transmission held by nearly all the early investigators) and very poorly with the hypothesis of initial, extranervous invasion. The generalized lymphoid hyperplasia found post-mortem is a secondary phenomenon. The subject will be dealt with at length in a paper which has just been submitted for publication in a medical journal.

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## THE NON-IDENTITY OF "PURE" AND "ISOELECTRIC" GELATINS

IN a recent text on biochemistry one of the writers (R. J. W.) made the statement, which is contrary to J. Loeb's conceptions, that "pure" and "isoelectric" gelatin are not identical. The validity of this statement and the clarity of the argument has been questioned, probably due primarily to the fact that no experimental confirmation was cited.

We have within the past year actually performed experimental work which seems to check this conclusion, and are therefore presenting it briefly at this time. The theoretical basis for the case must first be summed up.

If we possessed an organic ampholyte which by its chemical nature was exactly neutral in character, a solution containing nothing but this pure ampholyte and water would obviously be neutral in reaction and furthermore would be at its isoelectric point because the tendency to ionize as an acid and as a base would be exactly balanced.

If, however, we were to dissolve in pure water an ampholyte which is slightly more of an acid than a base, the solution would be slightly acid instead of neutral, and the material would *not* be at its isoelectric point, because by nature it ionizes more readily as $H^+ X^=$ than as $Y^+ OH^=$. In an electric field the substance should migrate to the anode because of this unbalanced tendency to ionize in the two ways. In order to bring such a solution to the isoelectric point of the ampholyte, one would have to add a small amount of acid to the solution. This would repress the acidic ionization of the ampholyte and increase its basic ionization.

Gelatin is, by any process of reasoning, a slightly acidic substance (or mixture of such substances). In its make-up there is a preponderance of acidic amino acids, and when amino acids are combined in the peptide linkage the resulting products are more strongly acidic than the original amino acids. Gelatin belongs, therefore, to the latter type mentioned above. A solution of "pure" gelatin would not be neutral and would likewise not be at the isoelectric point of the gelatin. A slight amount of acid would have to be added to bring it to this point.

Experimentally, we prepared three batches of electrodialyzed gelatin. These were washed with acetic acid and electrodialyzed according to the method used by one of us (L. F.) in previous studies on gelatin. The samples obtained yielded from 0.011 per cent. to 0.014 per cent. ash, which values are about one eighth as high as those of Loeb's "ash free" gelatin.

In three separate runs 0.5 per cent solutions of samples of electrodialyzed gelatin were subjected to from 4,600 to 5,100 volts potential in a two-compartment cell for from 70 to 90 minutes. The pH values of the original solutions in each of the cases were 5.2, 5.21 and 5.14. After subjecting the solutions to electrolysis, migration of the gelatin was noted in every case. The gelatin content of the anode portion after electrolysis was increased from 11 per cent. to 92 per cent. in the different experiments.

In another experiment a 5 per cent. solution of electrodialyzed gelatin with a pH value of 5.0 was electrolyzed in a similar manner. There was a 13.7 per cent. increase in the gelatin content of the anode compartment after electrolysis.

When one drop of normal HCl was added to a portion of the original 5 per cent. solution, the pH value was decreased to 4.52. Electrolysis of this acidified solution for 75 minutes resulted in a reversal of migration. There was a slight *decrease* in gelatin content of the anode portion, namely 2.3 per cent. This was expected, since the gelatin solution had been brought slightly to the acid side of the isoelectric point of the gelatin.

In summary we may state that when a solution containing electrodialyzed, non-ionogenic, "pure" gelatin was electrolyzed, a marked migration to the anode was noted. This appears to bear out the statement that "pure" gelatin and isoelectric gelatin are not identical. A similar statement applies to most other proteins as well as amino acids.

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## AIR FILTRATION IN BACTERIOLOGICAL LABORATORIES

ONE of the conspicuous results of building operations near our laboratory during the past two years has been the increased amount of dust in the air. Laboratory tables and equipment accumulate a layer of dust if the windows are opened for any considerable time during the day. Some of the time the dirt even sifts in with the windows closed. This, coupled with the close proximity of the power house, has caused much extra work of wiping up the dust and sterilizing the table with mercuric chloride-alcohol solution. Extra care in manipulations has been nec-

essary to avoid contaminations while making transfers or plating out samples.

Under these conditions, permission was granted to buy a small air-filtering apparatus designed for ventilating bacteriological transfer rooms. This apparatus, consisting of a blower fan and a filter, was installed in a window of a laboratory 12 by 20 feet and 15 feet high. It pushes filtered air into the room, forcing out the contaminated air through doors or any other opening. Although this room is larger than that for which the apparatus was designed, it was thought advisable to see whether conditions in the room could be improved for bacteriological work.

For testing the ability of the filter to reduce the number of microorganisms in the air of the room 5 petri dishes 120 mm in diameter, containing solidified nutrient agar, were exposed for three minutes on the laboratory table. The results of the first test were very interesting; before using the apparatus, exposed plates had an average of 15 colonies per plate after incubating four days. After three days' use of the filter, the average was 2 colonies per plate; one hour after stopping the apparatus and opening the window, the average was 16.7 colonies. The test was repeated about three weeks later with similar results.

The apparatus was then transferred to another room 9 by 20 feet and 15 feet high and installed in the transom over the door. Petri plates of nutrient agar were exposed for five minutes in the morning with the window and door closed and the air still. On these, an average of 19 colonies developed in four days. Plates exposed after the filter had operated ten minutes gave only an average of 5 colonies, whereas those exposed ten minutes after opening the window, had 20 colonies.

After several days' interval, the observations were contained in the same room, still without any special cleaning, with the following results:

| | Average |
|---|---|
| Closed room, air still | 16.6 colonies |
| After ten minutes operation of filter | 3.4 colonies |
| After one hour operation of filter | 8.8 colonies |
| Ten minutes after stopping apparatus | 11.0 colonies |
| Ten minutes after opening window and door | 20.0 colonies |
| One hour after opening window and door | 19.2 colonies |

These results show that in these laboratories, it is possible to greatly reduce the chance of air contamination of cultures by installing an air filter. There are two points, however, which make it inadvisable to use such a filter in an office laboratory. In the first place, the noise of the fan is distracting if one wants to do any except routine bacteriological work. In the second place, the temperature in every test was two to four degrees Centigrade higher in the room getting the filtered air than it was in the adjoining room with the window and door open. The only explanation of this seems to be that the air is heated that much as it is taken in over the motor of the fan. Of course, there are times when that would not be objectionable. As to its ability to furnish air free of microorganisms to a room, there can be no doubt. Petri plates, fifteen in all, exposed for five minutes each in the air current as it came from the filter remained sterile except in one case and then only one colony developed. Obviously, that was no fault of the filter.

The fact that the number of microorganisms suspended in the air is greatly reduced within ten minutes is interesting, as well as is the fact that the numbers seem to increase again, probably due to the stirring up of the dust in the room. For the present, it is planned to take advantage of this sudden reduction of suspended organisms by running the air-filtering apparatus only as it is desired to make transfers.

In these days when air-conditioning is beginning to be taken seriously, it may be well to look still further ahead to the day when conditioned and germ-free air will be forced not only into every bacteriological laboratory, but into every workroom where cleanliness is essential. In the meantime, an air filter, consisting of an electric fan and germ-proof filter offered for sale by a commercial firm, may be installed to force air freed of microorganisms into the transfer room and materially reduce the chance of contamination.

NATHAN R. SMITH
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## BOOKS RECEIVED

BURNHAM, WILLIAM H. *The Wholesome Personality.* Pp. xv + 711. Appleton. $3.50.

CHAPMAN, FRANK M. *Birds of Eastern North America.* Pp. xxviii + 581. Illustrated. Appleton. $5.00.

CHIDESTER, F. E. *Zoology.* Pp. xii + 581. 267 figures. Van Nostrand. $3.75.

ECKSTEIN, O., A. JACOB and F. ALTEN. *Arbeiten über Kalidüngung.* Pp. 237. 72 figures. Verlagsgesellschaft für Ackerbau, Berlin.

FREEMAN, JOHN R. *Earthquake Damage and Earthquake Insurance.* Pp. xiii + 904. Illustrated. McGraw-Hill. $7.00.

HARMAN, MARY T. *A Text-book of Embryology.* Pp. xiii + 476. 284 figures. Lea & Febiger. $4.25.

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TOBEY, JAMES A. *Cancer: What Everyone Should Know About It.* Pp. xxix + 314 + x. Illustrated. Knopf. $3.00.

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