by international cooperation.—The London *Times*.

SCIENTIFIC BOOKS

Readings in Evolution, Genetics and Eugenics. By Horatio Hackett Newman. Chicago, 1921: The University of Chicago Press. Pp. XVIII plus 523.

Doubtless every college teacher who gives a general course in organic evolution has at times wished for the presentation in a single text-book of the materials he has found it necessary to have his students glean from numerous volumes. This need has been met by Professor Newman in the present book. The work is drawn up on much the lines of the "source books" in history which have become popular in recent years, and it will doubtless fulfill a similarly useful function for courses in evolution, genetics and eugenics. The wide range of matter necessary for such courses has been selected from the books and papers of many authors and reprinted in their own words, but the whole has been deftly knit together by means of occasional brief comments and passages written by the compiler himself.

One's preconception of such a presentation is that it must inevitably be a patchwork, but, as a matter of fact, Professor Newman, by judicious selection, has achieved a surprising unity. Another inherent difficulty in such a collection of articles and excerpts is the impossibility of touching out in otherwise excellent older accounts what, in the light of our more recent knowledge, are minor mistatements or contradictions; but here again, through careful choice, the defect has been reduced to a minimum.

The typographical errors observed by the reviewer are few. In line 6, page 294, *this is* should read *that is;* the numeral in line 16, page 365, should be 18 instead of 19; figures 87 and 88 on pages 434 and 435 have been exchanged.

The thirty-seven chapters (512 pages) are divided into five main parts: (1) Introductory and Historical (pp. 3 to 53); (2) Evidences of Organic Evolution (pp. 57 to 182); (3) The Causal Factors of Organic Evolution (pp. 185 to 283); (4) Genetics (pp. 287 to 456); and (5) Eugenics (pp. 459 to 512). Since the historical survey in Chapter II plunges one into the midst of genes, x-chromosomes, selection, orthogenesis, heterogenesis, Mendelism, biometry, etc., the general reader could find his way through this maze far more readily if a full glossary of scientific terms were appended. Such a glossary would also be very helpful in relation to other parts of the work.

In many colleges and universities the work in genetics and in organic evolution is given as separate courses. The reviewer, in fact, has used the volume under discussion in a practical way only as a text for a course in evolution. For such a purpose it would be advantageous to have the sections dealing with variation introduced before or along with the discussion of the causal factors of organic evolution. It is probable also that many teachers would, as does the reviewer, prefer to have the evidences from morphology presented before those from paleontology, but there is, of course, no reason why the user of the book may not take the various sections in this order if he so chooses. While to the initiated the chapters on Neo-Mendelian Heredity, Sex-linked and Other Kinds of Linked Inheritance, and Linkage and Crossing-Over are clear, succinct accounts, it is questionable if the beginner would get far with them without considerable additional elucidation on the part of the teacher.

In the opinion of the reviewer, Professor Newman has, in this series of readings, prepared for the general student the most complete and acceptable one-volume account of organic evolution and allied subjects in print.

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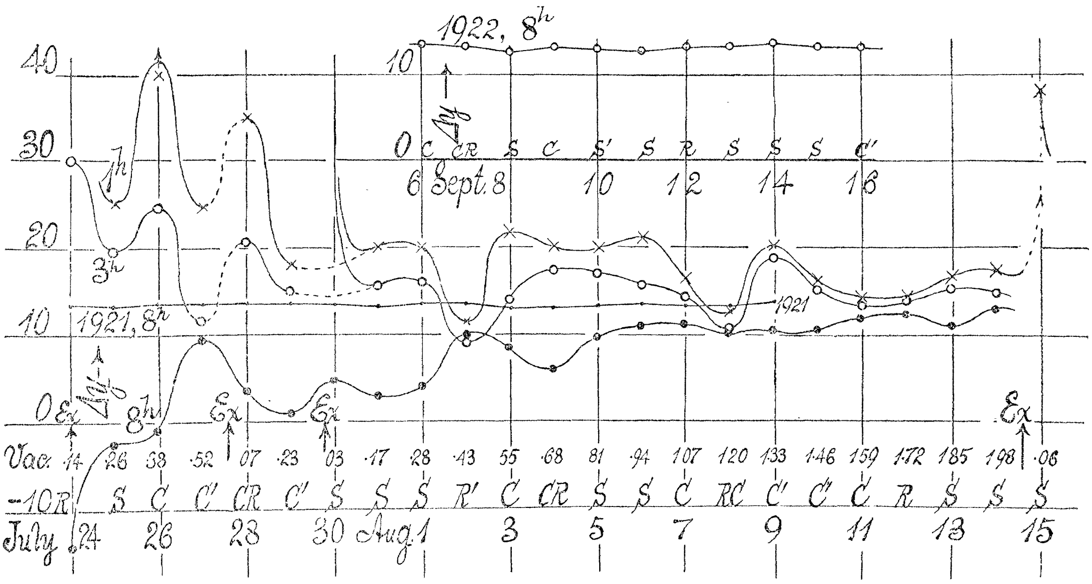
SPECIAL ARTICLES

STATIC DEFLECTIONS OF THE VACUUM GRAVITATION NEEDLE, IN 1921 AND 1922[1]

To obtain a comparison, it will be necessary to measure the distance apart, Δy (y being the telescopic scale reading, with the needle at rest), of the equilibrium curves corresponding to the two opposed positions of the attracting

[1] Advance note, from a Report to the Carnegie Institution of Washington, D. C.



weights, M, at the same hour, on successive days. As the graphs are often quite divergent, the interpolations will lose in accuracy; but the general relations of the results will nevertheless appear much more clearly. These static deflections, Δy, are given in the lapse of time in the figure. For 1922 the graphs are drawn for 1^h, 3^h, 8^h P.M. of the successive days,[2] and are distinguished by circles or crosses. For 1921 the night observations (at about 8 P.M. on the average) only are given, as the other lines would lie too close and confuse the diagram. In fact the variations in 1921 are of a smaller order and must be given on a scale ten times larger to be adequately shown.

The diagram brings out the striking difference of the results very well. For 1921 the observations lie practically on a straight line, $\Delta y = 13.42$, for which the normal period of the needle in vacuo would be 752 sec. In the results for 1922 the time of the successive exhaustions (Ex) is indicated approximately. It will be seen that the cooling or other influence of such an exhaustion (though carried from 1 mm. to .001 mm. only) is still effective in exaggerating the radiant forces, for at least six hours or more (*cf.* July 24, 30) after the exhaustion has been completed. Consequently the graphs for 1^h and 3^h should probably be joined by the dotted lines as indicated.

In all cases the extraneous radiant disturbance which is strong in July, 1922, gradually recedes more and more, as the observations enter the days in August. On July 24 at 8 P.M. the combined gravitation and radiant effect of the attracting mass M was repulsive (Δy negative), the radiant repulsion being about twice the gravitational pull. Positive values are not reached until after July 26. From July 28 on, the 8 P.M. increase is determined, though it has not quite reached the values of Δy even at the end of the diagram (August 14). In the afternoon observations (1922) the rain effect (or the absence of sun effect) is brought out very clearly by the marked depressions on August 2, 8, 11, 12. At night this effect may be reversed. When the day's radiation is scantily received, the needle fails to radiate at night.

In case of the observations of 1921, the small fluctuations of the Δy curves throughout a month showed instances of resemblance to the run of atmospheric temperature. But in the large variations recorded in 1922 (as a consequence perhaps) I was unable to detect such resemblances in the night observations, which are here alone of interest. The same is true of the change of temperature per day, etc. Nevertheless it is possible that relatively

[2] S denotes sunshine, C cloudy, C′ partly cloudy, R rain. Vac. shows the vacuum in mm. of mercury.

short atmospheric temperature changes from without, such as would not be otherwise recorded, may make an impression on the 8 P.M. graph. This, however, would not bear upon the 1922 graph as a whole, from July 24 to August 14. Supposing, moreover, that the closed region within is in some way modified thermally by the high exhaustions (carried to within .001 mm.), it seems hardly probable that the apparatus would take so long to return to the normal condition of 1921.

What has gone down during this series of measuremeents is the vacuum and one would therefore conclude that states of high exhaustion (a few hundredths or tenths of a mm.) are (like the plenum) more susceptible to the presence of radiant activity than the lower exhaustions of a few mm. Thus, night observations presupposed, the radiant forces pass through a minimum in a partial vacuum of several millimeters or more, and the best conditions for observation are then at hand. To test this further, I exhausted the apparatus on August 14. The morning observations August 15, twelve hours later (see figure) are again abnormally high.

It not infrequently happens that night values are low when day values are high and, in general, there is a tendency of the graphs to converge toward rainy or densely cloudy weather. All this conforms with the view that the needle is screened from radiation by the large attracting mass M and that the radiant forces act with gravitation, if the temperature-time coefficient $d\theta/dt$ is positive, and act against gravitation when $d\theta/dt$ is negative, as elsewhere explained. I have been tempted to envisage a coefficient $d\theta/dt$, which is not all temperature; for there may be some other radiation or agency behind the recent rains (for instance), as well as behind the difference in the character of the results of 1922 and 1921 as exhibited by the figure. It is difficult, in other words, to surmise what the nature of the radiant discrepancy may be, which clings to the apparatus so persistently in July and early August. If it were merely thermal, or dependent on a kinetic mechanism associated with $d\theta/dt$, its behavior would seem to be incompatible with the daily cycle, which is practically immediate. However, if the slopes of the curves giving the static elongations, y, of the needle in the lapse of time, are enhanced by the higher degrees of exhaustion, these curves would also ultimately intersect, so that even negative values of Δy, referable to causes within the apparatus would not be unexpected.

On my return to the laboratory in September, I resumed the work (upper curve). The vacuum had in the mean time decreased to about 3 mm. Under these conditions the night observations (8^h) are again normal and compare favorably with the corresponding graph of 1921, as was anticipated.

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THE AMERICAN CHEMICAL SOCIETY

(Continued)

Division of Dye Chemistry
William J. Hale, *chairman*
R. Norris Shreve, *secretary*

SYMPOSIUM ON METHODS FOR STANDARDIZING AND TESTING DYES
R. E. Rose, *chairman*

Introductory remarks: Robert E. Rose.

Chemical control of dyestuffs: Walter M. Scott. This paper presents a general discussion of various methods for estimating the strength of dyestuffs as follows: (1) Colorimetric comparison of standard dyestuff solutions. (2) Titration of a solution of known strength of dyestuff with a standard solution of titanous chloride in an atmosphere of carbon dioxide. (3 Determination of the percentage of nitrogen by the Kjeldahl method. (4) Estimation of the inorganic salts which have been used in the standardization of the dyestuff. In connection with the materials used in dyeing there is such a great variety that it is only possible to discuss a few of the more common types. This paper gives an outline of the general methods of analysis used and also suggested specifications for the following: acetic acid, sulfuric acid, ammonia, black iron liquor, commercial "nitrate" of iron, di-sodium phosphate, Glauber's salt, common salt and soap made from olive or red oil.

The estimation of erythrosine: W. C. Holmes. A method is outlined for the direct evaluation of