Living entirely among the natives for many months, and speaking their language, the author was able to test the power claimed by the natives of being able to predict the outbursts of the geysers. He is convinced that by constant observations on the direction of the wind and the condition of the atmosphere, the natives have learnt to prognosticate the movements in all these hot springs with wonderful accuracy. He was also able to prove that during the whole time of his residence in the district certain of the geysers were only in eruption when the wind blew from a particular quarter.

IV.—ON AN ACCURATE AND RAPID METHOD OF ESTIMATING THE SILICA IN AN IGNEOUS ROCK. By J. H. PLAYER, F.G.S., F.C.S.

THIS paper describes a method of estimating the silica in igneous rocks by

1. Fusing the finely ground rock with a flux prepared by mixing carbonates of potash and soda and nitrate of potash.
2. Disintegrating the glass so obtained by the action of strong nitric acid.
3. Driving off nitric acid at a temperature just below 250°, thus rendering all silica insoluble.
4. Treating with hydrochloric acid, to leave the silica with some impurity, for weighing after calcination.
5. Separating the impurity by means of ammonium fluoride and weighing it.

REVIEWS.

OBSERVATIONS SUR LES GROUPES SÉDIMENTAIRES LES PLUS ANCIENS DU NORD-OUEST DE LA FRANCE. Par M. HÉBERT. (Extrait des Comptes rendus des Séances de l'Académie des Sciences, tom. ciii., Séance du 26 Juillet, 1886.)

IN this memoir, Professor Hébert submits to the Academy a view of the Geology of North-Western France which differs in some points from previous interpretations. Brittany and Western Normandy present difficulties such as have perplexed British geologists in many of the tracts occupied by the older rocks. French writers are agreed that in North-Western France there are (omitting the true crystalline schists) (1) a granite, (2) a great formation of phyllite, and (3) a series of purple conglomerates and (?) shales (*schistes*). The last-named group is overlain by the *Grès Armoricaïn*, and over this sandstone come shales and slates, with *Acidaspis Buchii*, and more than one species of *Placoparia*. These *Placoparia* beds, with the same *Acidaspis*, occur in our Salopian area, not far above the grits of the Stiper Stones; so that the *Grès Armoricaïn* may be safely regarded as Arenig. But below this horizon, the interpreters of Brittany geology find the materials for widely diverging opinions. The theory of M. Hébert may be thus summarized.

The oldest of the three rock-masses is the granite. It furnishes numerous rolled blocks to a conglomerate in the phyllite series, and it never penetrates the adjoining strata in veins. At its junction with the phyllite, the granite is in the state of sand, and the phyllite also is

decomposed. The stratified rocks of the district are indeed penetrated by veins; but these consist of "*granulite*" (not granite), and they ramify through both granite and sedimentaries alike; in the former they are called pegmatite, in the latter granulite proper. They behave like true eruptive rocks, and are welded to the walls of the adjacent phyllite, which they harden and modify at the contact.

The phyllite is next in age, but is older than the purple series. M. Hébert submits twofold evidence for this contention. (1) The purple series includes beds of rounded fragments of a quartz which is identical with certain quartz-veins in the phyllite. One of these varieties, a black quartz, is at Coutances quarried in the phyllite, and is found not far off in the conglomerate of the purple group. (2) While the phyllite usually dips at high angles, or is tilted to the vertical, the purple series lies at much lower dips, and these relations are sometimes seen where the two groups are in contact. M. Hébert concludes that the phyllites are Archæan; but he would confine the term to this formation, which he regards as the oldest sedimentary group, "*le premier terrain.*" The granite and the crystalline schists are thus left unclassified. The phyllite is regarded by M. Hébert as the equivalent of the less crystalline of the Pre-Cambrian rocks of Anglesey, and of the beds which, according to Prof. Green, underlie the Cambrian conglomerates of Llanberis.

The purple conglomerates and (?) shales, separated by a marked discordance from the phyllite series, are placed in the Cambrian.

It would be rash for a stranger to the district to express an opinion on a question of such evident difficulty as the one before us. M. Ch. Barrois, writing only last year (1885), is at variance with M. Hébert on the main points discussed, and he will doubtless take up the cudgels which he can wield so well. The issue, whatever it be, should have an important bearing on the geology of the Channel Islands, recently brought to our notice by the Rev. Edwin Hill, and it may tend to smoothe, or the reverse, the troubled waters of the Archæan controversy.

It would aid our future studies in this direction if a precise meaning were attached to certain terms used in M. Hébert's paper, especially to the words "*phyllites*" (*les phyllades*), "*schist*," and "*grauwacke*."

CH. CALLAWAY.

REPORTS AND PROCEEDINGS.

I.—November 17, 1886.—Prof. J. W. Judd, F.R.S., President, in the Chair.—The following communications were read:—

1. A letter from the Lieutenant-Governor of the Falkland Islands, communicated by H.M. Secretary of State for the Colonies:—

"Government House, Stanley, Falkland Islands,
3rd June, 1886.

"MY LORD,—I regret to have to report that a slip of the peat-bog at the back of the town of Stanley, similar to that which occurred in November, 1878,¹ but about two hundred yards to the

¹ See Quart. Journ. Geol. Soc. vol. xxxv. Proc. p. 96.