be cumulative, being increased in amount by the continued action of the conditions. They would be non-adaptive, their nature depending on the constitution of the reproductive cells and having no functional relation to the original stimulus.

As possible examples of such variation, I may recall those variations referred to by Darwin as 'fluctuating variations which sooner or later become constant through the nature of the organism and of the surrounding conditions, but not through natural selection' ('Origin,' ed. 6, p. 176); to the variations in turkeys and ducks which take place as the result of domestication ('Variation,' 2, p. 250); to those variations which Darwin had in his mind when he wrote the following sentence ('Origin,' p. 72): "There can be little doubt that the tendency to vary in the same manner has often been so strong that all the individuals of the same species have been similarly modified without the aid of selection."

It is, however, as I have said, extremely doubtful if variations of this kind really occur. The appearance of them may be caused by the combination of the two other kinds of variation. In all cases which might be cited in support of their occurrence, there are the following doubtful elements: (1) no clear statement as to whether the variations showed themselves in the individuals first acted upon; (2) no history of the organisms when transported back to the old conditions.

Moreover, a general consideration of the facts of the case renders it improbable that such similar and definite genetic variations should often occur at any rate in sexual reproduction. For although the effect upon the reproductive organs may possibly be almost the same in nearly all the individuals acted upon, it must not be forgotten that the reproductive elements have to combine in the act of conjugation, and that it is the essence of this act to produce products which differ in every case.

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(To be Concluded.)

THE LANGUAGE OF HAWAII.

II.

V.—Special Peculiarities.

Volubility.—The language of Hawaii is extremely voluble. The comparative ease with which the same ideas may be repeatedly expressed in a different form, and apparently as new material, is shown by the following incident which happened during my visit.

Owing to the mixed composition of the Hawaiian legislature, it is necessary to employ continually two languages. All speeches in English are immediately translated into Kanaka, and *vice versa*. On this occasion the interpreter innocently exposed a fundamental characteristic of the native tongue in replying to a member. An Hawaiian had spoken possibly ten minutes since his last words were translated. A friend, anxious that nothing of importance should be lost, asked why the interpreter did not perform his duty and give the English-speaking members the benefit of the words just uttered. The reply was: "He has said nothing fresh yet." The speaker had simply repeated in new phraseology the substance of his previous remarks, and so skillfully was it done that the friend, although somewhat conversant with the tongue, was misled by Kanaka volubility.

Here we have a distinguished feature in Polynesian methods of thought. By its very simplicity, its lack of generic terms, and its flexibility, the Hawaiian tongue is capable of almost endless expression of the simplest ideas. As we trace the growth of the language, influenced by the peculiar environment and temperament of the peo-

ple, the causes of its unique construction become apparent. In illustration of this idea we shall add a few remarkable characteristics of Oceanic speech:

Three Numbers—They have three numbers: the singular, dual and plural. This appeared also in the parent speech of Western tongues, and was preserved in the Aryan, old Bulgarian, and in (Homeric and Attic) Greek; and however strange in English, is but one of the many traces of an early contact in the primitive tongues.

Throughout all Polynesia, and even as far east as the Indian archipelago, we find that peculiar, but very rational, idea which requires the use of a distinguishing word when the person addressed is included or excluded in the statement made. The rule applies both to the dual and plural numbers.

Hele maua means we two went, *excluding* the person spoken to.
Hele kaua means we two went, *including* the person addressed.

Of course, the first expression requires the presence of at least three persons; the second admits the presence of only two.

Hele makou means that we (myself and party) went, but not you.
Hele kakou, we (myself and party) went, and you as well.

Changed Meanings of Words.—It is a fact frequently observed that one nation often takes a word from a foreign language and gives it a debased meaning in its own, much in the same spirit that one religion supplants another and makes the gods of the old one the devils of the new. *Apporter* (to carry) in French is transformed into *apportieren* in German and applied to dogs as a hunting term.

Take the word *manger*. With us it is for horses; in French it means to eat, and applies also to men and women. The word saloon here means a low drinking place; in France it is the parlor. These linguistic compliments are mutual between two of the Latin countries of Europe. The French word to speak (*parler*) is used in Spanish to designate one who talks too much and says little of importance (*parlero*). Reciprocally, the Spanish word to talk (*hablar*) serves a similar purpose across the Pyrenees, and a *Hableur* is one with many words and few thoughts, who goes about telling lies. Each nation, by implication, casts a slur on the other. We all know what it is to take French leave. So do the French—only they call the same thing going off, after the English fashion, *s'en aller à l'anglaise*. We speak of the leprosy being a disease of the Hawaiian islands. The Hawaiians call it *mai pake* (Chinese disease). The same principle was exemplified in Europe in the sixteenth century. The Italians called it French. These, in turn, threw it on the Spanish; and so it went. No country was willing to father it.

These facts are cited by way of contrast with what took place in Hawaii. The tendency here was to give words and ideas absorbed through external intercourse an elevated meaning. Their conception of foreigners was one of superiority. Captain Cook was the personification of their God, and he is still spoken of as *Lono*, one of the four deities of Hawaiian mythology. No human being was ever feared or worshipped as he, and notwithstanding the tragic circumstances of his death, the natives could not entirely relinquish the supernatural idea, nor bring themselves to give up the illusion of a reappearance of their Savior, to which many still cling after long association with the whites.

It so happened that words that came to the natives through the medium of beings believed to be associated with the Gods were taken to represent better things than they originally designated.

Special Descriptive Terms.—The Hawaiian is a child of nature. Nothing can exceed

the vividness with which natural things are portrayed. Almost every conceivable wind has a special name. *Kona* is a wind from the southwest; *hoolua*, a strong north wind; *ea*, the sea breeze at Lahaina; *ulumano*, a violent wind at night on the west side of Hawaii; *mumuku*, a wind blowing between two mountains; *kiu*, a northwest wind at Hana Kaupo; *hau*, a land breeze that blows at night; and so on almost indefinitely. Notice that special terms are given to local winds. Just how the sea breeze at Lahaina differs from that at other places does not appear; nevertheless *ea* applies to this locality and to none other.

Every day of the month has its special name. They count by nights and not by days. *Po akahi* means the first night, *i. e.*, Monday, *po alua*, the second night, or Tuesday, and so on. There are six different words meaning to carry; ten to express the different ways of standing; twenty that apply to various positions of sitting. This shows with what vivid imagery the Hawaiian describes the actions of everyday life. Here are a few examples of shades of meaning for the word carry:

hali,	to carry, in general.
auamo,	to carry on the shoulder with a stick.
ka'i ka'i,	to carry in the hands.
hii,	to carry, as a child in the arms.
koi,	to carry on a stick between two men.
haawi,	to carry on the back, etc., etc., etc.

When the missionaries came to translate the Bible they met an unexpected difficulty. It was necessary to decide between the ages of Mary and Martha, because it is impossible to speak of two sisters in the Hawaiian language without indicating which is the older. I do not know that anything is said in the Scriptures fixing definitely the relative ages of these two persons. The translators were obliged to decide from the context, in the absence of explicit and positive information on the subject.

The childlike and primitive character of the language is shown in the absence of abstract words and general terms, as also in the continual repetition of syllables. The first words pronounced by our own children are a repetition of two of the easiest sounds, pa-pa, ma-ma. The Hawaiians carry this to excess. Take the word *Humu humu nuku nuku apuaa*. This consists largely of repetitions, and is the name of a small fish considerably shorter than its name as ordinarily written. Here is another fish—*Muku muku wahanui*. However, in this case it suits Hawaiian ideas equally well whether you say Muku muku or Kumu kumu. The mere fact of a transposition of syllables is nothing in a language where there are 20 conjugations and where the verb has nearly 3500 forms.

Cadence.—Cadence is one of the prime features in all the South sea dialects. So essential is this considered that the tonic accent must be carried forward when an enclitic is employed. The stress is usually on the penultimate in the word *Lani* (heaven), but with the addition of *la* it falls on *ni*, and we say *ma ka laní-la*. *Ua mokú-la*, already given, is another example.

How much more rhythm is regarded in tropical than in northern languages may be seen by comparing the examples just cited with the Spanish, where they say *déme* for give me and *démelo* for give me it. No matter how many enclitics are employed, the accent is still retained in its original place.

Mathematical Ideas.—Examine their system of counting. The unit is four. This arose from taking cocoanuts and fish—two in each hand. After laying aside ten units of four, or forty they turned back and counted another forty. This process was continued for ten forties, which took the name of *lau*. Ten of these made 4000, or *mano;* and so they went on until 400,000 was reached, beyond which they had no conception. This was the old system. The

missionaries introduced the modern way of going to ten (*umi*) then joining this with names previously used, as—

umikumamakahi, ten with one, for 11,
umikumamalua, ten with two, for 12;

and so on to twenty, which was *iwakalua*. Then the same method was continued, as:

iwakaluakumamakahi, twenty with one, etc.

There is no word in any of the Polynesian languages to express the idea of a definite fraction. Many words exist to indicate a part; but an aliquot part—something that is contained an entire number of times in the whole—was entirely beyond their mathematical powers.

Abundance of Words.—The peculiar character of the Hawaiian language is shown by the great number of words employed as compared with the Aryan tongues. Sometimes the ratio is three to one. We say, "Forgive our debts as we forgive our debtors." Eight words express the idea in English. Twenty-four must be employed in Hawaiian, since it is necessary to say:

E kala mai hoi ia makou i ka makou lawehala ana me makou e kala nei i ka poe i lawehala i ka makou.

A few examples will show how cumbersome in a Polynesian tongue are some of the commonest and simplest terms in English. Take the word *across*. In Hawaiian this is *mai kekahi aoao a i kekahi aoao ae*, making eight words, and no shorter way of rendering the idea exists.

Daily would be expressed by *kela la keia la*, meaning that day, this day; being something akin to the Spanish locution for every other day, *un dia si y otro no*.

Oratory, Religion, and Poetry.—Besides the ordinary language of life, there is a style appropriate to oratory and one to religion and poetry. Any one who has heard the Kahuna chant his incantations can never forget the doleful, plaintive tone which invariably accompanies such service.

The Hawaiians are passionately fond of poetry. They have no rhyme or meter in the modern sense, and no conception of the change of the length of feet, nor the shifting of the accent, which lends such a charm to English versification; but they have a style, highly figurative, appropriate to different classes of poetry.

There are, first, religious chants. Then the Inoas or name songs; these were composed at the birth of kings. Then came the dirges, and finally the Ipos or love songs. Here is an example of a dirge composed at the death of Keeaumoku and cited by Alexander in his history of the Hawaiian people. The translation is by Ellis:

Alas, alas, dead is my chief;
Dead is my lord and my friend;
My friend in the season of famine;
My friend in the time of drought;
My friend in my poverty;
My friend in the rain and the wind;
My friend in the heat and the sun;
My friend in the cold from the mountain;
My friend in the storm;
My friend in the calm;
My friend in the eight seas;
Alas, alas, gone is my friend;
And no more will return.

Imagery.—Notwithstanding the exceedingly primitive nature of the Hawaiian language, it has been successfully employed to express the abstractions of mathematics, and is found flexible enough to deal with law and theology. Of the three classes of words found in all languages, namely, those expressing sensations, images, and abstract ideas, the Polynesian dialects are most copious in the second. The several dozen words already cited, indicating different positions of the body during activity or repose, give abundant evidence of their love of imagery.

Their vocabulary is exceedingly rich in terms relating to the sea, the sky, and the surf; their cloud terms might well rival in exhaustiveness the scientific nomenclature of the modern student of meteorology.

Almost every stick in a native house bears its special name. Each one of the six houses, that every well-to do Hawaiian was supposed to have, before the advent of the whites, had its appropriate use and name.

These were—

1. The *Heiau*, where the idols were kept.
2. The *Mua*, the eating-house for the husband.
3. The *Noa*, or separate house for the wife.
4. The *Hale aina*, or eating-house for the wife.
5. The *Kua*, or the wife's work-house.
6. The *Hale pea*, or the hospital for the wife.

To fully understand these arrangements we must bear in mind that during the reign of the *tabu*, men and women never ate together under any circumstances. The food of the husband could not be cooked in the same oven used by the wife, and pork and many kinds of fish were absolutely prohibited to females; but they could eat dog and fowl.

The custom of applying a term connected with the position of the sun to designate a locality, common in other countries, finds usage in Hawaii. France has her *Midi*, Spain her *Levante* and *Poniente*, and the Kanakas their *Kau*. Kau means summer or warm season, and is used to designate the most southern province of Hawaii. In the first case we have the name of the hottest part of the day given to the territory, and in the latter the name of the hottest part of the year is so utilized.

Seat of Moral Powers—Parallel Italian Expressions.—The Hawaiians supposed that each man had two souls. One died with the body, the other lived on as a ghost, and was known by strange squeaking or whistling sounds (*muki*), like the ghosts which did 'squeak and gibber in the Roman streets.' Polynesian ethics also taught that the seat of the moral powers was in the small intestines. The word *loko*, which means *within*, was applied to the moral state or disposition. This idea was so prominent that large stomachs were cultivated as indicative of great moral strength. The word *papio* was applied to the act of lying face downward with nothing for the belly to rest on for the purpose of enlarging it and thus augmenting the moral powers.

This peculiar thought, after all, is not very far removed from that contained in the Italian expressions, *amico sviscerato*, bosom friend, and *un amore sviscerato*, an intense passionate love—literally a disemboweled love. No doubt the idea came through sources where a belief was held similar to that prevalent in Hawaii. Compare also *Mi ha levato un peso dallo stomaco*, He took a weight off my stomach; likewise the sentence, *Questa nuova vi ferirà nella parte più cara delle vostre viscere.* Besides, there has always been more or less connection, either expressed or implied, between the mind and stomach. It was in the Latin language that the original Greek word στόμα changed its meaning from mouth to belly. After this the step was easy from the organs of digestion to those of sentiment, and we find many examples in the Romance languages of this enlarged meaning of the original word. So the idea finds expression not alone in the South seas, but may be found cropping out all along the road of linguistic development, whether it be in Greece or Polynesia.

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COAL FLORAS OF THE MISSISSIPPI VALLEY.

The plant remains of the Trans-Mississippian coal field have received but scant notice. Something of their character is found recorded in the writings of Lesquereux, Newberry and others. These, however, are the merest glimpses, and give but faint conception of the actual extent and multiplicity of form that the floras of the coal measures present.