The book is abundantly provided with indexes (over thirty pages). In many cases the French spelling of geographical names is rather disconcerting to English readers, who may find a difficulty in running down familiar names in this guise. And finally, it may be asked, why will French publishers insist on putting the table of contents at the end of the volume instead of at the beginning, which is surely its natural place ?

The authorities concerned are greatly to be congratulated on the production of this invaluable work.

CORRESPONDENCE.

LATERITE.

SIR,—I have seen the correspondence in your Magazine, Vol. LXX, by H. B. Maufe (p. 144, March, 1933), J. B. Scrivenor (p. 191, April, 1933), and P. Lake (p. 240, May, 1933) on the subject of Buchanan's Laterite.

It may therefore interest you to know that Dr. L. L. Fermor, Director of the Geological Survey of India, has instructed me to visit the places which Buchanan mentions in his travels of 1800–1.

I will make this investigation in November and endeavour to clear up the whole question so as to give those geologists who are familiar with the Malay Peninsula and elsewhere data for correct judgment.

CYRIL S. FOX.

THE ELEVATION OF THE MARQUESAS ISLANDS.

SIR,—Will you kindly allow me space to correct an error that has found its way into my paper on the "Geology of the Marquesas Islands" (Bernice P. Bishop Mus., *Bull.* 68). On page 20 I described as limestone an outcrop of white rock at an altitude of 1,300 feet on the island of Nukahiva. I did not myself visit the outcrop, but it was described to me by Lieut.-Col. H. J. Kelsall, a member of the scientific staff of the "St. George" Expedition, who passed by it. Colonel Kelsall did not collect a specimen, as he had previously brought me many samples of white materials only to have them rejected as decomposition products of lava. Later, however, he brought me a specimen, purporting to come from the outcrop, given to him by a resident of many years' standing, Père Siméon Delmas. Immediately on receiving this I tested it with acid, when it effervesced freely, and on my return home I found it to be a fine-grained foraminiferal limestone, exactly resembling chalk.

Recently I heard from Mr. A. M. Adamson, of the Pacific Entomological Survey, that he too had noticed the white rock and had received a specimen of it from Père Siméon, as well as others collected

from the outcrop by Mr Robert MacKittrick. These had been examined by Professor Howel Williams, who found all to be decomposition products of some volcanic rock.

As the matter had a bearing on the question of the uplift of Nukahiva, I wrote to Père Siméon, who very kindly sent me further specimens. These are all a decomposition product of a lava, without any trace of calcareous material. Père Siméon very generously accepts the responsibility for having sent me a wrongly-labelled specimen, but is unable to explain its origin. It would appear, therefore, that there is no evidence of the presence of any uplifted limestone on Nukahiva.

Since beginning this letter I have received a copy of Professor Howel Williams's " Geology of Tahiti, Moorea, and Maiao " (Bernice P. Bishop Mus., *Bull.* 105). As regards Maiao, which both Professor Williams and I have visited and described, we are in almost complete agreement. Professor Williams, however, discusses the evidences of elevation and subsidence in the Marquesas Islands and especially criticizes my view that some of them have been uplifted to the extent of 2,000 or 3,000 feet. He has not actually visited this group, but he is not the first to publish views on the geological history of Pacific islands without seeing them. My own conscience is not quite clear in this matter, but I *have* visited the Marquesas Islands. A perusal of my paper will show that I depended for evidence of uplift, primarily, not on the " limestone " of Nukahiva nor on the scattered molluscan shells on the higher ground, which may indeed have been carried up by natives, but on the presence of high plateaux on some of the islands. The plateau at Nukahiva was described to me by officers of the *Service Topographique*, who were carrying out a topographic survey of the island, as a peneplain at 800 metres. I never set foot on it, but from a ridge which rises almost to the same height in the south-western part of the island I observed the even, horizontal skyline, which differs markedly from the castellated skyline characteristic of so many Pacific islands. I worked for several days on the southern plateau of Hivaoa, and if Professor Williams could see it I have no doubt that his conclusion would be the same as mine. The interfluves are all bevelled at exactly the same height, and all have broad and remarkably level summits. From the western edge of the plateau, 1,300 feet above Taa-hu-ku, one can look eastward for eight or nine miles, one's line of sight just skimming the surface of the flat tops of the interfluves all the way. From its southern margin the plateau slopes gently upwards with an even gradient to a height of 1,600 feet at the foot of the central ridge, which rises sharply some hundreds of feet higher. Such a level surface could only have been formed either just above, or more probably just below, sea-level. It is a very remarkable feature, and any topographic map that fails to show it is inaccurate. The occurrence, reported by Professor Williams, of an undoubted marine deposit at a height of 250 feet above sea-level on the island of Tahuata

is certainly in no way opposed to my view, nor does it limit the amount of uplift to this figure. It is interesting, as previously little definite evidence of uplift had been found on this island.

Professor Williams agrees with me that there has been extensive faulting, leading to the disappearance of parts of some of the islands. This involves either a downthrow of at least 2,000 or 3,000 feet on one side of a fault, or an upthrow of similar amount on the other side. The latter alternative seems to explain all the known facts. That such faulting has taken place does not support Professor Williams's conclusion that the area is a relatively stable one.

Professor Williams questions too my method of estimating the amount of the submergence suffered by the Marquesas Islands at a later stage in their history. I assumed that originally the valleys were " V "-shaped, and the slopes of their sides were the same as they are now; then, the width of an embayment being known, a simple calculation will give its rock-bottom depth. The first assumption is completely justifiable, as, except where they have been partially filled in with deltaic deposits since submergence, the valleys are still " V "-shaped and the drainage cannot have been more mature before submergence than it is now. Steepening of the valley sides since submergence is unlikely, as the tendency of subaerial erosion will have been to lower their gradients. The embayments may have been slightly widened by marine erosion, but as far as possible I allowed for this in my calculations.

I reckoned the amount of submergence of Hivaoa at 600 feet, and this is more likely to be an under- than an over-estimate. The post-glacial rise in sea-level can account for only a part of it.

L. J. Chubb.

University College,
London.
10th October, 1933.

BRECCIAS IN THE WARWICKSHIRE COALFIELD

Sir,—In a paper recently published in this Magazine,[1] the author makes a brief reference to a publication [2] of mine which may give, unintentionally, a misleading impression of some of the conclusions come to in the course of my work among the Red Rocks of the Midlands. He says (p. 474) that I stated " that the unconformity below the (Clent) breccia is greater in magnitude than that between it and the Bunter ". What I said was that the break between the Clent breccias and the overlying Bunter in the Birmingham area is generally not so pronounced as that at their base. I was dealing specially in that paper with the lithological evidence, and did not mean that the unconformity at the base of the Bunter in the Midlands

[1] F. W. Shotton, " New Evidence on the Origin of Breccias and Conglomerates in the Warwickshire Coalfield," Geol. Mag., October, 1933.

[2] W. S. Boulton, " The Rocks between the Carboniferous and the Trias in the Birmingham district," *Quart. Journ. Geol. Soc.*, lxxxix, 1933.