

it seems that previous to 1845 it had been detected in North Carolina.

The disease appeared in Michigan about 1857; the exact time is not known, nor by what method it was introduced. To my knowledge it has not been reported in Ohio or Indiana. If this be true it is a query how it got to Michigan unless imported in the fruit or young trees brought from nurseries in infected districts. This I believe to be the case, and have a faint recollection of seeing a published statement to that effect.

The orchards of the South Haven district seem to have been the first to suffer.

From the above facts of history, it will be seen that this disease is one that progresses slowly, and yet in one sense rapidly, and is as sure in its results as is pulmonary consumption. It is to be hoped that such active measures shall be taken that its future history shall not cover near as much territory as at the present time. It is a disease that, unless checked in its progress, will follow wherever civilization advances.

[*To be continued.*]

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## ON THE SO-CALLED CHUKCHI AND NAMOLLO PEOPLE OF EASTERN SIBERIA.<sup>1</sup>

BY W. H. DALL.

THE natives of that portion of Asia lying east of the meridian of 180° from Greenwich, and between Behring sea and strait and the Arctic ocean, have always been regarded with particular interest. This interest arises partly from the fact that they alone of all the Siberian tribes have maintained their independence of Russian authority, and partly from the idea that these people form a link between the races of Asia and America; a thorough knowledge of their ethnological position being supposed to be all that was required to confirm or disprove certain theories of migration.

Another source of interest is the confusion that has always existed in regard to their division into different stocks, and which is still far from being cleared away. The forthcoming work of Lieut. Nordqvist, of the *Vega* Expedition, will doubtless afford

<sup>1</sup> Read before the American Association for the Advancement of Science, Cincinnati, 1881.

means of rightly locating a part of these people and the rest will doubtless be cleared up before many years by new investigations.

F. von Stein, in *Petermann's Mittheilungen*,<sup>1</sup> has recently given an interesting résumé of the information in regard to these people contained in articles by Nordqvist and Hovgaard in the *Isvestia*<sup>2</sup> of the Russian Geographical Society; among others who have contributed some information on the subject, most of whom are referred to by Stein, are Wrangell,<sup>3</sup> Neumann,<sup>4</sup> Maydell<sup>5</sup> (or Maidel), Kennan,<sup>6</sup> Bush,<sup>7</sup> Stimpson,<sup>8</sup> Professor Asaph Hall<sup>9</sup> and Dall.<sup>10</sup> Others, to whom I have seen no reference made, are Shismareff<sup>11</sup> and an unknown writer in the *Journal of the Interior Department*<sup>12</sup> of Russia, both articles being in the Russian language.

In a summary of our work for the season of 1880 (being an abstract of a letter from me describing my third visit to the coast of Northeast Siberia), contained in the January number of the Royal Geographical Society's Proceedings, this paragraph occurred:

"It was remarked that the proper name of the people on the Asiatic side described by Nordenskiöld and his companions, and previously by Hooper<sup>13</sup> and Mr. Dall, is Yū'-it, a corruption or shortening of In-nū-it (Eskimo), of which they merely form one tribe. They are totally distinct in language, race and manners from the so-called Reindeer Chukchis (*Tsau'-yū-at*), who are a mere tribe of the Korak nation."

To this somewhat ambiguous and not literally exact statement, Lieut. Nordqvist has taken exception in a communication to the

<sup>1</sup> 1881, Heft II, pp. 41-45.

<sup>2</sup> Band XVI, Heft II, 1880.

<sup>3</sup> Narrative of an expedition to the Polar sea (Sabine's ed.). 8vo. London, 1840 (p. 126). Cf. also *The Telescope*, 1835, No. 26.

<sup>4</sup> Hist. Ubers. Tschuktschen Exp.; *Isv. Sib. Abth. Russ. Geogr. Soc.* Vol. 1, Nos. 4-5, II, No. 3, 1871.

<sup>5</sup> Antworten der Tschuktschen Exp.; *Isv. l. c.* II, Nos. 1 and 2, pp. 60-70; 1871.

<sup>6</sup> *Tent Life in Siberia, etc.* 12mo. New York and London, 1870. (p. 120.)

<sup>7</sup> Reindeer, dogs and snowshoes. 8vo. Harper Bros., 1871. (p. 426.)

<sup>8-9</sup> Cf. *Alaska and its Resources*, pp. 549-554.

<sup>10</sup> *Alaska and its Resources*, Boston, 1870, pp. 374-385. Also, *Contr. to Am. Ethnology* (J. W. Powell), I, pp. 12-15, 93-106, 1877. Also *Proc. Roy. Geogr. Soc.*, Jan., 1881, pp. 47-49; Sept., 1881, pp. 568-570.

<sup>11</sup> *Zapiski Hydr. Dept.*, X, pp. 178-200, 1852.

<sup>12</sup> *Zhurnal Minist. Vnutr. Del*, 8vo, St. Peterbuorg, 1835, XVI, 5, and 1851, Nos. 6-7.

<sup>13</sup> *Ten months among the tents of the Tuski, etc.*, 8vo, London, J. Murray, 1853.

Imperial Geographical Society of St. Petersburg,<sup>1</sup> which I have not seen, but which is summarized in a note in the Royal Geographical Society's Proceedings for June, 1881.<sup>2</sup> According to the editor, Lieut. Nordqvist's observations are as follows:

"According to Lieut. Nordqvist the stationary and nomad Chukchis both belong to the same race, and call themselves in the singular 'Chau-chau,' and in the plural 'Chau-chau-ate.' These people, he says, live to the north of Cape Chukotsky, and must not be confounded with the true Eskimo who live to the south of it, chiefly on the shores of the Gulf of Anadyrsk, as far as Cape Oliutorsky, a fact which Lieut. Nordqvist urges, is incontestably proved by a comparison of the idioms in the languages of the two peoples."

While not holding Lieut. Nordqvist responsible for the literal words of the above note, it was evident that some misapprehensions entered into his suppositions concerning the people on the coast referred to, as well as some errors of my own to be corrected. This called my attention to the subject, and induced me to overhaul my notes and look up the Russian literature of the subject, trusting that to Lieut. Nordqvist's valuable investigations in regard to the people on the north coast of Siberia, west of East cape, some facts might be added in regard to those on the eastern and southern shore of the same great peninsula.

On the Siberian coast south and west from East cape, the *Vega* spent less than a day at St. Lawrence bay, and little more than a day and a half at Konyam bay, a length of time insufficient to give to the members of the party more than a cursory glimpse of the people, without affording any ground for positive statements; as indeed is frankly admitted by these gentlemen (according to Stein's digest of their publications), who express themselves with due reserve in regard to the ethnological problems of this section of the coast.

The summary of the season's work was written by me while on the voyage home, having then seen only Palander's narrative, which appeared in the *Scientific American Supplement*, Nos. 231 and 232. There being little doubt that at some former time the Eskimo had occupied the north coast of Siberia as far west as Koliuchin bay; the description of the manners and customs given by Palander of the dwellers on that coast agreeing precisely with

<sup>1</sup> Published in its Bull. fascic. II of 1881.

<sup>2</sup>l. c. p. 36.

those of the Eskimo tribes further south; and the few words given of their language belonging, at least in part, to the jargon spoken by both Eskimo and Korak (or Chukchi) in communication with the whites and with each other, it was not all unnatural to suppose that the winter neighbors of the *Vega* were Eskimo (or, as formerly distinguished, sedentary Chukchis) similar to those with whom I had had personal intercourse.<sup>1</sup>

The observations of Lieut. Nordqvist must be taken as conclusive in relation to the people with whom he was brought in contact. Hence we must conclude that at the present day the inhabitants of the region on the north coast of Siberia, west from East cape and as far as Cape Shelagskoi, belong to that branch of the Korak nation which form the original genuine Chukchi of the early Russian explorers. They are, however, not the wandering or reindeer Chukchi, but that part of the nation which gain their living by sealing and fishing. The *Vega* party were visited by reindeer Chukchi, during the winter, repeatedly; some from the vicinity of Behring sea appearing on two occasions, but in Stein's paper no reference is made to any comparison between them and the fishing Chukchi, by which the differences in life and manners might be made clear. The names Chukchi, sedentary Chukchi, etc., have been used in such a confused manner that they no longer have any clear signification, and it is desirable that they should be discarded entirely. For instance, in speaking of sedentary Chukchi, I should refer to the Eskimo of N. E. Siberia, to whom that appellation has generally been misapplied, but Lieut. Nordqvist would understand the north coast people of his wintering place, to whom it more properly belongs. It will, therefore, be advantageous to preface any discussion of the different branches by a synonymy which will show what is meant by any particular name. For the real, original wandering Chukchi, who live by their reindeer and by summer fishing, the name of

<sup>1</sup> Of the twenty-three words given in Palander's account (as printed in the cited work) three were Eskimo or corrupted Eskimo; seven were recognized as similar to words having the same meaning of the Chukchi (reindeer men) of the vicinity of Plover bay; one (certainly, and probably two) is of Hawaiian origin, and is in use on both sides of Behring sea among all the people who have had intercourse with whalers and traders from the Sandwich islands; another is a corrupted Russian word; the rest were not recognized, but were pretty certainly *not* of Eskimo origin. Several apparently were roots reduplicated in a manner characteristic of the jargon, but, to the best of my belief, not so formed in the language as properly spoken among themselves.

Tsau-yū' may be adopted; at least there is no doubt that such as live near Plover bay so call themselves.

### TSAU-YU'.

*Reindeer Chukchis* of authors.

*Chūkchis* (variously spelled) of authors, in part.

*Reindeer men* of the adjacent coast dwellers in conversation with the traders and whalers who know them best by this name.

*Tsau-chū* of Erman, in part.

*Tschekto* of Matiushkin, in Wrangell, Sabine's edition, p. 120 (meaning "people").

*Tsu-tsin* of Stimpson, quoted in *Alaska and its Resources*.

*Tchukchus* of Bush, l. c.

*Tsau'-yū-at*, Dall in R. Geogr. Soc. Proc., l. c.

*Kugh-ūkh-tüz-ū-mūt* of the Diomedede Islanders.

*Wandering Chukchis* of authors.

*Koy-ee'-khit* of the Asiatic Eskimo (Cape Chaplin).

Lieut. Nordqvist tells us that the termination *at* or *ate* is merely a plural inflection, and that the first part of the word has the collective signification, and in this I have no doubt he is correct, though until his criticism was made I had not looked thoroughly into the matter.

There is, I presume, little doubt that these people adopt slight distinctive changes in their national name according to their native habitat, or that they are in some way divided into clans or tribes, since competent explorers give slightly different names as the tribal name, yet all with a fundamental similarity. Thus Matiushkin on the Kolyma found *Chck-to*; Erman from some source derived *Tsau-chū*; Stimpson, on Seniavine strait, near Konyam bay, obtained *Tsū-tsin*; the writer, near Plover bay, *Tsau-yū*; Nordqvist for the "sedentary" branch on the north coast, *Chau-chau*, and Shishmareff for the same at Mechigme and St. Lawrence bays, *Chau-chū*, for the term "people," meaning themselves collectively. I am inclined to doubt if the *Ch* should not be more properly *Ts*, as in many American tribes, for instance, *Chinook* and *Chehalis*, which we know should be written and pronounced *Tsinūk* and *Tsihalis*, but which have become permanently crystallized in the language under the former erroneous spelling. Nevertheless, as no one is better qualified to pronounce on this subject than Lieut. Nordqvist, his spelling will be here adopted for the people of the Korak race allied closely to the *Tsau-yū*, but who live as the Eskimo do, along the shores, and possess no reindeer, but derive their subsistence from the sea.

## CHAU-CHAU.

*Chau-chau*, Nordqvist l. c. (north coast).

*Chau-chū*, Shishmareff l. c. (St. Lawrence and Mechigme bays).

*Sedentary* or *Fishing Chukchis* of authors, in part only.

*Namollos*, Pritchard and other authors, in part.

*Ciukci* of Lieut. Bovè.

These people, according to Nordqvist, live along the Arctic coast from Cape Shelagskoi to East cape, and are of the only race represented by living inhabitants on that stretch of coast. So far as the accounts yet published extend, their mode of life, manners, customs (except some of those relating to religious matters), dwellings and implements, differ in no distinguishable manner from those of the Eskimo of Plover bay or the Asiatic shore of Behring sea. The full account which Lieut. Nordqvist will doubtless publish in time, may afford some discriminating features.

In regard to the people at and south-west from East cape, Lieut. Nordqvist seems to be in some doubt as to their exact status, while maintaining, so far as we learn from Stein, a certain reserve on this point, he nevertheless is represented as asserting that they are not Eskimo and that these Eskimo do not occur north of Cape Chukotsky, but reside chiefly about the Gulf of Anadyr. On the other hand he seems to hold that these people on the west coast of Behring strait are composed of a hybrid mixture of Chau-chau and Eskimo blood which is not recognized as their own race by the former, at least not by such as dwell on the Arctic coast.

The synonymy of the Eskimo tribe or race found on the Asiatic shore is the most complicated of all:

## YŪ-IT.

*Yūit* (people), their own name for themselves, a corruption or shortening of *In-yū-it* or *Innūit*, the universal name of the Eskimo stock except of the Aleuts.

*Namollo* of Pritchard and other older writers.

*Tchouktchi Asiatiques*, Balbi, Atlas Ethn.

*Tuski*, Hooper, Markham and Dall, l. c. provisionally. Perhaps a misapplication and corruption of *Tsū-tsin* which belongs to the *Tsau-yū* race.

*Chūk'chi* (variously spelled) of various authors, erroneously.

*Chūklūk'mūt*, Stimpson MSS., Dall, l. c. This is a local name of the tribe or local population of Chūklūk island (Ittygrane or Tchirklook of Rodgers' chart), Seniavine strait, and has been so used by me; cf. *Contr. Ethn.*, I, p. 14, 1876.

*Sedentary* or *Fishing Chukchis* of authors (in part only).

? *Onkilon*, Wrangell Journey to the Polar sea. This is, according to Neumann and Maidel, a corruption of

*Ang-kali* or *sitzende Tschukschen*, or

*Ang-kadli*, meaning dwellers by the sea, cf. Neumann, l. c., or Stein's article.

*Aiguan*, Nordqvist, according to Stein, l. c.

*Aigwan*, Maidel, l. c., pp. 67-68; all of the five preceding being names stated to be applied to the *Yū-it* by the *Chau-chau*, and meaning dwellers by the sea.

*Kōkh'-lit-inūin*, partly, of the American Innuït, according to Dr. Stimpson.

*U-ū-ūt* of the St. Lawrence bay *Chau-chū*, according to Shishmareff (? corruption of Innuït).

*Em-nūn-ka*, *Kāliā-ing-wir*, *Rliā-rliā-ūt* and *Un-wee-ven* (= *Innuïin*?) of the Mechigme bay *Chau-chū* according to Shishmareff. The third of these names has a local Eskimo termination and the fourth is probably a corruption of the plural form of *Innuït*.

"*Matsinka*" men of the trading jargon, meaning "good" men.

Those living at East cape (*Nūwūkh*) are called by the Diomedé Islanders *No-gwah-mūt'*. Those living at the Chūklūk village in Seniavine strait call themselves *Chūk-lūk-mūt*.

We have then four groups of people to consider and refer to their true relations, namely, the *Tsau-yū*, the *Chau-chau*, the *Yū-it* and the dwellers between Cape Chukotsky and East cape.

With regard to the *Tsau-yū'* and *Chau-chau* we may accept Lieut. Nordqvist's decision that they are mere branches of one people, the differences between which, it is to be hoped, he will eventually make clear. Both are, without doubt, branches of the Korak (or Kariak) stock, and correspond essentially to the divisions of settled and wandering Koraks described by Wrangell, Erman, Bush and Kennan, the last two of whom—having had more intercourse with both the Koraks and "Tchukchi" than any other explorers for many years—unite in the opinion that there is no essential difference of any kind between the two people, either in life or speech.

As to the region occupied by them, it extends from the Kolyma to Behring strait. Even the *Chau-chau*, or sedentary branch, as attested by Nordqvist, resemble the Innuït in their more or less constant movement, to and fro, between different points, as well as in almost every other respect except language and race.

Only the *Tsau-yū*, by reason of their self-transporting sustenance, the reindeer, are able to make long interior journeys.

The relations of the *Yū-it* to the *Innuït* are not doubtful. No one questions their identity in race and language, though their manners have changed in many respects since they migrated from America to Asia.

Their hunting grounds are confined to the coast like those of the

*Chau-chau*, and about the south-west limit of them, at least, there is little or no doubt. They are slowly migrating southward along the Kamchatkan coast. In 1865, and for many years previously, their visits to the Anadyr river mouth were few and far between, probably not more than once a year on the average, and they had no village there up to 1866. In 1879 a colony had reached Cape Oliutorsk (according to Capt. Owen of the steam whaler *Mary and Helen*), and planted themselves and sent word for more to follow them as they "had found a good place." These migrants came from Plover bay, where seal were no longer plenty, and had paddled some five hundred miles.

The northern limit is more uncertain, Lieut. Nordqvist puts it at Cape Chukotsky, which is too far south. On the authority of Capts. Redfield and Smith, traders of many years' experience and who understand perfectly the difference between the races, their languages and the trading jargon in use by both, I placed it at Cape Serdze.

The *Chau-chū* of Mechigme and St. Lawrence bays informed Shishmareff, in 1821, that an Eskimo tribe were living on the Arctic coast who wore labrets. One old man at St. Lawrence bay told how he had traveled to the River Amiluk not far from Cape Chavaka (Shelagskoi), from a point beyond Koliuchin island, without seeing any people. At the cape and on this river were people whom he called *Chāvāki*, who wore labrets like the Americans. At Mechigme bay the same people were alluded to as existing on the Arctic coast, and were called *Eg-liū-nok*. Shishmareff saw at both St. Lawrence and Mechigme bays, people of the *Yūit* race; whom the *Chau-chū* said, lived by themselves along the sea coast, obtaining their living from the sea, kept to themselves, spoke a different language and knew nothing about reindeer keeping. Stimpson, in 1856, obtained a nearly pure Innuvit vocabulary at Chūklūk village in Seniavine strait. In nearly every year from 1870 to 1880, Capt. Owen and other whaling masters have obtained Innuvit whale fishers from St. Lawrence bay, who stayed by the vessel until she left the Arctic, when they were landed at their homes rich with accumulated stores of salted whale meat and "black skin" to keep them during the winter. In 1880 Innuvit came off to my vessel from Cape Chaplin where they have a large village. Their language was almost identical with the Mahlemūt of Norton sound. One



of them spoke English well. He said, in response to questions, that they had little intercourse with the *Chau-chū* except in trade, that their languages were entirely different, but that they communicated by the trading jargon: that the "deer men" were rich and the "matsinka men" (*Yū-it*) were poor. They did not intermarry as a rule; sometimes an Inuit girl would marry a "deer man" chiefly because she would always have plenty to eat and little or nothing to do; but the *Chau-chū* women never married *Yūit*, "they would have to work too hard and submit to seasons of semi-starvation." On the other hand, Cornelius, a native of Plover bay belonging to the Eskimo stock, speaking English with great fluency and correctness, informed me that his people had only a commercial intercourse with the *Tsau-yū*, that the shamans of the former had different practices from their own, and that they never intermarried. I asked him what the "deer men" called themselves. He said *Tsau-yū'-at*. But, said I, at Cape Chaplin they said *Koy-ee'-khit*. "I have heard many names given to the 'deer men,'" he said, "but the only name I have ever heard them call themselves is *Tsau-yū'-at*. The name you say is for making fun of them, it is not their own name." I tried to find out what the meaning was, but he evidently was unwilling to explain, and it is evidently some contemptuous appellation, such as the American *Innuit* give the Indians (*In'-ka-lik*) which means "children of louse eggs." This Cornelius had lived a number of years in the United States, had been in Washington as well as New Bedford. The native of Cape Chaplin who boarded me in the strait had also spent a winter in San Francisco, and was very outspoken in his disgust at the white men who were willing to eat turtle, which he had seen at the restaurants, and which he described as "American devil." Their travels are made as members of the crews of whaleships, where they do efficient duty, but I have yet to hear of a *Chau-chau* who has left his native shores.

I have shown that *Yūit* (Eskimo) extend to St. Lawrence bay. For their extension to East cape, beside the authority of several whalers and traders of great experience, I had a pure Eskimo vocabulary, obtained for me at the *Nūwūkh* village on East cape, by Capt. Smith, about 1872, which is now in the collection of the National Bureau of Ethnology. This, I think, settles the fact of the existence of *Innuit* at that point as late as 1872, and I see no reason for doubting that they still exist there. That occasional

parties at the time of the walrus hunt (June) proceed along the coast as far as Cape Serdze, I believe, though the only information I have is derived from several whalers, notably Capt. Owen, who was boarded by them in the autumn of 1879, at nearly the time that the *Vega* was frozen in, and not over fifty miles from that vessel, which was reported to Capt. Owen in such a way that he suspected it to be the *Vega*, and sent a letter by the first party (whom he paid with a large quantity of hard bread, etc.) offering assistance if needed. This letter, however, some time afterward was brought on board his own vessel by a second party of *Innuit*, who demanded large pay for its safe delivery.

The possibility, or probability, of parties of *Innuit* making their way along the Arctic coast at certain seasons does not affect the fact asserted by Lieut. Nordqvist, that the generality of the inhabitants, and perhaps the only permanent inhabitants of that coast, are *Chau-chau*. We know that there are large numbers of the latter at St. Lawrence bay, and doubtless there are also at other harbors on the west shore of Behring strait, including that at East cape, living on perfectly amiable terms with the *Yū-it*.

At Plover bay they do not inhabit the same spot, though near neighbors. I saw an old *Tsau-yū* shaman in 1866, who had come all the way from Anadyr bay to perform certain rites of sacrifice on some of the ovals of upright stones on the hill near the anchorage. He was accompanied by several of his compatriots, while the *Yū-it* clustered round, interested spectators of a rite they did not join in.

Several *Chau-chau* were residents of Cape Chaplin, though most of the natives there were *Yū-it*. Old "Enoch" was one who received each year until his death, a number of casks of strong liquor from the traders, for which he faithfully accounted the following spring.

A word may be said as to the jargon of which I have spoken. It is similar in some of its constituents to a jargon used on the shores of Norton sound and at Kotzebue sound. That is the corrupted Russian, Hawaiian and English words are much the same, but on the Asiatic side there is a large admixture of words of Korak (Chukchi) extraction. *Kau-kan*, corrupted Hawaiian for food, "grub," eatables generally, is in common use on both coasts. *Shawak* or *Chopak*, corrupted Russian for dog (*sabak*) is in use on both coasts. Many of the words consists of a redupli-

cated Korak or Innuït root which is used with little or no inflection, while in the original tongues reduplication is extremely rare and the roots are always inflected. Many of these words have an abstract meaning which does not exist in the native dialects, as for instance "*kau-kau*," food. In the dialect of *Chau-chau* and *Innuït* alike, there is no abstract word for food known, but there are special names for each kind of food, which are always used in speaking among the speaker's own people. This jargon was in use, I have reason to believe, in some shape between the *Innuït* and *Tsau-yū*, long before the advent of the whites, but when traders came it was soon amplified by new words for things previously unknown, almost always modified from their original pronunciation by the unaccustomed native tongues (as 'Myr-kan for American; chopak for sabak; tāwā'ka for tobacco, etc.).

The confusion can only be cleared up by trained linguists. Ordinary explorers cannot be expected to be qualified for the task. The vocabularies obtained by them will almost certainly be infected by jargon, if indeed not wholly composed of it. Even with the great care doubtless exercised by Lieut. Nordqvist and his companions, I should feel little hesitation in predicting that their vocabularies will be found to contain a certain admixture of Eskimo words, which could be picked out by an expert.

Now if this be the case (and we shall doubtless learn in good time about it), since the mode of life, the general features of physique and the jargon used by both races differ but very little, according to the reports from the *Vega* and the experience of others, how can we say dogmatically that the Innuït are not at any time to be found on the Arctic Siberian coast, until the several villages and their inhabitants have been examined in greater detail than has yet been possible?

I will conclude by noting that the *Innuït* of the American and Asiatic shores of Behring strait are not on good terms with each other. They are not actually at war, as in the time of their discovery by Popoff and Deshneff, but they cherish a mutual contempt. The "*Mātsin'kā* men" of Asia despise the "*Nakū'ruk* men" of America. The inhabitants of the Diomedes, who do most of the intertrading, warned us, in 1880, against the "bad men" of East cape. The Plover bay natives (*Yūit*) were outspoken in their contempt for the American *Innuït*.

The long journeys from Asia to America formerly performed

by the natives, are now unnecessary on account of the visits of traders to both shores, and are seldom or never undertaken. The Diomedé people, however, visit both shores and carry liquor from Asia to America. The increasing scarcity of food is impelling a southward migration as previously mentioned, and it may not be many years before the native Eskimo population of Asia may be located where Lieut. Nordqvist at present has somewhat prematurely placed them, namely, to the south and west of Cape Chukotsky.

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## THE LENGTH OF LIFE OF BUTTERFLIES.<sup>1</sup>

BY W. H. EDWARDS.

SOME inquiries on the subject led me to investigate the matter, and to refer to my note books, in which are recorded everything that has come under my observation relating to butterflies for the past fifteen years.

Boisduval, and Kirby, and Spence allege that the life of the summer butterflies is brief, the male expiring soon after copulation, the female after oviposition. On the other hand, Mr. Scudder has spoken of butterflies living two to three months. Mr. Edwards expressed the opinion as to the hibernating butterflies, that they lived from about the 1st of September to the end of the following May, or eight to nine months at the outside. Whereas Mr. Scudder asserts that *D. archippus* lives from a year to fifteen or sixteen months.

Observations show that one brood follows another in rapid succession in many species at the South, a month sufficing for the complete duration of the generation. As the emergence of individuals from the chrysalis is not all at once, but is continued through several days or weeks, it follows that the life of any individual butterfly must be much less than the duration of its generation; certainly not over one-half to two-thirds that of the generation. In the case of polymorphic species like *Papilio ajax*, it is not difficult to fix the duration with some definiteness. Mr. Edwards gave from his note books dates of the first and last appearance at Coalburgh, W. Va., of the form *Ajax walshii* and of the form

<sup>1</sup> Abstract of a paper read at the Cincinnati Meeting of the American Association for Advancement of Science.