MR. CHARLES W. PUGSLEY, of Lincoln, Nebraska, assistant secretary of agriculture, has presented his resignation to Secretary Wallace and has accepted the presidency of the South Dakota College of Agriculture and Mechanical Arts.

DR. J. HOWARD BROWN, Europa, Miss., and Dr. William L. Holman, San Francisco, have been appointed associate professors in bacteriology at Johns Hopkins Medical School, to succeed Dr. Stanhope Bayne-Jones, who resigned to become head of the department of bacteriology in the University of Rochester Medical School.

DISCUSSION AND CORRESPONDENCE

ON THE DONNAN EQUILIBRIUM AND THE EQUATION OF GIBBS

THE theory of membrane equilibrium due to F. Donnan (1911) is exciting much attention at the present time. There is no doubt that it is one of the most important contributions to colloid chemistry, and as the work of a fellow countryman, I do not wish to diminish the praise that has been given to it. Nevertheless, it is of historical interest to find that the Donnan equilibrium is one more addition to the list of theories implicit in the work of J. Willard Gibbs, published in the transactions of the Connecticut Academy in 1875. It is remarkable that Gibbs' equation has been overlooked for more than forty years, in view of the fact that membrane equilibrium enters into so many problems.

The following quotation is taken from the 1906 edition of "The Scientific Papers of J. Willard Gibbs," Vol. 1, p. 83:

> We will, however, observe that if the components S_1, S_2, etc., can pass the diaphragm simultaneously in the proportions a_1, a_2, we shall have for one particular condition of equilibrium
>
> $a_1 m_1' + a_2 m_2' + \text{etc.}, = a_1 m_1'' + a_2 m_2'' + \text{etc.}\ldots\ldots$" (78)
>
> a_1 = equivalent weight of substance S_1
> a_2 = equivalent weight of substance S_2
> $m_1' = m_2'$ are the potentials of S_1, S_2 inside the membrane
> $m_1' = m_2''$ are the potentials of S_1, S_2 outside the membrane
>
> If S_1, S_2 behave like perfect gases, equation (78) can be simplified since $dm_1 =$ at. d. log p_1 (285)
> where t is the temperature and p the pressure
>
> $$\log p_1 + \log p_2'' = \log p_1'' + \log p_2''$$
>
> expressing concentrations in the conventional manner this becomes
>
> $$[S_1]' \times [S_2]'' = [S_1]'' \times [S_2]''$$

Equation (78) applies to solutions of electrolytes which do not obey the gas laws, but we have stated this simple form of it for comparison with Donnan's equation:

$$[\text{Na}]' \times [\text{Cl}]' = [\text{Na}]'' \times [\text{Cl}]''$$

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IRON-DEPOSITING BACTERIA

THE presence of three kinds of iron-depositing bacteria (*Spirophyllum ferrugineum* Ellis, *Gallionella ferruginea* Ehrenburg, *Leptothrix ochracea* Kützing or *Chlamydothrix ochracea* Migula) in the natural chalybeate waters around Yellow Springs, Ohio, seems not to have been reported previously.

Gallionella, according to Harder,[1] has been reported in three localities in the United States, *viz.*, from mines in southwestern Wisconsin, central Minnesota and from the city water supply of Madison, Wisconsin. As found at Yellow Springs, Gallionella, as well as the other two genera mentioned above, is abundant in the water that issues to the surface in the Cedarville limestone. One of these chalybeate springs has made a large deposit of ocherous material, which gives us some indication that the deposition at this particular spring has probably been going on for a long time.

As noted by Harder[1] it is quite striking that these iron bacteria are so peculiarly distributed, their distribution sometimes seeming to depend upon the amount of iron in the water, but often on other less well-known causes. We have many springs in this vicinity and these bacteria appear in a very few of them. The causes of distribution as well as many morphological and physiological features of these iron-depositing bacteria remain unsettled.

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WATER GLASS AS A MOUNTING MEDIUM

THE use of the common water glass or egg preserver as a mounting medium for microscopic objects has not been reported to my knowledge. Very recently I have had occasion to use it with such apparently successful results that I am forwarding this note in the hope that others who possibly have tried it successfully or otherwise will give us the benefit of their experiences.

It is used in the same manner that one would employ with Canada balsam, but has the added advantage that dehydration is not necessary. The medium at the periphery of the cover glass quickly hardens to the consistency of glass itself, thus sealing in the liquid center in which the specimen is held. The liquid condition of the medium surrounding the specimen, while viscous enough to prevent movement,

[1] Harder, E. C., "Iron-depositing bacteria and their geologic relations," U. S. Geological Survey Professional Paper 113.

allows hairs, scales and bristles to maintain a natural position. It is not satisfactory for mounting alcoholic specimens, but those previously cleared in K O H may be mounted with the same ease that is experienced with fresh or water preparations.

It also makes a very satisfactory substitute for shellac in mounting insects on points, as it is colorless, unaffected by heat and holds the insect securely in many cases where the shellac mounted insect is apt to snap off.

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UNIVERSITY OF CALIFORNIA

STAFF ORGANIZATION OF INSTITUTIONS OF RESEARCH AND EDUCATION

PROFESSOR WHETZEL'S letter of resignation as administrative head of the Department of Plant Pathology at Cornell University, extracts from which were printed in *Phytopathology*, xii 10, October, 1922, p. 499, ought to lead to a broad discussion of the staff organization of our institutions of research and education. There is no question that our present system is archaic, a remnant of the time when our institutions were small and each department was fully served by a single scientist or professor with perhaps the aid of an assistant whose duties were strictly those of a helper.

With the growth of our institutions there has been a natural increase in the working force of the various departments, while administrative duties have absorbed more and more of the energies of the department chief, with the result that at the present time the bulk of the research and teaching is being taken care of by persons of the nominal grade of assistant, though with a minimum of direct supervision by the department head. If the only persons concerned were those to whom the system is familiar, the matter of title would be of little consequence. The system, however, is very confusing to members of the general public, who are in the habit of interpreting the titles of professional workers in terms of their own occupation. To such persons the assistant is merely a helper, a species of apprentice who has not demonstrated the capacity for independent work, and one who remains an assistant indefinitely is looked upon as a failure in his profession. Not long ago I was discussing the merits of a certain research worker with a man of wide business experience when I was interrupted by the remark: "But he is only an assistant. He hasn't arrived." Need we marvel that men of this type are so often suspicious of the education which has been so largely imparted by the assistant professors of our colleges? Is it strange that the hard-headed business men who inhabit our legislative halls go slow in providing support for research to be carried on by apprentices? And how are we to regard the farmer who, having written for information to his state experiment station and receiving a perfectly good letter signed by an assistant, feels that his request has been slighted, loses confidence in the institution and fails to write again?

Thus it follows that young men of real ability as teachers or investigators, if they are to gain proper recognition and an adequate salary, and if they are to gratify a laudable ambition for accomplishment, are forced into commercial lines or obliged to seek administrative positions when they may have but moderate administrative talent and would be happier and more successful could they pursue the occupation of their choice. As the demand for administrators is limited, the result is discontent and frequent changes of personnel. Evidently there is a feeling abroad that the present form of organization might be improved. Many of the larger universities have established full professorships other than those occupied by administrative department heads, but this practice does not abound to as great an extent as could be wished. The appointment of associates and subsidiary research men has served as an expedient to get around the difficulty. No doubt many of the heads of our institutions would be glad to give their men greater recognition if they could do so without appearing to degrade the professional title by associating it with an inadequate salary, and there are certainly numerous departmental heads of broad enough mind to see no loss of prestige to themselves in an increased recognition of their associates. Probably reforms in these respects may best be brought about by degrees, and Professor Whetzel's suggestions, if not too strictly interpreted, have a good deal of point as a step taken by one on the inside. May we not hope that when many of the so-called assistants shall find themselves in positions of administrative authority, means may be found for further progress in organization reform?

W. J. YOUNG

OHIO AGRICULTURAL EXPERIMENT STATION

QUOTATIONS

THE BRITISH NATIONAL TRUST

YESTERDAY the National Trust added another interesting possession to its steadily growing list. Lord Ullswater accepted, on its behalf, from the Norfolk and Norwich Naturalists' Society an island of some twelve hundred acres of sand-dunes and saltings on the Norfolk coast, the protection of which has long been desired by all lovers of birds and flowers to whom it was known. Such a place finds its natural guardian in the Trust, whose work at Wicken Fen, Blakeney Point, and elsewhere has already won the