

spoken at the Polynesian settlements of Mel and Fil, while Melanesian idioms prevail elsewhere. But from the examples adduced, and especially from such agglutinating forms as *mitāngu*, *mitāma*, *mitāna* = my, your, his, eye (*māta* = eye), it is obvious that the Efatese in question is not an Oceanic (Malayo-Polynesian) dialect at all, but a strictly Melanesian tongue affected by Oceanic influences. The language on which the author mainly relies is consequently useless as a point of comparison between the Semitic and Malayo-Polynesian families.

The actual relation between these two families is again stated to be "that of an ancient to a modern language, as Latin to French, Saxon to English. This implies that we shall find the Oceanic, as compared with the Semitic, characterised by phonetic and grammatical decay, &c." Doubtless there is in Oceanic, as in all linguistic groups, abundant evidence of decay. But, as compared with the Semitic, it must be regarded not as a modern, but as an almost infantile, form of speech. Semitic stands in some respects on a level with, if not even on a higher footing than, Aryan itself, as regards its grammatical evolution, whereas in Malayo-Polynesian the verb is not yet clearly differentiated from the noun. Thus even in Samoan most of the so-called verbs are merely nouns modified by detached relational particles, and, like the adjectives, forming reduplicate plurals. Compare *nofo* = to sit, pl. *nonofo*, with *tele* = great, pl. *tetele*. This instance alone will satisfy the ordinary linguistic student of the prodigious gulf that separates the Oceanic from the Semitic with its highly complicated system of verbal conjugation.

And how does the writer propose to bridge over this gulf? Mainly by a string of words taken without method from any given Oceanic language, and compared with any member of the Semitic group to which it may happen to bear some faint resemblance in sound if not in sense. No attempt is of course made to establish some general preliminary system of "lautverschiebung," without which all such comparisons are absolutely destitute of any scientific value. They resolve themselves mainly into onomatopœic forms, the common property of all articulate speech, or into some of those numerous etymological curiosities which can always be found by the diligent seeker, but which are such terrible pitfalls for the unwary.

Most of the Hebrew terms themselves are moreover taken either in secondary and later forms, or else in secondary and later meanings, forms and meanings which are consequently useless for the purpose of comparison between the *organic* Semitic and Oceanic languages. Thus the Efate *mitaku* = to fear, is compared with the Hebrew *dag*. But this *dag*, or rather *dāag* (דָּאָג), Jer. xvii. 8), is a comparatively modern form of an older *dāab* (דָּאָב), which primarily means *to melt*, and which neither in sense nor sound shows any further resemblance with the Melanesian *mitaku*. This is only one instance from among many. The further back these supposed parallels are traced, the more divergent become the lines, until at last they fade away into parabolic curves, and leave the gulf between these linguistic systems more impassable than ever.

Mr. Macdonald does not expressly mention the "lost tribes." But it is on these flimsy grounds that, in a slightly incoherent concluding sentence, he claims to have rediscovered in the South Seas a lost Semitic people, "their language full-orbed and in all its living vigour"!

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AMERICAN WHEAT¹

THIS is a pamphlet issued by the Chemical Division of the Department of Agriculture, U.S., and is further specified as *Bulletin* No. 1. It may be described

¹ "An Investigation of the Composition of American Wheat and Corn." By Clifford Richardson, Assistant Chemist. (Washington Printing Office, 1883.)

as an elaborate monograph upon the composition of American wheat, and the subject is handled with great thoroughness, although the value of the result obtained falls considerably short of being startling. It is a specimen of painstaking analytical work which may form the basis for generalisations of value in the hands of able agriculturists and statisticians.

The variation in the composition of the wheat grain itself as affected by climate is rendered evident, and a comparison is instituted between the composition of European, American, Egyptian, and Australian wheats. The author in the first place produces elaborate tables of analysis, showing the composition of numerous varieties of wheat. Secondly, he considers the composition of the typical or average wheat of each of the American States. Lastly, he compares American wheats with those produced in other quarters of the globe. Among this mass of analyses it is difficult to arrive at conclusions, and there is some danger of falling into error. Mr. Clifford Richardson finds that American wheats are drier than European wheats in the proportion of 10.27 to 14 per cent. of moisture. The percentage of dry matter is consequently much higher, and the grain is proportionately more valuable. The carbohydrates average 72 per cent. instead of 68 per cent. as in the case of English wheat for example. The amount of fibre is also less in American wheats. The ash constituents are most abundant in wheat from newly cultivated tracts, and on old worn out lands both the ash constituents and nitrogen are considered to have diminished.

American wheat is, however, deficient in albuminoids to a degree which appears to disconcert Mr. Richardson more than we think it need. In American wheat we evidently have a small grain, specially free from fibre (bran), peculiarly dry, very rich in carbohydrates and oil, but deficient in albuminoids. European wheats sometimes contain 19.5 per cent. of albuminoids, and ordinarily 13 per cent. American wheats contain upon an average 11.95 per cent. of albuminoids, but in Oregon and on the Pacific coasts only 8.6 per cent. Mr. Richardson seems to overrate the importance of this fact. He appears to be in doubt as to the true importance of the albuminoids when he says, "The albuminoids are regarded, and probably rightly, as the most valuable part of the grain." He might, however, have been led by his investigations to doubt how far a high percentage of albuminoids is the best indication of quality in wheat. First, Australian and Egyptian wheats are both somewhat deficient in albuminoids, and are yet known to be remarkably fine. He also notices that while Oregon and Californian wheats contain comparatively low amounts of albuminoids, the grains are large and handsome. He further points out that the proportion of albuminoids in spring wheats is higher than in winter wheats, although he fails to notice that all wheat-growers know that winter wheat is better than spring wheat. Having concluded that American wheat is at fault in this particular, he endeavours to explain why such is the case with a view to remedying the defect. So far from being a fault, the richness of American wheats in starch, and the comparatively smaller proportion of gluten, appears to us as indicative of its high quality. "Tail" corn contains more gluten than "head" corn, and badly matured grains are usually rich in this important constituent. A little consideration as to the constitution of a grain of wheat will show that the gluten is not the best criterion of value. The outside layers of the grain contain the gluten, and then honeycomb cells inclose the starchy interior. This outer portion of the kernel is the first to ripen while growth still continues along the axis and in the centre. The fully matured grain, in fact, becomes like a well-packed trunk, thoroughly stuffed out, and this with starch grains. If we are correct in this view of the maturing of the grain, the percentage of gluten must diminish in proportion as starch is

deposited, and increases in relative weight. We are disposed to think that the carbohydrates, and not the albuminoids, must be taken as the true criterion of quality in wheats, and that, judged by this test, the Americans have no need to fear that their wheats are inferior to those of Europe.

The author finds a difficulty (p. 33) in accounting for the small proportion of water in American wheats. Any agriculturist would have been able to tell him that well-developed, thoroughly matured, and well-harvested wheat always contains a less proportion of moisture than wheat in an opposite condition. It is due partly to simple drying, but also to the fact that good wheat is thoroughly filled up with starch cells (carbohydrates), and that there are no fissures left for moisture or air to lurk in. Well-fed meat contains less water than badly-fed meat for the same reason, viz. the thorough filling up of the internal spaces with fat cells. A little attention to the structure of the wheat grain would have enhanced the value of Mr. Richardson's monograph.

The fact that unripened and badly matured wheat is often rich in gluten is well known to chemists, and we are disposed to think that the richness of European wheat in this constituent is partly due to the fact that it is often defectively matured.

After treating exhaustively upon the composition of American wheat, the author proceeds to treat of flour and bread, and lastly of other cereals and maize. The pamphlet certainly repays the trouble of perusal, and indicates the vast pains which is now being taken by the United States Government in order to bring scientific knowledge to bear upon its most important industry. The wheat production of each State is watched with minute care, and the quality of the produce is subjected to analysis. It is gratifying to notice that Canadian wheat is in all respects equal to that grown in the United States.

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THE REMARKABLE SUNSETS

SINCE our last number appeared the view that the recent wonderful sunrise and sunset phenomena have really been due to the terrible eruption of Krakatoa in August last has been confirmed in the most definite manner. Material brought down by rain in Holland and snow in Spain has on microscopic examination proved to be identical with actual products of the eruption brought from Krakatoa in the ordinary manner.

The following letter to the *Times* from Mr. Joseph McPherson, an eminent geologist now in Madrid, must be read in connection with the letter from Holland given below:—"Desirous of obtaining positive proof of the brilliant theory put forth in your columns relative to the cause of the remarkable appearances at sunrise and sunset which have for many days excited public attention, I have this day analysed some fresh-fallen snow with the following results, namely, that I have found crystals of hypersthene, pyroxine, magnetic iron, and volcanic glass, all of which have been found in the analysis lately made at Paris of the volcanic ashes from the eruption of Java."

This being so, every fact connected with the displays instead of losing really gains an additional interest, and now that we know we are in presence of the work of the upper currents each date becomes of great importance.

The extraordinary fact now comes out that before even the lower currents had time to carry the volcanic products to a region so near the eruption as India an upper current from the east had taken them in a straight line *via* the Seychelles, Cape Coast Castle, Trinidad, and Panama to Honolulu, in fact very nearly back again to the Straits of Sunda! The 5th of September is now fixed from two sources as the date of the first appearance of the strange phenomena at Honolulu.

Mr. Bishop thus writes to the *Saturday Press* (published at Honolulu, September 22), which has been forwarded to us by the courtesy of the Hawaiian Consul at Glasgow:—

"I first noticed these peculiar appearances on Wednesday the 5th inst. at 7 p.m., so long after sunset that ordinarily no trace of colour remains on the western sky. The sky, from south-west to west, was then covered with a lurid red and dull yellow glow, much resembling that produced by a distant conflagration. This extended to an altitude of 15° or 20°. I continued to distinguish the light till 7.25."

He then proceeds:—

"I would note three peculiarities of the phenomenon, distinguishing it from ordinary sunset reflections, and unlike anything I remember to have observed before: (1) It appears to be a reflection from no cloud or stratum of vapour whatever. (2) The peculiar lurid glow as of a distant conflagration, totally unlike our common sunsets. (3) The very late hour to which the light was observable—long past the usual hour of total cessation of twilight. To this may be added (4) that the centre of brilliancy was more or less to the south of west."

Mr. Bishop at once ascribed the phenomena to Krakatoa dust, and suggested more vivid appearances along the line Honolulu, Ladrones, Manila, Sunda. Of course he knew nothing of the line Panama, Trinidad, Cape Coast Castle, Seychelles, Sunda.

In a subsequent communication Mr. Bishop tells us that the after-glow remained brilliant for some time, being very brilliant on September 30. The haze stratum was visible as a continuous sheet at a height far above that of the highest cirrus, a slight wavy ripple being noticeable in its structure, always perfectly transparent and invisible except under certain conditions. A conspicuous circle of 15° to 20° radius was observed during several days, "a misty, rippled surface of haze, with faint crimson hue, which at the edges of the circle gave a purplish tint against the blue sky."

He states that Capt. Penhallow, of the *Hope*, observed these phenomena in lat. 24° N., 140° 29' W., on September 18.

The following notes as to the eruption itself we take from the *Straits Times*, as dates and times are mentioned:—

"In the afternoon of Sunday, August 26, a rumbling sound was generally heard at Batavia, coming from the west, like that of far distant thunder varied by strong detonations, the concussion from which shook and rattled doors and windows on all sides . . . especially when on the night between August 26 and 27 these phenomena steadily became more violent until 1 a.m., when a detonation was experienced which brought about such a concussion that the gaslights here were all as it were extinguished at the same moment. Many persons, anxious for their wives and families and for life and limb, hence forbore to sleep and awaited the morning in great excitement. Morning broke, but the sun, instead of shining with that clear brightness which characterises the morning hours in the East, concealed itself, and the whole sky seemed overcast. At 7 a.m. on that day, August 27, the first shower of ashes was noticed here, from which it was inferred that whatever might be the volcano at work in the neighbourhood, the outburst must assuredly be appalling when ashes in showers could be noticed even in distant Batavia. The ash showers fell heavier, and before the hour of midday had struck the whole of Batavia was enveloped in thick darkness. From the lack of sunlight the temperature fell several degrees. People shivered with cold, their discomfort being heightened by anxiety, especially when lamplight had to be used at midday. Like a mountain a great sea wave came rushing on along the whole coast of West Java, forced its way into the rivers, thus causing them instantly to rise several yards and overflow their