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NOTE ON THE EDIBLE EARTH FROM FIJI.

By the Hon. B. G. CORNEY, M.D., Professor DAVID, B.A., F.G.S.,
and F. B. GUTHRIE, F.C.S.

[*Read before the Royal Society of N. S. Wales, December 6, 1899.*]

THE sample of edible earth, which forms the subject of this note was collected by one of us (Dr. Corney), by whom it was presented to Professor T. P. Anderson Stuart, who in turn presented it to the Geological Department of the University of Sydney.

The earth occurs in several localities in the Fiji Islands. The specimen examined was collected near the northern coast of the large island called Vanua Levu, where the rocks are igneous. The natives, that is the women, eat small portions of it at times, and assert that it has some salutary influence over the later stages of pregnancy. It seems not unlikely that it may relieve some of the disagreeable or painful sensations incidental to that condition; and the practice may have arisen in consequence. The natives have no specific name for this earth, calling it merely *Qele kana*, which means 'edible earth.'

At Tavuki, on the north side of the island of Kadavu, it is met with in the solid, and the people cut it into brick-shaped blocks with which they face up the raised foundation mounds upon which their dwellings are constructed. The women there also eat it in small quantities.

At Naitasiri, on the bank of the Rewa river, the Indian coolies who work on the sugar plantations recently quarried out some three quarters of a ton of the earth, which by degrees they ate. In their case it was noticed that those who were afflicted with the small intestinal nematode called *Anchylostomum duodenale* were almost always geophagists; but it is uncertain whether the discomforts arising out of the presence of this worm in the intestine give origin to a craving which the ingestion of the earth seems to partially satisfy, or whether the habit of earth-eating occurs first and is the means of introducing the ova of the parasite. Moist earth is understood to be the principal habitat of these ova during the extra-corporeal stage of their life-history, and therefore the latter supposition has received, perhaps, the most support.

The material consists of a very soft, pale pink, clayey material, with small white patches of similar substance and occasional lumps of grey to reddish chalcedony. Its hardness is less than 1 on Moh's scale. The matrix is extremely fine-grained for the most part, but here and there are lumps of angular chalcedony up to $1\frac{1}{2}$ " in diameter. Angular and rounded pyramidal quartz crystals are also fairly numerous, and attain a diameter of from $\frac{1}{8}$ " to $\frac{1}{6}$ ". There are also present numerous small and very perfect octahedral crystals of magnetite. Mr. W. G. Woolnough, B.Sc., has estimated the amount of quartz and magnetite crystals present, and has found 5 per cent. quartz crystals and 0.5 per cent. magnetite.

The rock has suffered so much from decomposition that it is difficult to obtain definite evidence as to whether it represents a decomposed volcanic tuff or a decomposed lava. On the whole it is probable that it represents a decomposed tuff of the nature perhaps of a quartz andesite (dacite). It is even possible that the lava may have been sufficiently acid to justify its being classed as a rhyolite. Mr. E. C. Andrews, B.A., has already described both rhyolites and andesites from Fiji.

On the whole, in view of the abundance of magnetite crystals, it is more probable that the rock was originally a dacite. It was probably of tuffaceous origin, and though now, as the subjoined

analysis shows, practically a kaolinite, was probably originally a dacite tuff.

Moisture at 120° C...	...	...	...	2.45
Combined water	...	...	...	12.78
Silica	...	...	...	41.53
Alumina	...	...	...	35.09
Oxide of Iron, (Fe ₂ O ₃)	...	...	...	7.66
				<hr/>
				99.51

The earth in question is very soft, of a pinkish colour, with redder patches of ferric oxide distributed irregularly throughout. The oxide of iron can be dissolved out with hydrochloric acid. The colour is unaltered on ignition. Moistened with water, the earth has the greasy feel and peculiar odour of moistened clay or kaolin. For analysis the sample was reduced to fine powder with very gentle pressure and separated from the harder quartz particles by means of a very fine sieve. Lime and magnesia are absent; alkalis were not determined. The silica, alumina and combined water are present in approximately the proportions required by the formula $\text{Al}_2\text{O}_3(\text{SiO}_2)_2(\text{H}_2\text{O})_2$; the percentage composition of which would be—

Silica	=	46.51
Alumina	=	39.54
Water	=	13.95
		<hr/>
		100.00

The amount of silica found in the edible earth, if combined in these proportions with the alumina and water, would require 35.30 per cent. alumina and 12.46 combined water, quantities which are very close to those obtained by analysis.

Assuming the material to be $\text{Al}_2\text{O}_3(\text{SiO}_2)_2(\text{H}_2\text{O})_2$ containing 7.66 per cent. ferric oxide and 2.45 per cent. moisture its composition would be:—

		Calculated.		Found.
Moisture at 120° C...	...	= 2.45	...	2.45
Combined water	...	= 12.54	...	12.78
Silica...	...	= 41.81	...	41.53
Alumina	...	= 35.54	...	35.09
Oxide of iron (Fe ₂ O ₃)	...	= 7.66	...	7.66
		<hr/>		<hr/>
		100.00		99.51

The substance appears therefore, to be a silicate of the composition $\text{Al}_2\text{O}_3(\text{SiO}_2)_2(\text{H}_2\text{O})_2$ —kaolinite—with about 7.6 per cent. uncombined ferric oxide as mechanical impurity.

It may be of interest to note in connexion with Dr. Corney's remarks (in the earlier part of the paper) as to the prevalence of intestinal worms amongst clay-eaters, that the same thing is frequently observed amongst cattle, more especially in the dry part of New South Wales. Samples of clayey earth from what are called "lick-holes" are frequently sent to the N. S. Wales Department of Agriculture for examination. The earth in these places is used as a lick by cattle, and it is stated that the cattle suffer from worms. Nothing unusual has been found in these licks except that they are generally fairly rich in saline matter, and the conclusion arrived at is that the cattle relish them on this account alone, and that the presence of worms is due to their poor condition and want of nourishment. The cases are certainly not quite parallel.



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