

definite and bright when the amount was large, and occasionally disappearing in part or even completely as the atmosphere cleared. Sometimes the whole halo became uniformly faint, while at other times portions of the circumference disappeared. The major axis was vertical, the moon being about on the meridian. The axes were estimated to be about 7° and 4° respectively, but no careful measures were made. The colour, if any, was very slight. The moon was at first quarter."

None of my astronomical friends to whom I have described these elliptical halos has ever seen one. They must be rare phenomena, and well worth recording.

FRANK SCHLESINGER.

Allegheny Observatory, February 24.

The halo appears to be that known as "Hall's halo," but the diameters given are rather less than those observed by Hall. The phenomenon is mentioned in Pernter's "Meteorologische Optik" (p. 262), and an explanation is suggested by him on p. 381 of that work.

[ED. NATURE.]

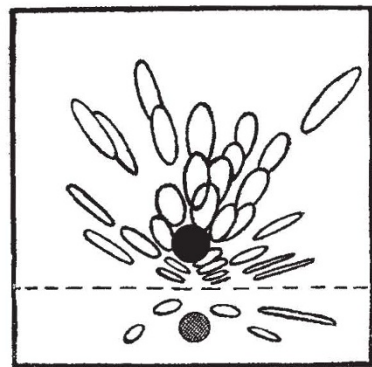
The Reflection of X-Rays.

IN continuation of the experiments of Mr. W. L. Bragg (NATURE, December 12, 1912, p. 410), I have investigated the reflection of X-rays by mica. Mr. Bragg finds one reflected beam, while Messrs. Hupka and Steinhaus (NATURE, March 6, 1913, p. 10) find two beams. Using a parallel pencil and an angle of incidence of 70° , I find no difficulty in photographing five beams emerging from the "incident" side of the mica, of which that obeying the ordinary laws of reflection is the most obvious.

From the "transmitted" side of the mica sheet there are certainly no fewer than thirty distinct beams apart from the intense primary beam which has passed through the crystal (0.33 mm. thick) without much absorption. The plane of the mica sheet was perpendicular to that of the photographic plate. In the reproduction given below, the intense black spot

is produced by the transmitted primary beam, while beneath it is seen another circular patch due to the ordinary reflected beam.

The greatest photographic intensity occurs in those transmitted beams which have suffered the least deviation, the ordinary reflected pencil being feeble in comparison with some of them.



It will be evident that the transmitted pattern is analogous to that obtained by Messrs. Laue, Friedrich, and Knipping (NATURE, November 14, 1912, p. 306), using a pencil of X-rays falling normally on a crystal of zincblende. Repeating my experiments, using a normal pencil, a transmitted pattern is obtained similar to theirs.

Besides giving rise to numerous pencils in definite directions, the mica sheet exhibits the ordinary incident and emergent scattering. It is well known that this effect is small in the plane of the radiator. This is borne out in all the negatives which exhibit general fogging, except along a line which represents the line of intersection of the photographic plate by a plane

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containing the mica sheet. This line is represented in the diagram by the broken line. Similar results are obtained using rock salt and galena.

Since the photograph described above is unsuitable for reproduction by a half-tone block, I have been obliged here to substitute a diagrammatic copy for it.

H. B. KEENE.

Physics Department, University of Birmingham,
March 15.

The Presence of Protozoa in Soils.

UP to the present, so far as I am aware, the only method of demonstrating the presence of Protozoa in soils has been by cultures. This method, of course, leaves untouched the really important question as to what Protozoa are leading a trophic existence at any given time in a soil sample, since many of the forms found later on in cultures may be derived from cysts. In these circumstances I thought it might be of interest to direct attention to a method by which the presence of Protozoa in the trophic stage in the soils can be readily demonstrated, even though this method from a quantitative point of view probably gives low results.

A small quantity of the soil to be investigated is mixed, as soon as it is collected, with about an equal volume of picric acid. The mixture is then placed in a wide dish and carefully stirred, so that the organisms on the surface films between the soil particles are free. If the mixture is then allowed to stand for a time it will be found that most of the bacteria, diatoms and Protozoa that were present come up to the surface film. The coverslips, cut according to the method which I have previously described, can then be floated on the film, and then placed in tubes containing corrosive. These cover-slips can then be handled as though they were ordinary smears. The best method of staining seems to be to stain for some time in strong acid haemalum, followed by eosin. I have tried mixing the soil in the first instance with other fixatives in the place of picric acid, but have not obtained such good results. By this method perfectly clean preparations, showing large numbers of amoeba and flagellates, have been obtained from a six weeks old bed, which had been used for growing seedling cauliflowers. These have been used to compare the active fauna of such a soil with the fauna derived from the same soil in cultures.

As might be expected, it has been found that the prevalence of any given Protozoon in the cultures is not an indication of its prevalence in the trophic stage in the soil, though by varying the methods of culture it has been found possible to cultivate all the Protozoa that have been found by the above method leading a trophic life in this soil at the date of fixation.

C. H. MARTIN.

The Hill, Abergavenny, March 19.

Jelly-fish of the Norquane River.

THE discovery of a jelly-fish in the northern watershed of the Limpopo will be of some interest to zoologists.

During the new year holidays, while making zoological collections in the Bembezi district (thirty miles north-east of Bulawayo), I noticed some jelly-fishes in a pool of the Norquane River, a tributary of the fourth degree of the Limpopo.

With the scanty literature at my disposal, it is not possible at present to identify or determine it as a new species, but judging by the figures in Lankester's "Treatise on Zoology" and in the "Cambridge Natural History," and also by Mr. Moore's statement ("The Tanganyika Problem") that *Limnocnida tanganyikae* varies in size from that of a shilling to