

composition of all kinds of matter, the great chemists of the period were of necessity analysts, and the analytical branch of chemistry stood in high repute. Latterly there has been some neglect, and less fundamental knowledge of analysis has been demanded of chemists. This is partly due to the great development of organic chemistry and physical chemistry, which have held out better promise of new discoveries. The lecturer contends, however, that the field of research in analytical chemistry is by no means an exhausted one. He instances, in support of his opinion, the possibility of finding uses for the rarer elements, such as gallium and indium; the influence of minute quantities of elements on the properties of materials; and the importance of exact analytical methods in physico-chemical researches. A national institution of analytical chemistry is wanted, of high scientific authority and in touch with industry: the best conditions for establishing and maintaining such an institution are discussed by Dr. Hillebrand at some length.

C. S.

LETTERS TO THE EDITOR.

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Plated Teeth of Sheep.

I HAVE read with interest the letters from various correspondents in NATURE (vol. xcix., pp. 264, 284, and 306) and the abstract of Prof. Liversidge's paper (*ibid.*, p. 290). Since the latter paper was published, operating on a much larger sample than Prof. Liversidge had at his disposal, I have been able to make a complete quantitative analysis of the deposit, not only from the teeth of sheep, but also from those of oxen and of man, both of which in composition agree closely with that from the sheep. A full account of my investigations will shortly be published in the Proc. Linnæan Society of New South Wales.

Some of the writers in NATURE attribute the deposit to iron pyrites, either derived direct from fragments of mineral occurring about the pastures, or formed by interaction of iron oxide with sulphates. It would be interesting to know if any of these correspondents have applied tests to prove the presence of iron sulphide. Under the conditions ruling in a sheep's mouth, the formation of iron sulphide from the oxide and a sulphate is quite impossible, nor could iron pyrites be caused to spread itself on, and adhere to, the teeth when chewed along with its food by the animal.

As indicated by Prof. Liversidge, the deposit consists mainly of calcium phosphate with organic matter. As a matter of fact, such deposits, commonly known as "tartar," are of very general occurrence, being found not only on the teeth of sheep, but also on those of all mammals, including marsupials, which I have examined. Sometimes the coating is in a very thin layer, and brown or black in colour, but it varies up to quite a heavy coating one-eighth of an inch or more in thickness. In the case of sheep it does not always present the metallic appearance which has been the cause of so much speculation; it is sometimes nacreous and sometimes chalky. In man it consti-

tutes the "tartar," which is removed from the teeth by dentists in the operation of "scaling."

It is not derived from the food as such, or from any accidentally eaten mineral, but is a true salivary calculus, precisely analogous to the calculi so commonly occurring in the urinary tract, and is derived, probably entirely, from the saliva.

It is extremely unlikely that the deposit found in England differs from that occurring in Australia. I may say that I have handled and examined many hundreds of sheep's jaws, as well as those of other animals, in consignments of bones received at a large bone charcoal factory in Sydney, and in every case the deposit, when present, has been as above described. I have also on several occasions found good examples of the deposit on the teeth in sheep's heads purchased in retail shops.

THOS. STEEL.

Sydney, N.S. Wales, August 8.

An Optical Phenomenon.

I HAVE never seen the following phenomenon described; perhaps a physiologist can give the explanation. If the eye is fixed on a stream of water for twenty or thirty seconds, and is then turned on to a fixed object, the part of the field of view that had previously been occupied by the stream appears to move in a contrary direction to that in which the water had been moving; the apparent motion slows down rapidly and ceases in from five to ten seconds. This is seen not only with lateral motion, but also with up-and-down motion, as when a stream is looked down on from a bridge. The phenomenon is perhaps best seen with running water, but it may be observed with other bodies in motion—a passing train, for instance. The effect is very curious, as only part of the field of view appears to move, and it is remarkable to see objects apparently in motion, yet not changing their position relatively to objects above or below.

C. J. P. CAVE.

Lynmouth, October 4.

The Fireball of October 1 last.

SINCE forwarding to you the results of a preliminary discussion of the observations of this fine object, a large amount of additional data has come to hand. A re-examination on the basis of forty-four reports shows that the heights of the fireball as given in my contribution to NATURE of October 11 are as nearly as possible correct. But the radiant point should be further N.E., and the position of the object over England was more probably from forty-five miles E. by N. of Hull to twelve miles S. by E. of Wolsingham, Durham.

There were evidently two fireballs on the same night, one at 6h. 37m., the other at 10h. 46m. (October 1), and they appear to have been both directed from a radiant point near the star γ Piscium. It was this radiant which furnished the brilliant detonating meteorite, that fell in a field near Wigan on October 13, 1914. It has also yielded many large fireballs in September.

W. F. DENNING.

44 Egerton Road, Bristol, October 12.

The Autumn Moon.

IN the attractive paper on "The Autumn Moon" in NATURE of September 27 Sir Geo. Greenhill refers to the mistakes of poor common folks, and of poets and painters even, when they deal with things astronomical. He instances Coleridge's reported intention (in the first draft of "Christabel") to seat a star within the horns of the crescent moon. The idea seems to have