

The book treats of microbes from every aspect, morphological and physiological. The relation of microbes in general to the nutritive media, their chemical products, and the relation of these to the microbes themselves; the production of soluble ferments by them; the influence of light, heat, &c., are passed in review and treated fully.

The pathogenic organisms are next considered. Their relation to the animal body; the means by which they gain access to the animal system; the various influences commonly understood to constitute "predisposition"; the relation of pathogenic bacteria to food, air, soil, and water; the adverse influences, such as heat and light, disinfectants and antiseptics, &c., are all discussed with great lucidity and thoroughness.

There is hardly any aspect under which the study of pathogenic microbes—including the question of attenuation—presents itself, which is not discussed in this volume. The arrangement of the subject-matter is systematic, and the method of treatment does great credit to the author, inasmuch as he is, as far as possible, objective. He carefully weighs and sifts evidence, and does not disdain to make references to the literature of England and France. He has, in fact, carefully read the literature of this country on infectious diseases, and thus attests that he is not guided by that spirit of narrowness which one often meets with in modern German works.

An English translation would, we have no doubt, be a valuable addition to our own literature. E. KLEIN.

*Photography of Bacteria.* By Edgar M. Crookshank, M.B. (London: H. K. Lewis, 1887.)

SINCE Koch first employed photography in bacteriology ("Biol. d. Pflanzen," 1877, ii. 3) various attempts have been made in this country and on the Continent to advance the methods of photographing microscopic objects, such as Bacteria, with high magnifying powers. About fifteen years ago Dr. Woodward, of Washington, published photographic plates of histological objects taken under tolerably high magnifying power (400 and 500 diameters). These plates were brought out by the Surgeon-General's Office, Army Medical Museum of the United States: they attracted at the time a good deal of attention owing to their comparatively high excellence. That good photographs of histological and other microscopic objects are of great value in themselves, owing to their exactness, and the various advantages for purposes of publication, may be taken as requiring no further proof, and it seems equally obvious that indifferent photographs are of less value than accurate drawings.

Now, comparing Dr. Crookshank's photographs of histological and bacteriological objects, published in the present volume, the former with those of Dr. Woodward, the latter with those of Koch, there can be little doubt that no real advance has yet been made in producing photographs that are to take the place of accurate drawings. By saying this I do not mean to convey the impression that in Dr. Crookshank's volume there are not some good photographs—*vide* his Plate XVI., further his Figs. 7, 8, 30, 35, and 45, all of which are really fine in many respects—but taking photography as a whole, as applied to the representation of microscopic objects under high powers, I think that the time has not yet come when it can be said to have supplanted good and accurate drawings. In connexion with this it must certainly appear remarkable that in the numerous and important publications on Bacteria by Koch and his pupils since 1877 to the present time we do not find a single illustration represented by micro-photography. All their published illustrations are drawings.

With the new apochromatic objectives and projection eye-pieces by Zeiss better results may be looked for, and Dr. Crookshank, with his great skill in, and knowledge of, the technique, will, we have little doubt, be able to produce them.

As a clear and detailed account of practical micro-photography, Dr. Crookshank's book is of great merit, and will prove very useful and important. As the first treatise on the subject in any language it is sure to command a high place. E. KLEIN.

#### 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. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

#### The Sense of Smell in Dogs.

It is, I think, of some interest to supplement the very striking and exact experiments of Mr. Romanes on the scent of dogs, by an account of some experiments of a like kind made with a very different kind of dog, viz. a pug bitch. She was taught to hunt for small pieces of dry biscuit in a good-sized dining-room. The dog was put out of the room and a small piece, not much bigger than a shilling, of dry Osborne biscuit, was hidden; and as long as the hiding-place was accessible to the dog she never failed to find it. Sometimes the biscuit would be placed under a heap of a dozen or more newspapers on a dinner waggon, sometimes under a footstool, or sofa-cushion, or fire-shovel, and on two or three occasions in the foot of a boot which had been just taken off, the hiding body being always carefully replaced before the dog was admitted into the room, and without exception the biscuit in a very short time was discovered. It was over and over again proved that the dog did not follow the trail of the person who had hidden the biscuit; often the dog went by a different route, and in some cases one person hid the biscuit and another opened the door.

The experiment which has now special interest is the following one. A small piece of biscuit was placed on the floor under the centre of a footstool which was one foot square and six inches high, and standing on feet which raised it one inch from the ground. The dog, from the way in which she would set about moving the stool, not a very easy thing to do, as it stood in an angle of the wall, was evidently certain that the biscuit was beneath, and as scent seemed the only means by which she could have come at this conclusion, I thought to entirely mask this scent and prevent her finding the biscuit by pouring eau-de-Cologne on the stool. I found, however, it had no such effect, the biscuit was as readily and surely found when the eau-de-Cologne was there as when absent. It seems, then, that not only well-worn boots leave behind a recognizable odour, as Mr. Romanes proved, but also that to us at least so odourless a substance as dry plain biscuit emits so much and so characteristic a smell that it immediately spreads, even through considerable obstacles, to a distance of several inches in a few seconds, for in most cases the biscuit was found in thirty to sixty seconds after it had been hidden; thus time was not allowed, one would think, for all the surroundings of the hiding-place to become saturated with the scent.

W. J. RUSSELL.

#### Units of Mass, Weight, and Force.

MIGHT I venture to suggest to Prof. Greenhill that it would be very interesting to mathematicians, and probably would throw great light on the above subject, if he would give us quotations from some work by a practical engineer in which the idea of *inertia* distinctly appears. Or, failing this, perhaps Prof. Greenhill could give practical instances (other than problems in gunnery) in which *mass* quite apart from weight enters into the engineer's calculations.

It seems to me that many practical engineers never have occasion to deal with acceleration, except that of circular motion, and consequently only need to consider the *weight* of stuff, and have no use for the dynamical unit of force.

Gonville and Caius College, July 23.

JOHN B. LOCK.