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.]*

Transit of Mercury across the Sun's Disc, November 13-14, 1907.

PREMISING that the times given on p. 451 of the Nautical Almanac for 1907 are the Greenwich mean astronomical times of the several contacts in the above transit as seen from the centre of the earth, it may be useful to the readers of NATURE to record the corresponding Greenwich mean astronomical times of the contacts as seen from Greenwich. These times are deduced by the formulæ printed on the above-mentioned page of the Nautical Almanac:—

		d.	h.	m.	s.
External contact at ingress ...	November	13	22	23	24
Internal contact at ingress ...	,,	13	22	26	1
Internal contact at egress ...	,,	14	1	48	10
External contact at egress ...	,,	14	1	50	50

Angle from north point of sun of contact at ingress, 62°; angle from north point of sun of contact at egress, 345°; measured towards the east in both cases.

A. M. W. DOWNING.

H.M. Nautical Almanac Office, October 26.

Origin of Radium.

IN a letter to NATURE (June 6) I gave the experimental evidence which led me to conclude that in ordinary actinium preparations a new substance was present which was slowly transformed into radium. By a chemical method this substance was separated from actinium, and a solution of the latter was obtained which showed no appreciable growth of radium over a period of eighty days. Observations on this solution have been continued over a total period of 240 days, and there is still no detectable increase in the quantity of radium. The growth of radium, if it occurs at all, is certainly less than 1/500 of that observed in other experiments.

In two recent letters to NATURE (September 26 and October 10) Dr. Boltwood has given the results of his later experiments in this direction. He has confirmed my conclusions, and has, in addition, been successful in devising a satisfactory method of separating this new substance from actinium, and has examined its radio-active and chemical properties. He suggests that the name "ionium" be given to this new body, which is probably the immediate parent of radium. Dr. Boltwood is to be congratulated for his admirable work on this very difficult problem, for, apart from the chemical operations, the radio-active analysis required for correct deduction is unusually complicated and difficult.

Dr. Boltwood has not been able to separate the parent of radium from actinium by the reagent employed by me, viz. ammonium sulphide, but has found the use of sodium thiosulphate effective. In explanation of this discrepancy, he suggests that I employed old ammonium sulphide. As a matter of fact, I did not use the ordinary laboratory solution of ammonium sulphide, but added ammonia to the actinium solution, and then saturated it with sulphuretted hydrogen. The complete separation effected in my experiment was, I think, probably due to an accidental production of finely divided sulphur in the solution.

In a letter to NATURE of last week, Mr. N. R. Campbell raised objections to the name "ionium" given by Dr. Boltwood to the new body, from the point of view that every radio-active substance should be given a name to indicate its position in the scheme of radio-active changes. This system is very excellent in theory, but I have found it extremely difficult to carry out in practice. The continual discovery of new products in very awkward positions in the radio-active series has made any simple permanent system of nomenclature impossible. Besides uranium and thorium, twenty-four distinct radio-active substances are now known to exist in radio-active minerals. The number of products still to be discovered is, I think, nearly exhausted. When there is a general consensus of opinion that this is the case, I feel it will be very desirable for physicists and chemists to meet together in order to revise the whole system of nomenclature. There is not much to be gained in doing so immediately, as the discovery of a new product in the midst of a series would entail the alteration of the names of a possible half-dozen others which follow it. At the same time, I think it will be desirable to retain a distinctive name for those radio-active substances which, like radium, have a long enough life to be separated in sufficient quantity for an examination of properties by the ordinary chemical and physical methods. It is probable that the parent of radium fulfils these conditions, and should thus have a distinctive name like radium.

Personally, I do not much like the name "ionium," but for similar reasons neither do I care for the name "actinium." It is not easy to suggest a name that is at once simple and explanatory. I have for some time thought that possibly "paradium" or "picradium" might be suitable for the new substance. The former name suggests that it is the parent of radium, but I recognise that a possible play on words may make it unsuitable. The name uranium A, suggested by Mr. Campbell, in itself innocuous, is open to the objection that in the case of radium, thorium, and actinium the suffix A is applied to the first product of the disintegration of the respective emanations, while no such emanation has been observed in the initial series of changes of uranium.

E. RUTHERFORD.

University of Manchester, October 27.

The Nature of X-rays.

IN a paper published in the October number of the *Philosophical Magazine* (pp. 429–449), Prof. Bragg, after discussing the properties of various electric radiations, arrives at the conclusion that although a beam of X-rays contains some ether pulses, these may not after all constitute the bulk of Röntgen radiation. In place of the usually accepted theory, he proposes the hypothesis that these rays consist mainly of "neutral pairs" (consisting of a positive and a negative particle) each revolving in a plane containing its direction of translatory motion. This, he considers, affords an easier explanation of the properties of the rays, and is not improbable *a priori*.

I do not intend to discuss more than one point here, for it seems to me that the record of a simple experiment is of more value in deciding between the two hypotheses than a series of comparisons or discussion of probabilities possibly could be.

To explain the phenomena of secondary radiation from light atoms, he supposes that a "pair" striking a light and yielding atom does not suffer disarrangement, but may be returned unchanged and constitute a scattered ray. He also supposes that it is liable to be taken up only by an atom revolving in the same plane as itself, and that if ejected again the subsequent rotation and translation will continue to take place in the one plane. The secondary radiation in a direction perpendicular to that of propagation of the primary will then consist of pairs rotating in the plane of the primary and secondary propagations, and the tertiary will therefore be strongest when in the same plane, thus explaining the polarisation effect.

It is important to notice that this theory can only account for the amount of polarisation which I found to exist in a secondary beam from carbon (Proc. Royal Soc., A, vol. lxxvii., 1906), if the assumed relation between the plane of rotation and direction of propagation is an accurate one.

Now it can easily be shown that, according to the ether pulse theory, when an unpolarised X-ray beam is incident on a substance of low atomic weight, such as carbon, the intensity of secondary radiation is at a minimum in a direction perpendicular to that of propagation of the