plosions are actually dust explosions was first stated in England by Mr. Watson Smith, editor of the Journal of the Society of Chemical Industry, in a letter which appeared in *The Glasgow Herald* on July 12, 1872, immediately after the Tradeston disaster. The priority of Mr. Watson Smith was recognised at the time by the Royal Society of Edinburgh, and later (in 1882) by Sir Frederick Abel in a lecture at the Royal Institution.

It is interesting to know that nearly six years ago Mr. Watson Smith read a paper at Liverpool (the scene of the latest dust explosion) in which stress was laid on the fact that any kind of carbonaceous dust might, under certain conditions, become a source of danger (see Journ. Soc. Chem. Ind., January 31, 1906).

ALBERT SHONK.

10 Dartmouth Road, Hendon, December 5.

I MUCH regret that I had entirely forgotten the fact, stated in Mr. Shonk's letter, that Mr. Watson Smith had attributed the disaster at the Tradeston Flour Mills to an explosion of dust in a letter to *The Glasgow Herald*, published before the report of Profs. Rankine and Macadam appeared, or I would certainly have mentioned it in the article referred to.

W. G.

The Feeding Habits of Crepidula.

WITH reference to the note on Crepidula in NATURE of December 7 (No. 2197, p. 187) it may be of interest to your readers to know that during some recent researches on this animal I have been able to confirm the necessity for investigating how far the presence of the slipper-limpet (*Crepidula fornicata*) is a menace to successful oyster-culture on the Kent and Essex coasts. It has been believed by various naturalists that Crepidula takes the same kind of food as the oyster, but on this point there exists no definite information. During an investigation of this matter I discovered the manner in which the animal feeds, from which there can be no doubt whatever as to the nature of its food. The mode of feeding in Crepidula is the same in principle as that of the oyster, that is, there is an ingoing and an outgoing current of water kept up in the mantle-cavity, while between the two currents the gill acts as a strainer, retaining even very fine particles of suspended matter, which eventually—by one of two ways—reach the mouth.[1]

Thus it is established beyond doubt that Crepidula feeds on the same material as the oyster, that is, on the food-material found on or floating near the sea-bottom, and the danger apprehended from this intruder is confirmed: Crepidula is competing successfully with the oyster for food and space. Whether there is enough food and space for both Crepidula and oysters is another matter which must be determined by local researches. Thus the problems for the Kent and Essex oyster-farmers are to keep up the food supply of oysters and to reduce the numbers of Crepidula and the many other animals which take the same food as oysters.

J. H. ORTON.

Marine Biological Laboratory, Plymouth, December 10.

Tadpole of Frog.

AT the beginning of April last I collected some frog ova for the purpose of making observations on development. Tadpoles appeared about April 9, and from time to time from that date until July 17, when young frogs were developed, I took batches away for preservation and sectioning. On July 17 only one tadpole was left of the original stock, and that one, though in water out of doors and with a supply of waterweed, has not developed farther, but is a tadople still and is still alive. Some years ago I had a similar case with a frog tadpole. Can any of your readers suggest the reason of this phenomenon?

T. PLOWMAN.

Nystuen, Bycullah Park, Enfield, December 8.

[1] It is proposed to publish a full account of how Crepidula feeds in the next number of the Journal of the Marine Biological Association.

MICROKINEMATOGRAPHY.

WITHIN the last few months we have been shown a new appplication of the kinematograph, which indicates yet another stage of technical attainment, and another field in which it may supplement our knowledge. Its range has been extended to the representation of objects as seen through high powers of the microscope. Apart from any positive increase to knowledge which may be obtained by its means, this is a technical achievement of a very high order. In the usual microscopic preparation it is impossible to obtain a high degree of illumination, and the greater the magnification the less the illumination becomes. It is only by artificially increasing the contrast by means of stains and so forth that we can obtain a clear differentiation of even a motionless object. To take in one minute some thousands of successive photographs of a living, unstained object, magnified six hundred or a thousand times, an object, moreover, which is moving rapidly, and therefore continually altering its focal plane, is a task which might easily seem impossible.

M. Comandon, however, has succeeded in this extremely difficult problem. The illumination-difficulty he avoided by using what is known as the ultra-microscope or dark-ground illumination, in which the object is seen against a black background, being lit itself by rays of light striking it from the side, and thence deflected upwards towards the lens of the microscope. This method gives an extremely brilliant contrast-illumination of the outlines of the object against a black ground and makes it possible to take on a properly sensitised film photographs of exceedingly short exposure. The resulting picture naturally shows comparatively little of the internal structure of the object under examination; the bulk of the rays of light are deflected from its surface. But it is surprising how much does appear. The nucleus of a cell, for example, is frequently quite distinct, and some structures, such as the kineto-nucleus of a trypanosome can sometimes be seen perfectly clearly and be followed as the organism moves from place to place. A large number of films prepared under the direction of M. Comandon has been exhibited during the present year by Messrs. Pathé Frères, and the realism and vitality of these kinematograph pictures can scarcely be imagined by anyone who has not seen them thrown on the screen.

An interesting film is one which displays the blood actually circulating in the vessels of the living body. The preparation, which is from the tail of the tadpole, shows a number of tiny blood-vessels, which measure about one-hundredth part of a millimetre in diameter. Crowded together in the larger of these, the individual corpuscles of the blood can be seen to pass out one by one into minute branches, for which they seem almost too large, and within which they make their way here and there through the surrounding tissue, not apparently without occasional difficulty. Even in the larger vessels, along which the bulk of the corpuscles are hurrying, the rate of progress varies considerably, and the direction may actually be reversed for a time and the blood apparently flow backwards. The coloured corpuscles of the blood, from which it derives its red tint, have, of course, no independent motion of their own, and are simply carried along by the stream in which they are suspended. But the colourless cells or leucocytes have such independent motion, and in another film we are shown a white cell gradually altering its shape, throwing out a long filament into which the rest of the corpuscle slowly flows, until the whole cell has altered its posi-