

tion of the Odonata can be compared. A new map showing the mean annual temperatures of these countries has been compiled on the basis of previous maps and more recent records of meteorological observatories, and is included in the volume. Classifying these temperatures into groups of 5° C. each, there are obtained five (or six?) zones whose mean annual temperatures range from 30° (or more?) C. to less than 10° C. The second table in the introduction, a systematic list of the species, gives their distribution, *inter alia*, by temperature-zones. Incidentally it may be mentioned that the zone of 25°–20° C. has yielded the greatest number of species of dragonflies and the greatest number of endemic species.

As may be gathered from the foregoing, the ecological relations of these insects have not been fully treated in the *Biologia*, but many data have been brought together in a separate paper<sup>4</sup> dealing with the composition of this Odonate fauna and its relations to temperature, rainfall, forest areas and other environmental factors. Two ecological topics, however, are incidentally referred to in the *Biologia* volume but not in the ecological paper: Mimicry and the Proportions of the Sexes.

The examples of mimicry indicated are: *Paraphlebia* and *Palæmnema* (page 133, footnote ‡); *Libellula saturata croceipennis*, *Orthemis ferruginea*, *Libellula foliata* and *Palltothemis lineatipes* (pp. 212, 292); *Dythemis cannaerioides* and *Cannacria* species (p. 277); *Rhodopygia hollandi* and *Erythemis hæmatogastra* (pp. 319, 338); *Platyplax sanguiventris* and *Erythemis peruviana* (pp. 328, 334). In none of these cases, however, is there as yet any evidence for or against the protective value of these resemblances.

*Proportions of the Sexes.*—10,838 specimens have been cited in this work from Mexico and Central America and 2,746 of the same species from other countries. Of the 10,838, 7,165 are males, 3,673 are females. That these

<sup>4</sup>“The Composition and Ecological Relations of the Odonate Fauna of Mexico and Central America,” by Philip P. Calvert. To appear in the *Proc. Acad. Nat. Sci. Philadelphia* for 1908.

numbers can not be regarded as having any special significance may be seen from the following comparisons:

A. Forms with dissimilarly colored wings in the two sexes, males the more conspicuous: *Heterina cruentata* 265 ♂, 91 ♀; *H. vulnerata* 43 ♂, 44 ♀; *H. macropus* 239 ♂, 81 ♀; *H. infecta* 27 ♂, 27 ♀.

B. Forms with uncolored wings, bodies dissimilarly colored in the two sexes: *Argia extranea* 236 ♂, 160 ♀; *A. pulla* 414 ♂, 53 ♀; *A. lacrymans* 7 ♂, 7 ♀; *Ischnura ramburi* 18 ♂, 27 ♀; *I. denticollis* 140 ♂, 143 ♀; *I. demorsa* 44 ♂, 57 ♀; *Orthemis ferruginea* 196 ♂, 76 ♀; *O. levis* 28 ♂, 28 ♀.

C. Forms with similarly colored wings and bodies: *Megaloprepus cærulatus* 42 ♂, 32 ♀; *Mecistogaster ornatus* 49 ♂, 73 ♀.

It is more likely that these numbers are due to the accidents of collecting than that they represent the proportions of nature.

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#### SOME INVERSIONS OF TEMPERATURES IN COLORADO

As a part of some botanical work being done on the hills south of Boulder, Colo., two thermographs were kept running during the spring of 1908. One of these was located on the campus of the University of Colorado, at an altitude of 5,420 feet, the other on a mesa (flat-topped hill) about three quarters of a mile to the south, and at an altitude of 5,835 feet. The station on the mesa is about one mile east of the face of Green Mountain, which rises abruptly 3,000 feet.

As is well known, a mean difference of three degrees Fahrenheit usually occurs for each 1,000 feet in mountain districts, the higher points being the colder. Unless “inversion” occurs the records of the mesa would be expected to show about one or two degrees colder than the university campus. The observations show that inversion does occur and that the night temperatures on the mesa are distinctly higher than on the university campus. For the present note it will be sufficient to give certain data for the month of May.

## TEMPERATURES OF CAMPUS AND MESA, MAY, 1908

	Campus, 5,420 ft.	Mesa, 5,835 ft.
Monthly mean .....	51.5	54.1
Mean maximum .....	60.5	61.0
Mean daily range .....	23.2	19.5
Greatest daily range .....	39.0	36.0
Least daily range .....	0.0	2.0
Number of days having minimum		
32 degrees or lower .....	5.0	2.0
Date of latest frost .....	May 21	May 5

For the table above the monthly mean was calculated by averaging the daily means obtained by the formula

$$(7 \text{ A.M.} + 2 \text{ P.M.} + 9 \text{ P.M.} + 9 \text{ P.M.}) \div 4 = \text{mean.}^1$$

The mean temperature of the mesa station was 2.6 degrees higher than that of the campus; the mean maximum 0.5 degrees and the mean minimum 3.4 degrees higher. It will be noted that the greatest difference is in the mean minimum. The mean daily range is conspicuously less for the mesa than for the campus. To state the case briefly the mesa station has a milder climate than that of the campus; the daily range is less, the mean temperature greater; also for the present year, at least, killing frosts did not continue so late in the season.

The month of April was warmer than May, but in spite of this anomaly there were about the same differences between campus and mesa. An important point to notice, however, is that the mean maximum was higher at the campus station, 63.8 as against 61.6 on the mesa, but the mean minima show about the same differences as recorded for May. In April, therefore, the campus showed a much more severe climate than the mesa. Days were hotter, nights were cooler.

Hann states (p. 252) that "in calm weather the valleys are colder than the enclosing mountains, up to a certain height." In the observations made by the writer there was this difference, not only in calm weather but also in windy weather, indeed, nearly every night the mesa station showed the higher temperature.

Since the university campus is on the plains, while the mesa is part of the lower

<sup>1</sup>Hann, "Handbook of Climatology," Ward's translation, 1903, p. 7.

foothills, it may be said that the plains have a more severe climate than the lower foothills. The writer believes that this difference in climate is an important one in determining the limits of distribution of plants at the tension line between foothills and plains. This question will be discussed at length in an article soon to be published in the University of Colorado Studies by the present writer and Messrs. G. S. Dodds and W. W. Robbins.

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## SOCIETIES AND ACADEMIES

## THE AMERICAN PHYSICAL SOCIETY

THE fall meeting of the Physical Society was held at Columbia University, New York City, on Saturday, October 24, 1908, with President Edw. L. Nichols in the chair.

The following papers were presented:

"Note on Spherical Aberration," W. S. Franklin.

"New Photometric Methods of Studying the Radiating Properties of Various Substances," Edward P. Hyde.

"Sparkling Potentials in a Very High Vacuum," R. A. Millikan.

"Non-Newtonian Mechanics," Gilbert N. Lewis.

"The Definition of a Perfect Gas," A. G. Webster and M. A. Rosanoff.

"The Specific Heats of Gases and the Partition of Energy," W. P. Boynton. (By title.)

"The Distribution of Sound from the Megaphone," A. G. Webster.

"The Reflection of Sound by the Ground," A. G. Webster.

"Thermometric Lag in Calorimetry," Walter P. White. (By title.)

"The Electromagnetic Mass of a General Electric System," D. F. Comstock.

"A Study of Electric Wave Vibrators and Receivers," H. W. Webb.

"Note on a Method of Determining the Concentration of the Free Electrons in a Metal," O. W. Richardson.

"The Kinetic Energy of the Positive Ions emitted by Hot Bodies," F. C. Brown.

The next meeting of the society will be at Chicago on the Friday and Saturday following Thanksgiving.

ERNEST MERRITT,

Secretary