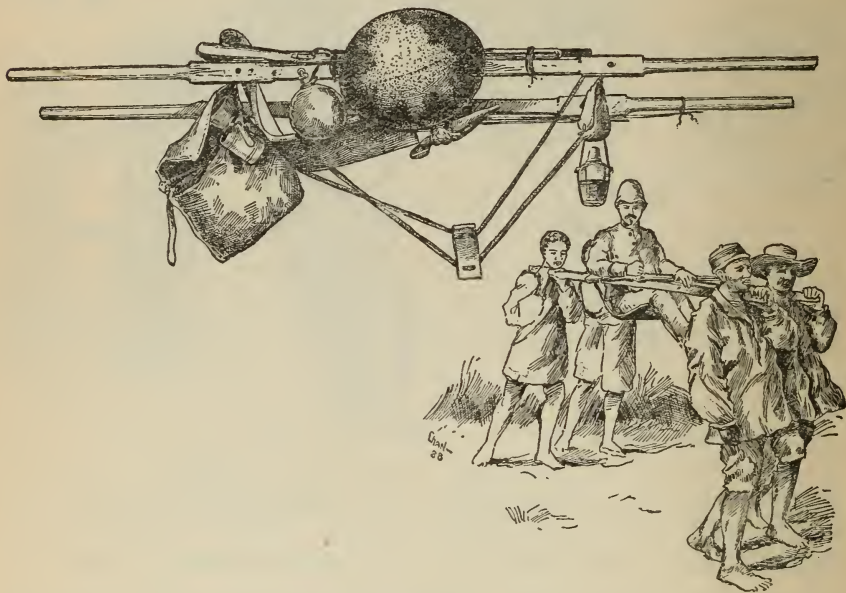


Fig 44.

FILANZANA OR CARRYING-FRAME OF MADAGASCAR. (After Shufeldt.)

(Cat. No. of frame 75928, U. S. N. M. Madagascar. Collected by Lieut. M. A. Shufeldt, U. S. Navy.)

"The average load of a coolie," says Mr. Neumann, "is 100 pounds, and with this he travels 30 miles. Kinkiang is an important place for the export of tea. The tea districts are situated about 60 miles from the town, and the coolies bring in the chests in two days; each man carrying a load of 100 pounds.

"The weight of a load and the distance over which a cooly travels, may be different in the north or south. I have not been able to make inquiries elsewhere but at this port."

Any one who has looked at all into the subject will recall the thousand and one attitudes of Chinese carriers in all pictures of social life. The

same is also true of Japan and the countries south of China. (Figs. 45, 46, 47.)

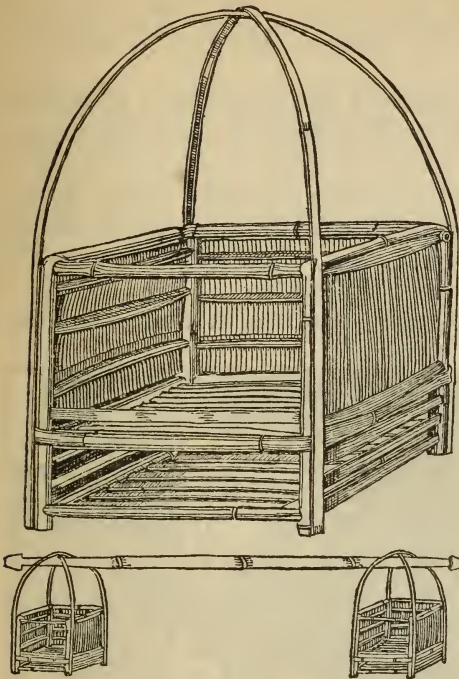


Fig. 45.

SHOULDER-YOKE AND CARRYING-BASKETS.

(Cat. No. 74506, U. S. N. M. China. Gift of the Chinese Centennial Commission, Philadelphia, 1876.)

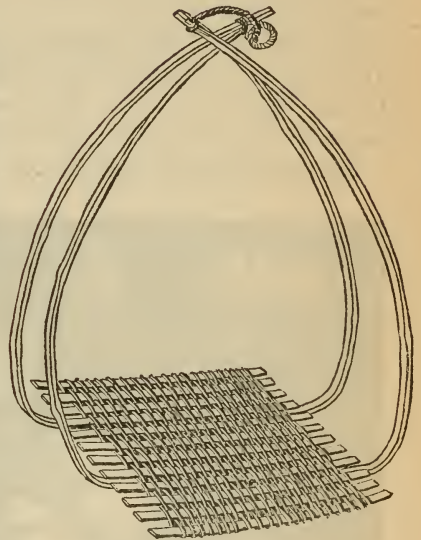


Fig. 46.

SIMPLEST FORM OF FRAME FOR SHOULDER YOKE.

(Cat. No. 54174, U. S. N. M. China. Gift of the Chinese Centennial Commission, Philadelphia, 1876.)



Fig. 47.

JAPANESE PEDDLER AND SHOULDER-YOKE.

(From a photograph in the U. S. National Museum.)

The shoulder-pole, or carrying-pole, assumes as many forms in China and Japan as the ingenuity of one-fourth of the human race has been able to devise. Inasmuch as they all operate on the same plan, a description of a very simple one in the National Museum will suffice for the whole series.

The essential parts of a Chinese carrier's outfit are, first, a stout strip of bamboo, 6 feet or more long, wide in the middle, and having knobs or notches at either end.

The middle of this apparatus rests on either shoulder of the bearer, and from the notched ends, with or without suspending strings, hangs the well-balanced load. The bearer carries a staff in hand, upon the top of which he may support his load while resting.

The wheelbarrow reaches its highest perfection in China (Fig. 48).

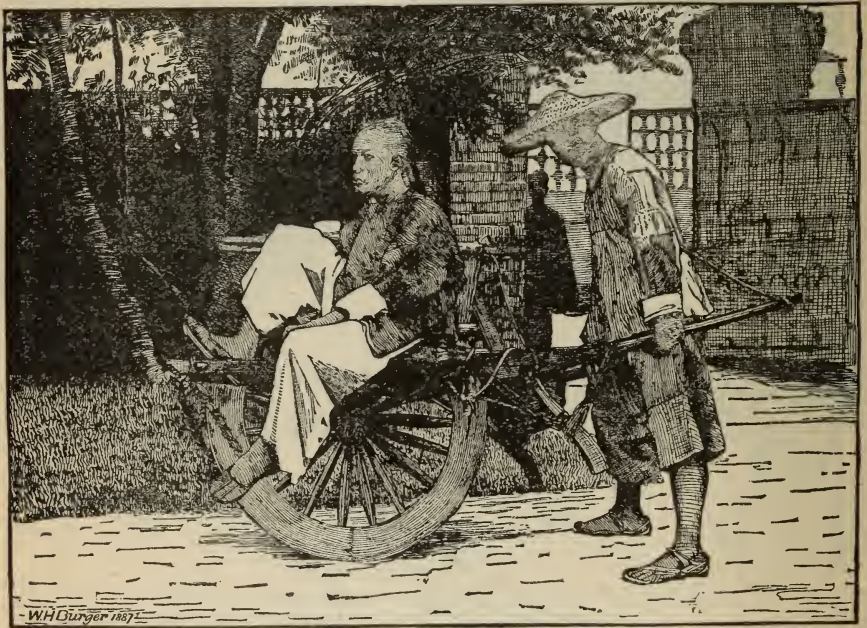


Fig. 48.

CHINESE BARROW WITH TWO SIDES, FOR BURDENS OR PASSENGERS.

(From a photograph in the U. S. National Museum.)

The man of burden is harnessed by means of his hands acting as stirrups, and a rope or strap passing from the shafts over his neck. To his rope or band he gives the effect of a trace by fastening it to the shaft some distance behind the hand.

The wheel is, moreover, in the center of the barrow, so that the downward pressure on the shoulders is far less than in our European barrows.

The load of this apparatus is disposed around the wheel, with some attention to the center of gravity; and the disposing of men, pigs, mer-

chandise, and household effects, with this sole object in view, gives to some of the Chinese loaded barrows rather a romantic effect.

The Japanese back is one of the best in the world, and the people have repeated many of the Chinese methods of burden bearing. The most frequent method of burden bearing is the bamboo basket, suspended from the shoulders in like manner to the knapsack. (Fig. 49.)

The palaukin of Japan is also very similar to that of China. In both countries, especially in the latter, on ceremonial occasions, frames and other devices have been invented for hitching up a great number of men, and thus of securing the advantage of combined effort. This



. Fig. 49.

COMMON CARRYING-BASKET OF JAPAN.

(From a photograph in the U. S. National Museum.)

should not be overlooked in studying the civilization of countries that became quite elevated without our modern appliances.

Any knowledge of Aino culture at this time is valuable, when a systematic effort is being made to discover the relationships of this primitive people. For carrying burdens the Ainos use a frame, like a small trellis or ladder, around which braided cord is wrapped to furnish a bed for the load. (Fig. 50.)

This frame is attached to the body by means of shoulder-ropes braided so as to be thick, and padded in the portions against the shoulders.

This is quite primitive as a carrying device, and has its counterpart only among the rude carriers of America and Africa.

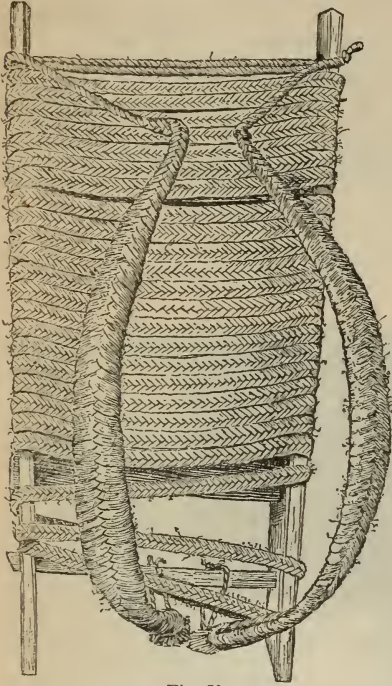


Fig. 50.

CARRYING-FRAME.

(Cat. No. 73093 U. S. N. M. Tate Yama, Japan. Collected by P. L. Jouy.)

A boy is returning home with two bread-fruits attached to the stock by their natural stem. The pole on the shoulder, with a weight depending from either end, is the commonest device of the professional carrier throughout this whole region. And in this picture we have the ancestor of every Chinese coolie art, of the principal part of Japanese, Siamese, and Polynesian carrying on the shoulder.

Indeed the Karen bread-fruit picker is at a single view the primitive agriculturist, taking his load at once from nature and the primitive agent of transportation.

A very elaborate and highly artistic

The palankin of Corea is an empty cube  $2\frac{1}{2}$  feet each way. Little windows look out in front and on either side, each fitted with a pair of sliding screens. Into these are let tiny panes of glass 2 inches square. Two men carry this box and divide the burden by means of a yoke, with straps that fit over the ends of the poles to which the box is fastened, two other men accompanying as relief. Each man is armed with a stick, which is used to insert under the chair and lift it up to ease their fellows. (Percival Lowell, Chosön, p. 50.)

The same author informs us that there is not a single wheel in Corea, the palankin being the only means of conveyance.

One of the most primitive illustrations of carrying on the shoulder is furnished by a copy of a small photograph, taken in the Karen hill country by the Rev. R. M. Luther.



Fig. 51.

KAREN BOY OF BURMA, CARRYING BREAD-FRUIT.

(From a photograph in the U. S. National Museum.)



offshoot of the Chinese coolie's double load is found in Siam. The pole rests on the shoulder, and on either end is suspended a long, daintily woven hamper. A wooden bottom protects the basket from injury, and the holes for the insertion of the pole are arranged like grommets by means of bamboo sewing. (Fig. 52.)

Cords are provided, both for the attachment of the top load and the convenience of the bearer. In all the Siamese carrying apparatus from Siam in the National Museum the workmanship is of the most delicate character. The baskets are woven of split rattan, and the stitching compares favorably with that of our best California weavers.

Compare the Siamese with the Sandwich Island pack, and the rude parentage of the Siamese method may be seen. (Fig. 53.) Captain Wilkes long ago said of the Hawaiian carriers: "One can not but be struck with seeing the natives winding their way along the different thoroughfares laden with all kinds of provisions, wood, charcoal, and milk, to supply the market and their regular customers.

Their mode of carrying burdens is to suspend them with cords from the ends of a stick; this is laid across the shoulders, and so accustomed are they to carry the load in this manner that they will sometimes increase the weight by adding a heavy stone in order to balance it. The stick on which they carry their load is made of the *Hibiscus tiliaceus*, which is light and tough. Instead of baskets they use a kind of gourd which grows to a large size. These are thin and brittle, but with the care the natives take of them are extremely serviceable. They are used for almost everything. It takes two gourds to make one of the baskets used for transporting articles, the smaller one being turned over the opening cut in the larger one, effectually protecting the contents from rain. Some of these gourds will contain upwards of two bushels. The gait of the Kanaka moving with his load is a quick trot, and he takes very short steps." (Wilkes.)

The carrying net of the Utes of Utah and Colorado re-appears in the Papuan area in the shape of a bow of wood, the space between being

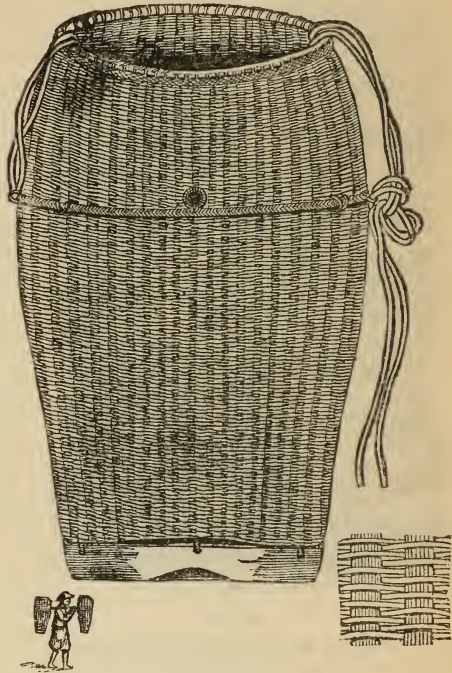


Fig. 52.

CARRYING-BASKET.

(Cat. No. 27613, U. S. N. M. Siam. Presented by the King of Siam.)

filled with a net-work. All sorts of loads are fastened within this frame and it is borne on the back in the most comfortable manner to the bearer. (Fig. 54.)



B.

Fig. 53.

CARRIER OF THE SANDWICH ISLANDS.

(From a photograph in the U. S. National Museum.)

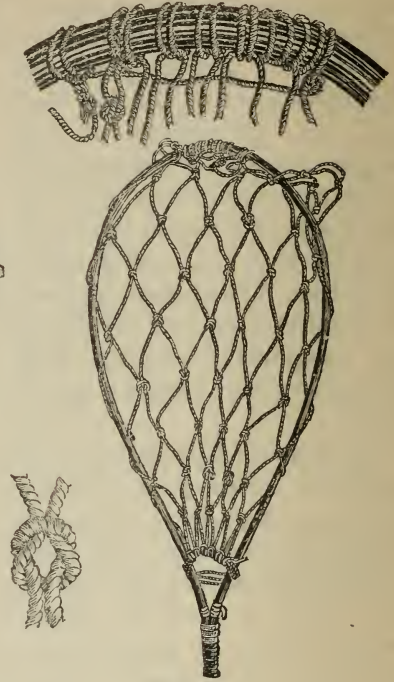


Fig. 54.

CARRYING-NET AND FRAME.

(Cat. No. 73386, U. S. N. M. New Guinea. Collected by A. P. Godwin.)

In the vast majority of the islands in the great oceanic area the human burden-bearer is transformed into the human propeller, most of the savage life here being passed on the water; but it is curious to notice that hand-work even here precedes machine work, in that men, women, and children are the most expert swimmers in the world.

"The women of New Britain," says Mr. W. Powell,\* "carry their babies in net-work bags, the band or strap of which comes round the forehead, and the child in the bag rests on their shoulder blades, and in traveling to market and elsewhere, should the child require suckling, they do it over the shoulder.

"They will also carry on their backs two or three cocoanut-mat bags full of merchandise, as well as the baby; this gives them a stooping gait and makes them always walk in a doubled-up manner, even when not carrying anything."

\* W. Powell, "Wanderings, etc.," London, 1884.

It would be a fascinating task to note the thousand and one devices by means of which mankind have shifted their burdens upon the backs of animals, upon the winds and the waters. The authorities of the U. S. National Museum have organized a section of Transportation and appointed to the curatorship Mr. J. E. Watkins, to whom I shall leave the task of working out the subsequent chapters in the history of this subject.