new inherited characters originate in animals and plants. While it may not be inferred from existing evidence that such radiation is the direct cause of mutation, yet a way is now open by which this question can be attacked experimentally. It is our intention to conduct a second experiment which will approximate fairly closely to the requirements of a crucial test of this important question.

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Mammalian Life in High Latitudes.

How far seals and whales migrate north in the summer months is a moot question, but the following facts suggest that the latitude reached in the case of the floe-seal, the narwhal, and the Greenland whale is a high one.

The occurrence is recorded, in log-books of whaling vessels in my possession, that in the Greenland Sea, in lat. 80°—a situation in which, owing to the direction of the prevailing winds, the ice is usually drifting south—in May of numbers of floe-seals—seals which, as Stefansson explains in his "Friendly Arctic", are tied to sheets of ice, of moderate thickness, the product of a single winter's frost, which therefore must have drifted south from a higher latitude during the winter and early spring. For example, on May 27, 1887, lat. 79° 58' N., long. 3° E., "got into a Floe-water; some Narwhals and many floe-seals".

The occurrence is also recorded in my father's log-books, that in the Greenland Sea, in lat. 80°, in May, large numbers of narwhals were often seen going north-east and in the direction of the high latitude in which the observers in the *Fram* saw them. Example, May 28, 1887, lat. 80° N., long. 2° E., "Numbers of Narwhals passed us during the night; all going north-east".

The Greenland whales, with the exception of a few old ones, mostly males, which in some seasons were seen off the Greenland coast in the summer months, deserted the waters between Greenland and Spitsbergen in June (in late seasons, not until July) and were not seen again by the whalers until the following spring. As Scoresby says: "It has often happened that not a single whale has been seen by any individual belonging to the whole Greenland fleet after perhaps the middle of June". They disappeared going north-west, but how far they went in that direction the whalers, being unable to follow them, never knew. Example, July 7, 1876, lat. 78° 40' N., long. 2° W., "Saw a whale . . . ; whale (the last one seen that season) making much headway to north-west".

The Greenland whale appears also to make the Arctic Ocean its usual breeding place; the fully grown whales that Scoresby speaks of seeing in latitude 80°, in the spring, which disappeared by the end of April, might quite well have been pregnant females on their way to produce their young in the Arctic Ocean. As mentioned in my letter on the "Breeding Habits of the Greenland Whale" (NATURE, April 13, 1929), Greenland whales were seldom seen in the Greenland Sea with calves with them, and then usually in the spring, in lat. 79° or 80°, on the confines of the Arctic Ocean. That they did have calves was proved beyond a doubt, as my father says, by the numbers of young whales that were frequently seen.

It seems also worth while pointing out that each of the Greenland whale's haunts communicates with the Arctic Ocean and that they migrate towards it

in the spring: the whales of the Bering Sea going north through the strait of the same name, those of the Greenland Sea north through the strait between Greenland and Spitsbergen, and those of Davis Strait and Baffin Bay west through Lancaster Sound, etc. Lastly, in the Antarctic, where there is no polar ocean to which it can retreat in the summer months, it is absent.

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The Origin of Alphabets.

THE mouth gesture theory of human speech—of which a summary appeared in NATURE of Feb. 23, p. 281—has just received a further extension which may be of anthropological and psychological interest.

The basis of the main theory was:

(1) That man naturally and unconsciously tends to express his ideas in pantomime.

(2) That there is a natural and unconscious sympathy between bodily gesture—more particularly hand gestures—and movements of the mouth and tongue.

In this way, it was suggested, the primitive pantomimic code of human expression became associated with a related code of unconscious mouth gestures which resulted in the production of the various speech sounds, and their use in the form of language.

Let us consider what might be expected to happen when—after a million years or so of speech development—man began to feel the need of a method of recording his speech. It is obvious he could not attempt to record its sounds, and *ex hypothesi* he could not directly record its gestures, for he was unconscious of them. Under these conditions it seems likely that the original sympathy between hand and mouth became once more operative, but in the reverse direction.

Man's mouth, by this time, had established a well-defined code of gestures by which his ideas could be expressed. His hand was now searching for a new form of symbolism by which to record his speech. This symbolism was one of hand gestures, which were made to leave their track on the surface of stone or bark or plastic clay; these were (still unconsciously) inspired by the mouth gestures for which they stood.

Human writing admittedly derives originally from pictographs, that is, hand gestures which outline the form of the object or motion described, but except in the case of the ideographic scripts, such as Chinese, the development of writing has tended to be largely phonetic—either syllabic or alphabetic. In other words, the system has tended to be one of hand gestures which symbolise mouth gestures.

Granting that the words for natural objects would most simply be recorded by outlining the objects themselves, as in pictography, there must have been an early need for a method of recording speech sounds *per se*. I have recently found definite evidence that in Sumerian, and still more in Greco-Roman writing, the symbolism depended largely on the principle of unconscious imitation of mouth gestures.

Thus, in the case of the Greek alphabet:

B represents an outline of the two lips of a head facing to the right; Θ is a front view of a mouth showing the tongue between the teeth; Δ is a view of the tongue raised to the palate, as in articulating the consonant D; Λ is a similar gesture, but made more lightly.

Mr. H. B. Walters, of the British Museum, whom I have consulted on the matter, agrees that nearly all the letters of the Greek alphabet show influence of