DISCUSSION AND CORRESPONDENCE

BACTERIAL FILTERS AND FILTERABLE VIRUSES

DR. S. P. KRAMER'S experiments with bacterial filters and filterable viruses, printed in SCIENCE for January 14, 1927, lead me to draw more general attention to some work of Professor Richard Zsigmondy (recent Nobel prize winner), to which I referred in a discussion at the A. A. A. S. meetings in Philadelphia. In Chapter XIV, on "Filtration Experiments," of his book "Colloids and the Ultramicroscope" (Wiley & Sons, 1909), he says:

All three kinds of filters (Maassen, Pukall and Chamberland) contain pores large enough to allow the passage of gold particles of about 30 μμ and less. The pores of a cell are of very different sizes, the Chamberland cell containing, for example, large pores, which allow the gold particles to pass through, and others which retain most of them. The size of the pores is, however, not the sole criterion in filter experiments. It is of especial importance in coarse filters, whether the particles to be filtered are held to the surface of the cell by adhesion or "adsorption" (A), or not (B).

(A) In the first instance the substance to be filtered gathers upon the outside surface (and to a certain extent in the deeper pores), and prevents the other particles from forcing their way through; first, because the pores are made smaller; second, because the particles held fast to the surface of the cell repel the freely moving particles following the course of the current.[1]

(B) When adhesion or adsorption does not take place, all colloidally dissolved substances pass freely through the cell, providing the pores are large enough.

In the presence of a protective colloid, *e.g.*, egg albumen, all the gold particles pass smoothly through, whereas in the absence of protectors, matters proceed as in case (A). The fact that protected gold particles of 30 μμ and over easily pass through Maassen and Pukall filters should be of interest to bacteriologists. The Chamberland filter, too, contains, besides the very small pores chiefly present, others which permit the passage of particles of the size mentioned.

Another point of great importance to bacteriologists has been emphasized by Professor H. Bechhold, who found that lecithin emulsions whose droplets were several μ in diameter passed through ultrafilters capable of retaining hemoglobin, and whose pores were less than 30 μμ (pressure 150 g./cm²). Bechhold explains that the droplets assume a filiform shape in their passage, reforming on their exit.[2]

[1] This action may be due to the well-known negative electric charge of the particles, which apparently also affects the adhering gold particles.

[2] See Bechhold's "Colloids in Biology & Medicine," Bullowa's translation, Van Nostrand; also Vol. I of Alexander's "Colloid Chemistry, Theoretical and Applied," Chem. Cat. Co., 1926, articles on Ultrafiltration and Electro-ultrafiltration by Bechhold.

Bechhold says in the latter reference, p. 832:

Therefore the diameter of the pores of the ultrafilter gives no definite idea of the diameter of a retained particle as far as *emulsions* are concerned, whose disperse phase has a low surface tension against the dispersing phase.

Since the work of Heilbronn, Chambers, Seifriz and others shows the great changes in viscosity which organisms exhibit during mitosis, and since changes in the milieu may produce similar changes, we must observe many precautions before hazarding an opinion about size deduced from filtration experiments. Alteration of the pH of the milieu may modify the charges of particle and of filter, and even reverse them. Salt ratios and antagonism must be considered, as well as anything leading to formation of surface films. And these or other factors may influence the viscosity of protoplasm. Professor H. Schade illustrates a phagocyte passing in filiform fashion through an orifice very much less than its average diameter, and appearing in its usual guise after it emerges on the other side of the membrane.

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PUBLICATION BY PHOTOGRAPHY

IN SCIENCE for December 31, Professor Albrecht discusses the use of photographic reproductions of typewriting in scientific publication, and mentions the difficulty of the irregular spreading of ink on the typewritten sheet. Some years ago I had occasion to publish (*American Journal of Psychology,* 29, 1918, p. 120) a 4-page psychophysical table and, wishing to obtain a clear reproduction and yet to avoid the expense of having so extensive a table set up in type, resorted to the following method which may be of interest in this connection:

The ribbon was temporarily removed from the typewriter, or set as for stencil cutting. The sheet of paper upon which the table was to be typed was covered with a sheet of carbon paper and placed in the machine. As the typing proceeded each key impinged directly upon the back of the carbon paper and made an impression from the latter on the white paper. The result was a remarkably clear reproduction, which photographed well with about 2:3 reduction and which is quite legible in the final printed form. This method is somewhat more difficult than typewriting with a ribbon, as the typist can not see what she is writing. All errors were corrected by pasting over the mistake a piece of paper with the correct figures. A new sheet of carbon paper must, of course, be used for every page. The increased

clarity of reproduction by this method, however, seems worth the extra time and effort involved.

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IN SCIENCE for December 31, Professor Sebastian Albrecht, of Dudley University, Albany, calls attention to the callitypic reproduction of tables in Volumes IV and V of the Transactions of the Astronomical Observatory of Yale University. Some years ago during a strike of printers in the east, a number of publications depended entirely upon the typewriter and photoengraver for the preparation of their matter.

Professor Albrecht makes reference to irregularity of impressions. The electric typewriter obviates this phase, as the several models now on the market do not depend upon the touch of the fingers for impact with the paper, but have a uniform stroke, and the intensity of the impression can be regulated.

The communication refers to typing with an ordinary typewriter ribbon. During the newspaper strike in the east when copy was prepared for zinc etchings, the publishers used carbon paper made up in narrow strips the same width as the standard typewriter ribbon for the machines used, and substituted these for the ribbon. In this way a sharp impression was secured—cleaner than the impression of the type through an inked ribbon.

OTTO KNEY

THE FRENCH SOCIETY FOR BIOGEOGRAPHY

AT the time when the Société de Biogéographie enters into the fourth year of its existence, we draw the attention to this association which includes naturalists on all specialties: botanists, biologists, ethnologists, geologists and zoologists whose aim is to study in common the distribution of all beings over the surface of the globe, to specify the conditions of such distribution and to investigate into the determination of consequences of the formation of the flora and fauna both living and fossil.

The society holds every month a sitting, the order of the day of which having been settled beforehand affords useful and interesting discussions on the different subjects in hand. Besides it institutes at fixed intervals deep investigations on a subject selected among those which most deservedly engross the minds of biogeographers and whose solutions require the concourse of all the disciplines represented; thus it is that thanks to the initiative of the society, a series of memoirs bound in a volume of 250 pages has lately been devoted to the "Histoire du Peuplement de la Corse" and that it is preparing just now a new volume on "Le Peuplement des Montagnes."

The number of members of the society (the seat of which is in Paris, 61 rue de Buffon) is limited; but it is possible to procure its reports (Compte Rendu Sommaire des Séances de la Société de Biogéographie) by subscription.

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THE JOURNAL OF GENERAL PHYSIOLOGY

THE relation of publication to the advance of science is not open to debate, and because of the rôle which publication plays scientists are concerned in having available a suitable outlet in which to report their work, whether this be in a journal owned by a society, by an individual or endowed. Where but one journal exists in a special field of science, it becomes much more important that its editorial policies be such as to encourage the submission of the best work and that those responsible for its conduct obtain and hold the respect of workers in that field.

The Journal of General Physiology occupies a unique position, in that it offers the only outlet in America for papers in this field, and in the last analysis its policies are determined by a group virtually independent in many respects. Many engaged in research in general physiology feel that as now managed the *Journal* is not serving the science adequately. The usual courtesies of correspondence are frequently neglected, the receipt of manuscript is not promptly acknowledged, it is customary to print dates of acceptance rather than dates of receipt of manuscript, thereby depriving authors of some weeks or months of priority for new work, and in one case on record not only did the *Journal* decline to reply to any letters of inquiry concerning a manuscript but without having indicated whether or not it was acceptable, declined to return it until it was demanded by a legal representative. While this is an extreme case, the experience of several would indicate that if the *Journal of General Physiology* is to perform its functions properly, the procedures of its board should be revised, and steps taken to establish and maintain the editorial ethics which in general are accepted in the offices of scientific publications.

This matter is brought to the attention of physiologists generally as a constructive criticism and with a view ultimately to draft suggestions which it is believed those responsible for the *Journal of General Physiology* will duly consider because of their established interest in the science.

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The account given by Dr. M. M. Brooks of her unfortunate experience with a paper sent to me for the *Journal of General Physiology* is in its main fea-