gullet, this whale does not require to open its mouth very wide; as the gullet is only from 1¾ inches to 2 inches in diameter, it indicates that the food consists of small morsels. The sharp, enamelled tooth at the summit of the tusk is probably used for tearing and rending soft-bodied animals such as cuttle-fishes, and possibly for tearing aside seaweeds when in search of food.

The tusks are 14 inches in length, 2½ inches wide at the jaw, 1⅜ inches at the summit beneath the conical real tooth, and from ⅜ inch to ½ inch thick. On the back the blubber was 3 inches thick, and 1½ inches on the belly. The oil was of fine quality, and had great penetrating power, almost like paraffin. Owing to the advanced state of decomposition of the viscera, the contents of the stomach were not examined.

From the foregoing it is evident either that previous drawings and data in regard to Layard's whale are more or less inaccurate, or that the present specimen indicates a new species. The drawings show that the upper lip or tip of the beak covers the lower lip, while the photographs indicate that the upper jaw slightly projects beyond the lower, the reverse being apparently the case in Sclater's and Moseley's illustrations. The lips were not horny, but rather like hardish flesh. The skull is very asymmetrical, the bulk of the frontal bones inclining from the right to the left side.

The creature had apparently been injured at some previous time, as the tongue-bones and two vertebræ showed signs of having been fractured and repaired. One of the most remarkable features of this whale is the small size of the flippers as compared with that of the body. The backward position of the dorsal fin is also noticeable. With the exception of those of the skull, the bones are remarkably light and porous. Those of the beak are, however, brittle, dense, and hard.

F. W. FITZSIMONS.

Port Elizabeth Museum, May 30.

The Radio-activity of Lead and other Metals.

IN the course of some experiments that have been recently carried out in the physical laboratory at Toronto on the natural conductivity of air confined in vessels made of different metals, a wide variation was observed in the results obtained with different samples of lead. The lowest conductivity observed with air enclosed by this metal corresponded to an average production of 23 ions per c.c. per second, and the highest to a production of 160 ions per c.c. per second. The lowest value hitherto recorded for lead appears to be that quoted by Eve in his paper in the *Phil. Mag.* of September, 1906, in which he gives 96 ions per c.c. per second as the number he obtained with this metal. The sample of lead which exhibited the low activity just referred to was a sheet which had been used as a lining in a case in the laboratory for nearly thirty years.

With zinc and aluminium receivers it was found that on the average 15 ions per c.c. were generated per second in the air which they enclosed.

From measurements made with the gamma rays from radium on the ionisation produced in air confined in a lead cylinder (1) when unlined, and (2) when lined with thin sheet aluminium, due allowance being made for absorption, it was found that the ionisation in a lead cylinder due to the gamma rays was one-half that obtained with the excited secondary radiation. On the other hand, with an aluminium cylinder, the ionisation due to the secondary radiation was found to be approximately one-half that produced by the gamma rays. Assuming these results to hold for the penetrating radiation from the earth, it follows that on the average 9 ions per c.c. per second are generated in free air by this radiation. It also follows that the difference between the natural ionisation in air observed with the aluminium cylinder, viz. 15 ions per c.c. per second, and that found with the least active lead, viz. 23 ions per c.c. per second, can be wholly explained by differences in the secondary radiation excited in the two metals. This result, combined with the observed differences in the conductivity of air enclosed in vessels made of different samples of lead, goes to show that the high activity usually observed with lead is due to the presence of active impurities in it, and not to the existence of any intrinsic activity possessed by the metal. In this connection it is interesting to note that Elster and Geitel (*Phys. Zeit.*, November, 1906, and May, 1907) have recently been able to extract from commercial lead oxide and a sample of lead an active substance which they suggest may possibly turn out to be radium F.

In the experiments described above, the measurements were made with a sensitive quadrant electrometer on air confined in cylindrical vessels 60 cm. high and 24 cm. in diameter.

J. C. MCLENNAN.

University of Toronto, June 25.

Inheritance and Sex in Abraxas grossulariata.

IN February, 1906, in conjunction with the Rev. G. H. Raynor, I gave a paper to the Zoological Society on the inheritance of a variety of the moth *Abraxas grossulariata* and its relation to sex (*Proc. Zool. Soc.*, 1906, vol. i., p. 129). We found that when the var. *lacticolor* (*flavofasciata*) was crossed with the type it behaved as a Mendelian recessive, disappearing entirely in generation F_1. When two heterozygotes were mated together, var. *lacticolor* reappeared, but only in the female sex, roughly half the females and all the males being typical. When a heterozygous male was mated with *lacticolor* female, the variety appeared in both sexes in the offspring, viz. in about half the males and half the females. When, however, a *lacticolor* male so produced was paired with a heterozygous female, we found that all the males were typical and all the females *lacticolor*. This result was given in our paper with some hesitation, since it was founded on a rather small number of specimens (29 ♂, 11 ♀), but this year it is amply confirmed. I have reared 116 males and 74 females from six families of this mating, and every male is typical, every female *lacticolor*. Mr. Raynor has also reared equally large numbers with the same result. From a family of the converse cross, on the other hand (*lacticolor* ♀ × heterozygous ♂), I have reared 24 type ♂, 22 *lacticolor* ♂, 17 type ♀, 18 *lacticolor* ♀, a fair approach to the expected equality in each sex.

I think it may be concluded definitely that in this case

(1) The type is completely dominant.
(2) DR♀ × DR♂ gives DD♂ + DR♂, DR♀ + RR♀.
(3) R♀ × DR♂ gives DR♂ + R♂, DR♀ + R♀.
(4) DR♀ × R♂ gives DR♂, R♀.
(5) R♀ × R♂ gives R♂, R♀.

(In [2] above the absence of DD females has not been proved.)

This confirmation of our previous results seems to me to lend some support to the provisional hypothesis of sex-determination outlined in the paper referred to.

L. DONCASTER.

University of Birmingham, July 2.

THE DOUBLE-DRIFT THEORY OF STAR MOTIONS.

THE problem of determining the motion of the sun amongst the stars has undergone a great change in consequence of Prof. J. C. Kapteyn's investigations which have recently become known. These researches indicated that the stars surrounding us do not form a simple system, but a dual one. From a discussion of the motions of the stars of Bradley's catalogue, Prof. Kapteyn demonstrated the existence of two great streams of stars passing through one another, and found the directions of motion of these streams relative to the sun and to one another. The Bradley stars, numbering about 2600, are mainly stars visible to the naked eye; they cover nearly three-quarters of the celestial sphere, and throughout the whole of this area Prof. Kapteyn found the same two streams prevailing, and it seemed probable that all the stars he examined belonged to one or other of the two streams.

The investigations with which this article more particularly deals are based on the proper motions