



of absorption for air is very small, the penetrating radiation would be very considerably increased. The amount of ionization in the open air is in agreement with this view.

Curve 2 is very similar to the curves representing the hourly rate of change of temperature during the day.

The third method is the determination of the rate of leak below the ground. If the penetrating radiation is due to the γ radiation from radium in the ground, the ionization caused by it should be twice as much in a well or cave in the ground. During the summer the writer tested this by placing the electroscope in a cave. The rate of leak was found to be somewhat less than that occurring during the night on the surface, and was found to be about the same as the leak when the electroscope was surrounded with four feet of water in a cistern. Moreover, the rate of leak was the same during the day as during the night. Similar results have been found by Elster and Geitel.

The conclusion is that a large part of the ionization in closed vessels due to the external penetrating radiation is subject to large variations, and probably consists of γ rays from radioactive products in the air rather than in the ground. These products vary very much in quantity according to atmospheric conditions. A very convenient method of measuring these products is by measuring the amount of the ionization due to the penetrating radiation.

The writer wishes to express his sincere ap-

preciation of the constant spirit of interest shown by Professor Ames.

W. W. STRONG

JOHNS HOPKINS UNIVERSITY

MELTING-POINT CURVES OF BINARY MIXTURES OF THE THREE NITRANILINES

SOME interesting results have developed in the course of an investigation of the subject mentioned above. We prepared a series of mixtures of ortho- and metanitriline, the difference in composition between each consecutive member being 2 per cent., and plotted the melting points of these mixtures against their composition. The curve produced was regular, it fell from 71° , the m. p. of the pure ortho compound, to 54° , the eutectic point, then rose steadily to 114° , the m. p. of pure metanitriline. It is possible, therefore, to employ the curves to determine the composition of mixtures of the two isomers. For this purpose the melting point of the substance under examination is determined; this gives, in general, a temperature corresponding to a position on each limb of the curve and therefore to two possible mixtures. Another portion of the substance is now ground up with an approximately equal weight of either of the pure isomers—say the meta- and the m. p. of this mixture is determined. If it is lower than that of the first one the composition of the original material is represented by the point on the *ortho*-limb of the curve, whereas, if the second m. p. is higher than that of the first, the composition is read off from the

meta- side of the curve. In practise the two melting points are determined simultaneously, on the same thermometer. The method is extremely simple and requires a minimum of time and material, the results, so far as we have been able to test them, appear to be accurate to within 2 per cent. The ordinary method for the separation of these substances consists in laborious, repeated fractional crystallization.

We believe that this application of melting points is new.

A curve of a similar nature is given by mixtures of *meta*- and *paranitraniline*; it also can be used in the manner described above for quantitative analytical purposes. On the other hand, the melting points of mixtures of *ortho*- and *paranitraniline* vary in a remarkable manner, rising and falling through many degrees for relatively small differences in composition. The reason for this behavior is at present under investigation; it is possible that it may be connected causally with the constant, simultaneous production of *ortho*- and *para*-disubstituted benzene derivatives.

We expect to publish the full details of the work outlined in this note in an early number of the *Journal of the American Chemical Society*.

J. BISHOP TINGLE,
H. F. ROLKER

McMASTER UNIVERSITY
TORONTO, CANADA,
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NOTES ON ENTOMOLOGY

DR. HANS ROESCHKE's revision of *Cychrus*¹ is a work of much interest to American coleopterists since about half of the forms occur in the United States. The material at his command was quite extensive for the western species, but with the eastern species he has a rather slight acquaintance. Dr. Van Dyke has examined for him the types of Leconte and

Horn, and from the St. Petersburg Museum he has had types of Eschscholtz, Mannerheim and Ménétries, and much valuable material from the Oberthür collection. He recognizes three genera; *Scaphinotus*, with seven subgenera, among them *Nomaretus* and *Brennus*; *Cychrus*, with two subgenera; and *Sphæroderus*. Dr. Roeschke is a "lumper," and reduces the host of nominal species to 62; most of them with one or more subspecies, varieties or aberrations under them. There are three new species of *Scaphinotus*, all from Arizona, and one new subspecies of *S. elevatus*. *Nomaretus* is restricted to *N. cavicollis*, *bilobus* and *fissicollis*, the others forming a new subgenus, *Pseudonomaretus*. A new subgenus, *Neocychrus*, is erected for *C. angulatus*, and a new form, *N. behrensi*, from California. There are several new subspecies in *Brennus*. The plate illustrates the structural characters of the genera.

MAJOR T. L. CASEY, who apparently loves to study difficult groups of beetles, has published a large work on one of the little-known subfamilies of darkling beetles.² He divides the subfamily into 25 tribes, nine of which have no representatives in our fauna. There are 350 species, arranged in about 50 genera and several subgenera. Nearly all of the species are described as new, and most of them come from Arizona and California, others from Texas and Utah. Extremely few of the species are as yet known from more than one locality. About 25 of the species are from Mexico or Central America.

MR. W. L. DISTANT has issued another part of his large work on Transvaal insects.³ This part deals with the Fulgoridæ, and contains descriptions of many handsome species. But the most notable thing about the work is the placing of the portraits of Francis Walker and Carl Stål side by side.

² "A revision of the American components of the Tenebrionid Subfamily Tentyriinæ," *Proc. Wash. Acad. Sci.*, IX., 275-522, 1907.

³ "Insecta Transvaaliensia," Part VIII., pp. 181-204, 1907; 2 colored plates and several text-figures.

¹ "Monographie der Carabiden-tribus Cychrini, mit Bemerkungen über Typen und Lokalrassen der amerikanischen Arten von Dr. Edwin C. Van Dyke," *Ann. Mus. Nat. Hung.*, V., pp. 99-277, 1 plate, 1907.