While these results are no criterion for the protective action of media wherein bacteria have grown, towards these same bacteria, they do indicate that media may exhibit wide differences in "gold number," which often parallels protective and deflocculative action, as well as the ability to aid the passage of particles through filters. Thus, Hans Zinsser[7] reported that Ward and Tang, in his laboratory, found that the agents of vaccine and herpes would pass through a filter more readily when suspended in certain types of broth than when suspended in isotonic salt solutions, irrespective of pH; further, that Grinnell found that *B. prodigiosus* passed through all their "V" Berkefeld and Mandler filters, and through most of grade "N," if taken from old cultures and suspended in hormone broth of about pH 7.8.

Speaking of filtrable viruses, T. M. Rivers stated:[8] "Methods of filtration are crude and inaccurate, and the most any one can say concerning viruses is that under given experimental conditions they either pass or do not pass through certain filters. The failure to pass through a filter, however, is certainly not determined in every instance by the size of the virus."[8]

There are, no doubt, many other factors to be considered, besides the three above suggested. Thus, discrete particles in the medium might adsorb otherwise filtrable particles; or oppositely charged particles might form with bacteria a non-filtrable coagulum or union. As pointed out by May Annetts,[9] changes in conductivity, pH and stability may be expected to accompany the filtration of suspensoid sols. Filters described as "certain" may prove to be very uncertain, under special conditions. There is a wide call for bacteriologists, suitably equipped, to give proper recognition and evaluation to all these physicochemical factors, while attempting to establish exact technique for reproducible filtration experiments.

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A TEST FOR THE PRESENCE OF NOVOCAINE IN NERVOUS TISSUE

DURING the course of some research work upon spinal anesthesia, it became desirable to determine the degree of penetration of novocaine solution into the substance of the spinal nerve roots, spinal cord and medulla, when injected into the subarachnoid space of live animals. At first we attempted to follow the course of the novocaine by adding a dye (methylene blue) to the novocaine solution and checking the distribution of the color post-mortem. The dye was effective in coloring the surface of the nervous tissue and membranes but, on section, none was found within the substance of the nervous tissue. If the extension of the dye were an indication of the extension of the novocaine itself, the failure of the color to penetrate the nervous substance was not in accord with the production of anesthesia and, in some cases, the death of the animal. That the novocaine penetrated further into the nervous tissue than the dye with which it was in solution was the inevitable conclusion. To obtain direct evidence of this as well as to determine the exact distribution within the nervous tissue, a method of recognizing novocaine within the substance of the latter was sought. It occurred to one of us (Beber) that the novocaine might be diazotized, and a color reaction obtained with beta naphthol.

The method evolved is briefly as follows: The nervous tissue to be tested is placed in a beaker of cold 5 per cent. sodium nitrite solution. After a few minutes hydrochloric acid (1:10) is added in the proportion of one of the latter to five of the former solution. This liberates nitrous acid, which in turn diazotizes the novocaine. It is essential that the solution be kept cold for this reaction. After five minutes, the specimens are washed in distilled water and transferred to a 5 per cent. alcoholic solution of beta naphthol. The tissue containing novocaine takes on an orange red color which is greatly intensified by transferring to a weak solution (2 per cent.) of sodium hydroxide. The color fades if placed in water or carried through the usual solutions used in preparing paraffin sections. For section work it is found best after bringing out the color reaction to fix the tissue in 10 to 20 per cent. formalin for fifteen to twenty minutes, freeze and cut thick (fifty μ).

Control experiments, in which the nervous tissue was either treated with distilled water instead of novocaine or not treated at all, failed to produce a similar color reaction when subjected to the same process.

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SPONGE SPICULES FROM THE LOWER ORDOVICIAN OF WISCONSIN

WHILE examining insoluble residues from the Oneota dolomite (Lower Ordovician) of Wisconsin the writer came upon numerous detached sponge spicules from one locality. The location in question is on U. S. Highway 12, about three or four miles south of Springfield Corners, Wisconsin. Although the writer has examined several hundred samples of the Oneota from numerous localities in the Upper

[7] SCIENCE, 75: 257, 1932.

[8] Jordan and Falk, "The Newer Knowledge in Bacteriology and Immunology" (1927), p. 519; see also S. P. Kraemer, *ibid.*, 557.

[9] *Phys. Chem.*, 36: 2939, 1932.

Mississippi Valley, no sponge remains have been observed elsewhere.

The Oneota near Springfield Corners is a medium to thick bedded dolomite, having a gray or flesh color and carrying a few lenses and thin beds of chert. The sample yielding the spicules is from a pure, non-cherty bed, the insoluble residue consisting of a minute quantity of very fine sand, silt and sponge spicules.

Under the microscope the spicules are seen to be composed of amorphous silica, with considerable amounts of crystalline silica. In form they are uniaxial needles, sharpened at each end, and show no evidence of having been fused in the organism. The longest one observed measures 0.41 mm in length and 0.02 mm in diameter. Axial canals in the spicules can not be plainly seen, but there is a suggestion that they were present in life. It is believed, therefore, that the spicules are to be classified as Silicispongia, order Monactinellida Zittel.

The fauna of the Oneota is a meager one, and nearly all the forms found have been in the chert nodules. These sponge spicules may be the first sponge remains reported from the Oneota formation, as the writer has found no mention of them in the available literature describing these rocks. It is stated by Zittel[1] and Berry[2] that Monactinellid spicules are known from rocks as old as Silurian. No mention is made of their occurrence below the Silurian. If the writer's identification is correct, the spicules from southern Wisconsin may be the oldest Monactinellid spicules thus far discovered.

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THE WATER CONTENT OF MEDUSAE

DR. GORTNER'S faith[1] in a marine jelly-fish which is more than 99 per cent. water obviously can not be "flatly contradicted," but there are plenty of data which show his belief to be unfounded in the case of the commoner genera, and which justify skepticism.

In my paper I did not present new data because there was nothing to add to the old; but Dr. Gortner must have observed that the calculation of the "bound water" results in Table 3 necessitated routine determinations of total water. The total solid of *Cyanea* varied from 4.7 to 5.9 per cent., and that of *Aurelia* was always within the range given by Krukenberg. With Gortner's statement that the fraction of *organic* matter may be less than 1 per cent. I have no quarrel; indeed I once crudely estimated it by keeping a dead *Cyanea* in running tap water for 3 days and then drying it. The dry weight was 0.9 per cent. of the wet weight. The effect of the salts is clearly shown, also, by comparing the dry weight data of Krukenberg, whose jelly-fish came from the Gulf of Trieste, with those of Moebius, from the dilute sea water of Kiel Bay. The mean values for *Aurelia* were 4.88 and 2.08 per cent., respectively.

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QUOTATIONS

MEDICAL PATENTS

CEREMONIOUS opening of the new laboratories of an important drug manufacturing company is not an occasion on which we expect to hear plain speaking of the kind in which Sir Henry H. Dale indulged at Rahway, on the danger of being too practical in medical research, and of keeping a too eager eye on profits to be derived from the patenting of medical discoveries. The laboratories in question will undoubtedly develop many a useful remedy which will become the subject of a patent monopoly. Sir Henry spoke with authority. Once upon a time he was the director of just such a laboratory. Does not his own career argue against his contention that the pursuit of the practical is incompatible with the pursuit of pure science? He owes his present position of director of Great Britain's National Institute of Medical Research to the distinguished work that he managed to do as a chemist employed by a drug company whose patents are probably its most valuable assets.

There certainly has been no worshiping of false gods in the laboratories of the great German and American industrial organizations. Such Nobel Prize winners as Langmuir, Bosch and Bergius won their laurels as the employees of wealthy corporations. Indeed, certain kinds of research can apparently be conducted most effectively only with the financial aid and equipment of an industrial laboratory. If we want to learn anything about low-pressure chemistry, we must go to the General Electric Company; the best information on speech and hearing is likely to be obtained from the Bell Telephone Laboratories; the Eastman Kodak Laboratories are the recognized authorities on photochemistry. The larger and more liberal corporations have learned to leave their research staffs alone. Even pure science can not help making discoveries that yield a profit when exploited with the aid of patents.

Yet physicians as a class will endorse Sir Henry's warning. Deep down in all of us there is a repug-

[1] Karl A. von Zittel, "Text-Book of Paleontology," Eastman translation, p. 51, Macmillan Company, 1927.

[2] E. W. Berry, "Paleontology," p. 29, McGraw-Hill Company, 1929.

[1] SCIENCE, March 17, 1933.