

### Phosphorescence of Photographic Plates.

I HAVE frequently observed the phenomenon described in your correspondent's letter published in NATURE of January 14 on treating plates which had been exposed to the action of Röntgen rays, with a solution of alum.

I first noticed it in June, 1898, and the temperature of the dark room was 23°. The film being "hardened" was that on an "Ilford Special Rapid Plate," which had been subjected to a somewhat protracted development with pyrogallol; on pouring a 7½ per cent. solution of common alum over the plate, the liquid lit up with a pale phosphorescence, not unlike that seen on stick phosphorus on a warm night, which continued for about ten seconds and then faded away.

Plates developed with ferrous oxalate also glow occasionally under similar conditions, and phosphorescence seems to take place only when the film has not been exposed to ordinary light, and when the surrounding air is exceptionally warm.

JAMES F. RONCA.

Clapham, S.W., January 23.

WITH reference to the letter from Mr. T. A. Vaughton in your issue of January 14 regarding the phosphorescence of silver bromide, it is worth noticing that this is not a function of the silver haloid salt.

Whilst working here for Dr. W. J. Russell, F.R.S., I chanced to empty some spent pyro developer and a dilute solution of alum into the sink of the dark room at the same time, when the whole liquid at once glowed with a brilliant phosphorescence.

This takes place whenever a dilute aqueous solution containing pyro, a soluble sulphite, and an excess of alkali is made acid. It occurs even when the amount of pyro is very small, but it is essential that the solution be alkaline. If the pyro be mixed with sodium sulphite alone, although the latter be in sufficient quantity to ensure faint alkalinity, the solution remains colourless and does not phosphoresce; an oxidation of the pyro seems to be necessary.

Either a dilute solution of a mineral acid, of an organic acid, or of an acid salt can be used to acidify the pyro.

This phenomenon is not a new one, but so far as I am aware has never been studied.

O. F. BLOCH.

The Davy Faraday Research Laboratory,  
Albemarle Street, W., January 20.

### M. Blondlot's *n*-Ray Experiments.

ABOUT three months ago I independently discovered that a feebly luminous phosphorescent zinc sulphide screen when brought near the body increased in brightness.

I mentioned this fact to Mr. H. A. Taylor, remarking that I believed it to be the effect of an undiscovered ray given off by the flesh; he suggested, however, that heat was the cause of the phenomenon.

Further trials showed this to be the case; by laying the back of the screen against a fluted jar filled with warm water the zinc sulphide would brighten up along the edges of the fluting and clearly indicate the pattern; on removing the screen the light would fade, showing the pattern now as dark lines against a lighter background.

With care screens of sulphide of zinc or of calcium may be made highly sensitive to warmth, and by this means it might be possible to photograph many dark bodies simply by means of the heat rays given off, provided a suitable lens was employed.

S. G. BROWN.

4 Great Winchester Street, London, E.C., January 23.

### Curious Shadow Effect.

I SHOULD feel obliged, if not troubling you, if you could tell me where I could obtain information with regard to the following:—

During the Christmas holiday my brother and I were in North Wales, and happened to be on the ridge that lies north of Llyn Llydaw; the sun was about 1h. from time of setting, and was low enough to clear the lower edge of the thin clouds which came from a northerly direction. The hollow (Cwm Glas) to the north of the ridge was, every

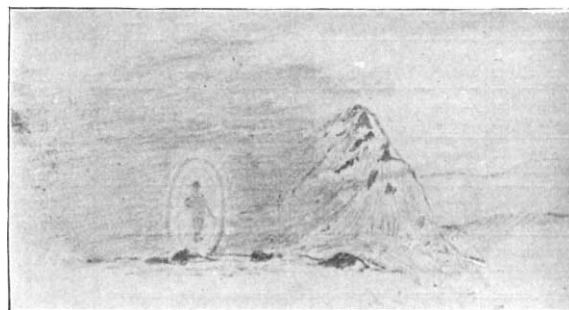
now and then, filled up with thin mist on which our shadows were projected; surrounding the shadow was a faint oval-shaped rainbow, which, as the sunlight strengthened, became brighter, and a second bow outside the one nearest to the figures appeared, though very faintly. Although my companion was within a few feet of me, we each saw our own shadows only. We also saw, when the mist was



further from us, a shadow of the ridge itself with our two figures on it, in this case the figures appearing much smaller than in the other effect, and without any bow.

These phenomena are, I believe, not rare on this ridge, certain conditions, such as a bright low-down sun behind one, and a fairly opaque mist in front, being, of course, necessary.

The point on which I desire information is why the bows



should be of this oval form, and why they should appear at all?

The shadow of one's figure I can more readily understand.

The little pencil sketch enclosed may perhaps explain my description.

H. M. WARNER.

44 Highbury Park, N., January 14.

### Destructive Action of Rain upon Animal Life.

THE protracted and heavy rains during periods of the past year must have imposed a severe strain upon the smaller and more fragile forms of animals, such as, for instance, plant lice, mites, many of the smaller species of insects, spiders, &c. Even if adults are able to withstand the destructive effects of torrents of rain, it is difficult to understand how very immature examples, or individuals that have recently undergone ecdysis, can survive. During prolonged and heavy rain over a mixed tract of country the available shelter is relatively very small. Practically the whole surface soil becomes sodden, and, in the open at any rate, almost the whole vegetation is drenched. In some plants, as is well known, the flowers and certain areas of the leaves and other parts afford shelter, but even taking this into account, it would seem that the injury must be very great. In the county of Sussex during ordinary June

or July weather the number of small creatures harbouring in such a position as, say, a patch of rank herbage near water is truly astonishing. During the last ten years I have often visited such positions in heavy rain, and I am convinced that great mortality is caused, but I have not been able to satisfy myself whether this is due to drowning, burial in the soil, the impact of falling drops, or to some other cause or combination of causes.

Over an area not subject to violent meteorological fluctuations, the fauna will assume a condition of equilibrium. Any sudden and wide departure from the mean conditions for the particular season of the year will have an immediate and profound effect. I venture to write, therefore, in the hope that someone will pay special attention to the effects of such periods of abnormal rainfall as we have had during the last few months. The subject does not appear to have received the attention it merits, and the inquiry might profitably be extended so as to cover other meteorological effects.

W. RUSKIN BUTTERFIELD.

4 Stanhope Place, St. Leonards-on-Sea, January 17.

### Subjective Images.

THE letter on the above subject (p. 271) reminds me of one that I sent to NATURE in 1871 (vol. iv. p. 122) describing a phenomenon complementary to that observed by Mgr. Molloy. I was induced to write it in consequence of a communication by Mr. T. Ward (NATURE, vol. iv. p. 68), who observed that the white chalk lines on a blackboard appeared to be blue when the sun was shining on his eyes; I noticed that the printing in a book looked bright red when I was walking on a chalk road, the book being shaded by an umbrella.

There appears to be a connection between the three phenomena, but I will not venture to suggest an explanation; possibly the persistence of colours may be different in different eyes.

HERBERT MCLEOD.

January 23.

IN response to Dr. Molloy's appeal, I may mention that a correspondent of *Work* having asked the reason for the colours in Benham's artificial spectrum top, I made, in the number for April 6, 1895, a suggestion which is practically the same as his explanation. This was that the optic nerves which according to the Young-Helmholtz theory produce the sensation of violet, are the most easily excited of the three sets, and that those producing the sensation of green, having the greatest inertia, are least easily excited and retain the impression for a longer time than the other two. In the number of the same journal for January 11, 1896, other phenomena were cited which might be explained by the same hypothesis.

ALEX. THURBURN.

Keith.

It seems probable that the effect mentioned by Dr. Gerald Molloy in your issue of January 21 is the same effect—produced in a different way—as that I spoke of in my letter published in NATURE of January 14.

In the instance he mentions we have black letters on a white marble slab, viewed by eyes in a partially dazzled state from the effect of strong sunlight. In the case to which I directed attention, these conditions are almost reproduced, viz. the blackened silver bromide on a white porcelain dish under a dazzling red light. Before the developing solution is added, the bromide under the red light appears as a grey powder in a white dish, but on adding the developing solution it is blackened, and when the liquid is poured off the change from black to bright green may be conveniently observed. The angle at which the dish is viewed seems not to be without influence on the brightness of the colour. Under the best conditions the bromide has the appearance of masses of uncut emeralds.

T. A. VAUGHTON.

Ley Hill House, Sutton Coldfield, January 23.

### Abysmal Deposits.

I BELIEVE there is some difficulty in accounting for the difference in the distribution of living Foraminifera at the surface of the sea and of deposits of their skeletons at the bottom. As is well known, the abysmal deposits contain

no Foraminifera, while the much vaster pelagic deposits consist chiefly of them. The difference in depth has suggested that in the case of the pelagic deposits the free carbonic acid in the water has not had time to dissolve the sinking skeleton, while it has had time before a skeleton can reach the greater depths occupied by the abysmal deposits. But surely if this were the whole truth some effect would have been produced by the time the skeleton had sunk 2000 or 2500 fathoms or even less, so that it ought to be impossible to find, as we do, perfect skeletons in the globigerina ooze.

I wish to suggest a theory which is new, so far as I know, viz. that solution does occur, but does not begin until the organic matter protecting the carbonate of lime has all putrefied away. Hence the solution may be begun and ended in the excess of depth which the abysmal parts of the ocean-bed have over the pelagic parts.

H. ROBSON.

29 Hurlbutt Street, Newington Butts, S.E.

### Spelling Reform.

IN your review of Dr. Joseph Bowden's "Elements of the Theory of Integers," there is included a severe condemnation of the very moderate instalment of spelling reform which the author appears to have introduced into his work. A discussion on the general question of spelling reform would, of course, not be suitable to your pages, and I therefore confine myself to making a respectful remonstrance against your reviewer's sweeping condemnation of what I conjecture to be an attempt to remedy a few of the glaring inconsistencies and anomalies of the current English spelling. Other languages have, from time to time, reformed their spelling so as to bring it more into harmony with the pronunciation, and this has been the case in our own time with German. It can scarcely be doubted that, sooner or later, the same will be the case with English. In that event the spellings you quote will certainly be adopted, with the exception of "*fixd*," which will, of course, be spelt *fixt*.

T. B. S.

Edinburgh, January 15.

MAY I point out that Dr. Bowden's book purports to deal with the "Elements of the Theory of Integers," and not with questions of spelling reform? Neither on the title-page nor in the preface does the author make any claim to address his work to those members of the community who prefer to have their thoughts expressed in a written language differing from that of their fellow beings. Failing any such indication, it must be assumed that the work is intended to be read and criticised by English speaking and English writing readers of the present day, to whom the author's spelling of the words in question must appear to be grossly incorrect. I quite agree with T. B. S. that "a discussion of the general question of spelling reform," as exemplified by the modern German equivalent of *red*, would "not be suitable to your pages."

THE REVIEWER

### RESEARCHES RELATING TO RADIUM.

THE year just passed has witnessed a widespread interest among all classes of people in Mme. Curie's discovery of radium, and attention has been generally directed to the nature of the new property of matter which it exhibits to such a surprising degree. The far-reaching consequences of M. Becquerel's discovery of radio-activity for the element uranium on our ideas with regard to the relations between energy and matter, although they have been long recognised by those immediately connected with the development of the subject, are now universally admitted. The million-fold more powerful radium appeals to the practical as well as to the academic imagination, and the problems raised by the new property have been brought into universal prominence. Owing to the excellent work of Giesel in improving the methods of extracting the new element from its