cited; the mistake is the one practical breeders have so commonly made for generations past of generalizing from a few instances. One often wishes it were as easy to inculcate into students the principles of genetics as it is to gain a wide acceptance of theories that have no scientific basis and calmly disregard any demands for proof.

L. J. C.

## SPECIAL ARTICLES

### ON THE RELATIONSHIP BETWEEN FREEZING POINT LOWERING, Δ, AND SPECIFIC ELECTRICAL CONDUCTIVITY, K, OF PLANT TISSUE FLUIDS

THE problem of the contribution of non-electrolytes, of undissociated molecules of electrolytes, and of dissociated ions of electrolytes to the depression of the freezing point, Δ, in terms of which osmotic concentration is usually measured, is one of considerable biological importance. We desire to know, for example, whether an observed difference in the osmotic concentration of the tissue fluids of a species growing in two different habitats is due primarily to differences in the quantities of electrolytes absorbed from the medium or to differences in the quantities of organic substances elaborated. The same question naturally arises when one is comparing the osmotic concentration of the tissue fluids of different species in the same habitat.

In the mixed solutions with which the biologist has to deal the problem presents serious difficulties. In certain cases some progress may be made by determining the correlation between the freezing point depression, Δ, and the specific electrical conductivity, $K$.

As a specific illustration we may take the relationship between osmotic concentration and electrical conductivity in a series of plant species growing in the non-halophytic habitats of the north shore of Long Island.[1]

In a series of 19 species of trees, 36 species of shrubs, and 162 species of herbs both Δ and $K$ are highly variable. The coefficients of variation, *i.e.*, 100 $\sigma/m$, where $\sigma$ is the standard deviation and $m$ the means are:

| | Δ | $K$ |
|---|---|---|
| Trees | 21.46 | 28.49 |
| Shrubs | 18.46 | 28.03 |
| Trees and shrubs | 20.20 | 28.27 |
| Herbs | 23.46 | 25.33 |

Our problem is to determine whether higher values of $K$ are associated with higher values of Δ, or whether within each of these growth forms[2] these two constants of the solution are essentially independent.

Determining the correlation coefficients by the usual product moment method we have the following measures of relationship between the magnitudes of $K$ and Δ in the various series.

For trees, $N = 19$, $r = +0.127 \pm .152$
For shrubs, $N = 36$, $r = -0.079 \pm .112$
For trees and shrubs, $N = 55$, $r = +0.022 \pm .091$
For herbs, $N = 162$, $r = +0.150 \pm .052$

For ligneous plants the correlations between Δ and $K$ are low and statistically insignificant in comparison with their probable errors. The coefficient for shrubs is actually negative in sign. That for trees and shrubs together is sensibly zero. The coefficient for herbaceous plants is also low but may indicate a slight relationship between the two constants, higher values of Δ being associated with higher values of $K$ and *vice versa*.

These results show that, in the vegetation of the glacial moraines of Long Island at least, there is practically no relationship between the concentration of ionized electro-

[1] Protocols of data and full details are given in a paper in press in the *Journal of Physical Chemistry*.

[2] It is necessary to separate the growth forms, since, as shown in detail elsewhere (Harris, Gortner and Lawrence, *loc. cit.*), the growth forms are highly differentiated with respect to both Δ and $K$. The actual means are:

| | Δ | $K \times 10^6$ |
|---|---|---|
| Trees | 1.292 | 11,213 |
| Shrubs | 1.177 | 10,770 |
| Trees and shrubs | 1.217 | 10,923 |
| Herbs | 0.846 | 14,308 |

lytes and of total solutes (molecules and ions) in the leaf tissue fluids.[3]

J. ARTHUR HARRIS,
ROSS AIKEN GORTNER,
JOHN V. LAWRENCE

## THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

### MINUTES OF THE EXECUTIVE COMMITTEE OF THE COUNCIL

THE meeting was called to order at the Hotel Belmont, New York City, on October 17, at 11 A.M., with Dr. Simon Flexner in the chair. The following members were present: Cattell, Fairchild, Flexner, Humphreys, Livingston, Nichols, Osborn.

1. *Minutes of last meeting* (published in SCIENCE, May 7, 1920) were approved.

2. *Audited report of retiring permanent Secretary* (Dr. L. O. Howard, for period from November 1, 1919, to April 1, 1920, was accepted and ordered to be filed and published in SCIENCE.

3. *Summarized report of new permanent secretary* (Dr. Burton E. Livingston) for period from April 1 to September 30, 1920, was accepted and it was ordered that such parts of it be published in SCIENCE as seem desirable to the permanent secretary. (The financial statement will be presented to the council before publication; other features will shortly appear in SCIENCE.)

4. *Election of section officers.*—Dr. A. E. Jenks was elected to be vice-president and chairman of Section H (Anthropology). Dr. E. A. Hooton was elected secretary of Section H.

5. *A special committee on the organization of Section H (Anthropology)*, which is a new section, formed by the division of the old Section of Anthropology and Psychology, was established, this committee to be appointed by the president and permanent secretary in collaboration and to cooperate with the section officers just elected. (This committee will shortly be announced in SCIENCE.)

6. *Present permanent secretary* was nominated to the council, to continue to serve during the ensuing 4-year term as heretofore; that is for one third of his time.

7. *Other nominations for Association officers* (president, general secretary, treasurer, five council members, two executive committee members). It was voted that these nominations be made at the first meeting of the council at Chicago and that elections occur at a later meeting of the council.

8. *Nominations for Committee on Grants* (3 members), to be appointed by the president with advice of the council. The executive committee recommends to the council that it is desirable to nominate members who are not now members of the Grants Committee, but the various branches of science should continue to be severally represented as heretofore. This matter should receive attention at first Chicago meeting of Council and nominations should be made at second meeting.

9. *Science News Service,* supported by Mr. W. E. Scripps. Dr. J. McK. Cattell and Dr. Geo. T. Moore were elected to represent the association in an advisory committee of this service.

10. *Editorial Committee for Science.*—It was voted that this committee continue to be constituted as heretofore; namely, of (*a*) its original members, (*b*) the chairman of the association sections for each year, and (*c*) the members of the executive committee.

11. *Determination of the chairman of Executive Committee.*—It was voted that chairman of this committee is to be elected by the committee at its last session at each 4-year meeting of the association, the term of office of the chairman to be for no more than four years.

12. *Election of Fellows.*—Three hundred and seven members were elected to fellowship, their nominations having been received from the following sources: by Secretary of Section A, 6; by Secretary of Section B, 37; by Secretary of Section E, 35; by Secretary of Section G, 162; by Secretary of Section O, 5; by Secretary of Section Q, 56; by permanent secretary, 6. It was voted that nominations for fellowship received by the permanent secretary shall hereafter be referred to the secretary of the proper section, so that all nominations shall come to the executive committee from the section secretaries. (Nominations for fellowship should be sent to section secretaries rather than to permanent secretary. Section secretaries are urged to send their lists of nominations to the permanent secretary in time so that they may be acted on at each meeting of the executive committee.)

13. *Auditor* for permanent secretary's annual report. The resignation of Mr. Herbert A. Gill was accepted and filed, and the committee passed

[3] This result holds within the individual classes. In comparing ligneous and herbaceous growth forms we note that the growth form with the higher total concentration has the lower conductivity. This is shown by the fact that the ratio of $K \times 10^6$ to $\Delta$ is 10923/1.217 for trees and shrubs but 14308/0.846 for herbs.