LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

Meteorological Observations during the Passage of the Earth through the Tail of Halley's Comet.

I HAVE cursorily examined the records from ten registering balloons sent up from Ditcham Park and Pyrton Hill on May 18, 19, and 20. Nearly all the traces show large fluctuations of temperature; but such fluctuations have been observed before, and there is nothing that leads me to suppose that the passage of the earth through the tail of the comet, if, indeed, it occurred before 7 a.m. on May 20, had any effect on the temperature of the upper air. Five of the balloons reached 17 km. or more, and all exceeded 13 km. W. H. DINES.

June 6.

THE quantity of ozone in the atmosphere at great altitudes, which for some time has been the subject of an investigation by the writer, was estimated on May 18 and 19. It was thought that, in this way, some light might be thrown on the question as to whether any electrical discharges of any magnitude took place in the higher atmosphere during the transit.

The method of conducting these measurements is described in the Transactions of the Chemical Society (1910, xcvii., 868), and consists in the use of a concentrated solution of potassium iodide. It has been found in this work that very dilute ozone reacts with potassium iodide to give iodine, potassium hydroxide, and potassium iodate, the relative amounts of each varying with the temperature. This reaction enables a distinction to be made from oxides of nitrogen, which only give free iodine, and from dilute hydrogen peroxide, which gives iodine and potassium hydroxide, but no iodate.

Three successful experiments were made with the help of the meteorological balloons at about the time of the transit, and the following results were obtained:—

Time of ascent of balloon	Height attained km.	Amount of ozone per cubic metre air mgrm.	
May 18, 9.40 p.m.	17	0·51	(or 1 part in about $2·6 \times 10^6$)
,, 19, 2.10 a.m.	12	0·54	(,, ,, $2·4 \times 10^6$)
,, 19, 6.30 a.m.	20	0·43	(,, ,, $3·0 \times 10^6$)

The above quantities of ozone are not materially different from the amount usually present in the air at these altitudes. Thus the average of three measurements made on March 18 corresponds to 0·72 mgrm. ozone per cubic metre air.

There was also no appreciable change in the quantity of oxides of nitrogen. J. N. PRING.

Physical Laboratory, Manchester University.

Ooze and Irrigation.

AGES have passed since the cultivator first realised the value of rivers as agents in fertilising the soil. The Nile is the classical illustration, and everyone has learned in early life to think of Egypt as being dependent on the life-giving waters for its fertility. But have the reasons for that ever been sufficiently investigated? Probably the majority of people would say that the waters of the Nile bring down vast quantities of soil and disintegrated rock from the heart of Africa, and this earthy matter, held in suspension or carried down by the river in spate, contains the chemical elements which are essential to the growth of plants. I believe that is the usually accepted theory; but does it go to the root of things? Others find the secret in the action of bacteria. I grant the point, but do not think it fully accounts for the facts. I have for some years been engaged in the study of our fresh-water annelids and their place in the economy of nature. I had occasion a few days ago to bring home from the banks of one of our Midland rivers some of the ooze from its banks. When I collected it I found some half-dozen specimens of a common fresh-water worm wriggling about in the slimy mass; but when I came to examine it at leisure, with pocket lens and microscope, I found it to be teeming with life. Vast numbers of tiny annelids (*Tubifex templetoni*, Southern, or an allied species), minute larvæ, and other living things were to be seen, and at once the question arose, Would the ooze, detritus, alluvium, or disintegrated rock of itself be so special a fertiliser if this teeming life were absent? The ooze is enriched both by the passing of the matter through the bodies of the animals and by the nitrogen from their corpses.

It seems to me that there is need for careful study of the alluvium of rivers from this point of view. Life has probably much more to do with the soil of the Nile and other rivers than is generally suspected. It would be a profitable thing for students to examine the mud of rivers like the Nile during the different seasons. It would then probably be found that at low water various annelids and other aquatic life-forms were breeding rapidly. The myriads of young would be carried by the flood into the lands which are irrigated by the river, and here they would not only be the food supply for the larger forms of life, but would help to keep the soil from becoming sour, and supply vast stores of nitrogen for the plants. I should be happy to hear from workers in this field, and give any hints which experience has taught me.

Gt. Malvern. HILDERIC FRIEND.

On the Preservation of Hailstones and the Investigation of their Microstructure.

THE investigation of the microstructure of hailstones in summer having proved very difficult, if not impossible, I constructed an apparatus (Fig. 1) for their preservation

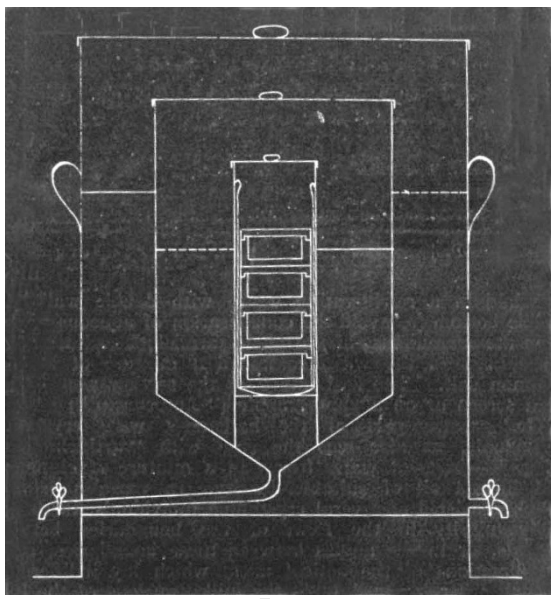

FIG 1.

until winter time. The apparatus consists of three co-axial cylinders; the inner space is intended for hail; the middle space for a mixture of ice and cupric sulphate (approximately in the proportion corresponding to eutectics $t = -1·6°$); the outer space for ice, forming a sort of guard coat.

During the summers of 1908 and 1909 I had only once the opportunity of observing a hailstorm; this was on August 2/15, 1909, when I was at sea near Helsingfors on my way from Åland to St. Petersburg. This hail lasted three to four minutes; the hailstones were very small (2–3 mm. diameter), but I gathered 200–300 grams of them, and, in order to avoid their freezing together, immersed them in glass boxes with a mixture of nearly equal parts of benzol and toluol, which I presumed to be of a density equal to the density of hailstones, but which proved to be lighter. These hailstones I brought later to Tomsk (Siberia), and in December sent them to the twelfth Congress of Russian Naturalists and Physicians in session at Moscow. These facts demonstrate thoroughly the possibility of the preservation and transport of hailstones. My