the extent of the injury that would be inflicted on the objects of such observations by a temporary interruption of the same. A large number of the problems presented by the physics of our globe can only be attacked with any hope of success from this basis; it is essential to have a number of well supervised principal stations in each country supplying an uninterrupted homogeneous series of observations. These stations are also of service in the study of climatological history, and are destined to prove of great importance in the study of meteorology in the future.

Only in a limited sense can we agree with Prof. Schuster's dictum that before commencing to observe we should make sure that our observations will prove of service, and will give answer to a definite question. Not even in the case of observatories do such instructions hold good. When addressed to private observers we would characterise them as "blinkers" which limit the range of vision to definitely laid down lines. We quote one example: when Schwabe began his sun-spot record, it must have appeared to specialists as a mere hobby, devoid of all scientific object; had it been otherwise astronomers would undoubtedly have commenced such observations earlier. And what scientific value have these observations now attained to?

LEAD IN PEATY WATER.[1]

THE report under notice is a statement of the results obtained from an examination of the water supplies and their gathering grounds and storage reservoirs in twenty-three more or less peaty collecting areas in Yorkshire and Lancashire. The object of the examination was to indicate the origin of the plumbo-solvent nature of these waters, and the best methods of preventing or counteracting this action before the water was distributed to consumers. Dr. Houston concurs with Mr. Ackroyd and with other chemists who have studied the subject in these districts in attributing the power of dissolving lead in dangerous quantity to the presence in these waters of acids derived from the peat; and he further intimates his belief that the acid is produced from the peat by the action of certain bacteria found in the peat itself. He finds that the acid nature of the water is frequently not indicated by litmus paper or by other ordinary means, but that it is easily ascertained by the change in colour produced in an alcoholic solution of lacmoid.

The "erosive" action which is exerted on dull lead by dissolved oxygen is considered to be of relatively slight importance, since, in the absence of peaty acids, the amount of solvent action due to this cause is comparatively slight. The peaty acids apparently produce soluble salts of lead and cause the water to bring a much larger proportion of lead into solution than could be introduced by the formation and solution of the oxide alone. Peat is invariably acid in reaction, and peaty water is also always acid. That the solution of the lead by moorland water is due to the peaty acids which it contains has been proved by direct experiment. Further, a decrease of plumbo-solvent power is noticed when these acids are reduced in quantity by various natural causes, or by artificial neutralisation. Indeed, the methods of counteracting plumbo-solvency in peaty water which are adopted in the moorland districts consist in neutralising the acids in the water with carbonate of soda, with carbonate of lime, or with slaked lime. In this connection, it should be remembered that the quantity of slaked lime used must be carefully adjusted, since when it is present unaltered in solution in the water it promotes and does not diminish the plumbo-solvent power.

The variation in degree of solvent action shown by the same moorland supply at different times is shown to be connected with the varying proportions of acid peaty water and of neutralising spring water which the supply contains. In dry weather, the neutral and neutralising water predominates, while rainy weather tends to increase the proportion of superficial acid water which comes out of the peat; these variations in composition markedly influence the plumbo-solvent power of the water.

The author appears to have confined his attention to the amounts of lead in solution in the water, and, undoubtedly, these are the common sources of danger. But a not inconsiderable amount of lead may be removed from the metal, and exist at first in solution as hydroxide, and subsequently as a deposit of hydroxycarbonate, when pure soft water acts on lead in the presence of the atmosphere; in water supplies this action is often considerably restricted by the presence of carbonic acid in solution in considerable proportion, or by the presence of silica, sulphate or carbonate in small amount.

The vast amount of detailed information contained in the report is worthy of serious consideration by those who have to deal with the supply of soft peaty water, as is also the recommendation that the seasonal plumbo-solvent power of the different sources from which any particular supply is derived should be accurately known; arrangements can then be made either to avoid the collection of portions of the supply at the times when they possess a dangerous solvent power on lead, or to neutralise them by satisfactory treatment before they are distributed to consumers. F. C.

[1] Thirtieth Annual Report of the Local Government Board, 1900–1901. Supplement "On Lead Poisoning and Water Supplies." By Dr. Houston. Pp. xi + 224.

PROGRESS OF THE NEW VEGETATION OF KRAKATAO.

IT is within a few months of twenty years since the great eruption took place which absolutely killed all life in the island of Krakatão. About three years later, Dr. Treub visited the island and examined the beginnings of a new vegetation, the results of which were recorded in 1888 (NATURE, vol. xxxviii. p 344). He found that the first vegetable settlers on the covering of pumice-stone, lava and ash were microscopic algæ belonging to the Cyanophyceæ. These organisms covered the surface with a slimy layer, which acted as a decomposing agent and created a suitable substratum for ferns, of which about a dozen species were already abundant in 1886. Dr. Treub also observed a few individuals of fifteen species of flowering plants, most of which had sprung from drift-seeds.

In the spring of 1897, a party of botanists visited the island, and Dr. O. Penzig has published the results of their investigations and observations (*Annales du Jardin Botanique de Buitenzorg*, 2me série, iii. (1902), pp. 92–113, with seven views), from which we learn that sixty-two species of vascular plants were observed on Krakatão and the neighbouring islets, Lang and Verlaten. Fifty of these colonists are flowering plants, representing twenty-one natural orders, and it seems highly probable that they all reached the islands independently of man. Classifying these fifty-three species according to the assumed means by which their seeds were conveyed to the islands, 7·54 per cent. were possibly carried by birds, 32·07 per cent. were probably wind-borne and 60·39 per cent. were almost certainly cast up by the waves of the sea. No additional species of fern appears to have established itself in the islands between 1886 and 1897. This is inexplicable, because the region is rich in ferns, the spores of which, one would suppose, would be brought by winds in abundance. Apart from ferns, the probable "aeolophilous" element consists of eight Compositæ, six grasses and four orchids. After passing the strand belt of vegetation, which is by far the most numerous in species, dense thickets of Phragmites, Saccharum and Gymnothrix were encountered. The interior and higher part of Krakatão is still much less covered with vegetation, ferns largely preponderating. Conspicuous and relatively common amongst the flowering plants was *Spathiglottis plicata*, a terrestrial orchid. The other orchids are *Vanda Sulingi*, *Arundina speciosa* and a species of Phajus. Krakatão is about twenty miles distant from both Java and Sumatra, and the most interesting question suggested by the new vegetation is, How far does it afford a solution of the problem of the origin of the vegetation of much more remote islands which have more than a littoral or coral island flora?

W. BOTTING HEMSLEY.

ANTHROPOLOGICAL NOTES.

THE strange cranial deformation known as trigonocephaly, in which the forehead is constricted and more or less pointed, and the temporal region and the base of the skull are broadened, is the subject of a research by Dr. M. Hanotte in *l'Anthropologie* (tome xiii. No. 5, p. 587).

The weight of the human brain is the subject of a detailed