rector of research of the Van Patten Pharmaceutical Company, Chicago.

DR. EARL N. BRESSMAN, of the U. S. Department of Agriculture, has been appointed the United States representative on the Inter-American Commission of Tropical Agriculture. This commission was established to plan an Inter-American Institute of Tropical Agriculture and to encourage rubber production in the Western Hemisphere.

CHARLES F. GOLDTHWAIT has been appointed senior cotton technologist of the new Southern Regional Research Laboratory at New Orleans of the U. S. Department of Agriculture, and is in charge of the modified finishing section of the cotton chemical finishing division. He has worked on the chemical treatment of cotton at the Mellon Institute of Industrial Research.

DR. H. H. NEWMAN, professor of zoology emeritus of the University of Chicago, on July 9 gave a convocation address before the summer session of Indiana University on "The Use of Twins in the Human Heredity-Environment Problem." In the evening he also conducted an open seminar on multiple human births.

THE eighty-ninth annual meeting of the American Pharmaceutical Association will be held at Detroit from August 16 to 23.

THE American Dental Association will hold its eighty-third annual convention in the Sam Houston Coliseum, Houston, Texas, from October 27 to 31. Headquarters will be in the Rice Hotel.

A CONFERENCE on Visual Problems was held at the Ohio State University on June 18 and 19. It brought together leading scholars actively engaged in research on various problems of vision. The participants included representatives from the fields of visual psychology, neuro-physiology, physiological optics, colorimetry, biophysics, illumination engineering, optometry and ophthalmology. Speakers on the program included Professor Selig Hecht, of Columbia University, and Professor Walter R. Miles, of Yale University.

THE Boston Society of Natural History announces that original, unpublished essays on any subject in the field of ornithology are eligible for the Walker Competition for 1942. Further information may be obtained from the Secretary, 234 Berkeley Street, Boston. The closing date is May 1, 1942.

IT was stated in a recent number of SCIENCE that the University of Texas had received a grant for the establishment of "the first laboratory of marine biology on the Gulf of Mexico." We are now informed that the Louisiana State University has maintained a class in marine biology at Grand Isle since 1928, and has occupied its own building since 1936. The laboratory has had an instructional staff consisting of members of the departments of zoology and botany, also instructors from elsewhere, and guest workers, in addition to the regular student body. This summer the staff consists of Dr. E. H. Behre, Dr. H. J. Bennett, Dr. J. H. Roberts, all of the department of zoology of the university, and Dr. Lauretta E. Fox, of the Louisiana State Normal College. The laboratory is open and available during the winter season to independent workers who may wish to use the facilities for intermittent or continuous periods.

THE third summer course in industrial statistics will be given at the Massachusetts Institute of Technology from September 8 to 20. This course is intended for workers in industrial plants and scientific laboratories who would like to acquire the rudiments of modern statistical technique as applied to inspection, to the design and analysis of factory and laboratory experiments, and to control of the quality of industrial output. The course will include lectures, discussions and laboratory work on the following subjects: judging results based on one or more small samples, identification of factors responsible for poor and variable quality, specifications and risks of producers and buyers, methods of sampling and their relationship to inspection, methods of experimenting under ordinary factory conditions, the design and analysis of small scale laboratory experiments. These methods will be applied in detail to practical problems analyzed at the institute during the past several years. Inquiries should be directed to Professor George P. Wadsworth, of the department of mathematics, or to Professor Harold A. Freeman, of the department of economics.

DISCUSSION

ILLUSIONS IN PRINTED MATTER

RECENTLY Christian A. Ruckmick[1] described an optical illusion seen when a page of typewriting on onion-skin paper is laid upon a carbon copy of the same writing. When the two sheets are about 5° from being parallel a series of white concentric circles can be seen. The circles are not complete, but are made up of a number of arcs separated from one another by intervening letters. The breaks in the circles are little more

[1] SCIENCE, 93: 2410, 236, March 7, 1941.

disturbing to the eye than are the breaks in a "dashed" curve in a graph.

Ruckmick's circles are not peculiar to himself. I can confirm him in all that he says, from having seen them many times, but can add a detail or two. It is not necessary to use onion-skin paper, for if the first sheet is rather thin and translucent, the carbon copy is not too pale, and the sheets are on a white background, the white circles are very conspicuous. The formation of an arc depends upon the alinement of spaces between words, and to be noticeable at least four lines are involved, two on the ribbon copy and their two carbon copies. Because of this, the chance of seeing arcs and circles is less with two pages of dissimilar typing than it is with Ruckmick's arrangement. In a half page of double-spaced typing, with every word having 7 or more letters, so that there were only 6 spaces on a line, there were only a few arcs. In another block of single-spaced typing, with an average of 4 letters to a word, the apparent arcs were numerous. On closer inspection they were seen to be practically straight lines, yet giving the illusion of forming broken circles.

When one of the specially typed blocks and its carbon copy are in exact register, the appearance is not unusual. If the ribbon copy is moved straight up or down about 3 mm, so that the lines are parallel to those of the carbon copy and there is no shifting to right or left, the typing will be crossed by a number of white lines at right angles to the lines of typing. Now, with the lines still 3 mm out of register and parallel, a shift of about a millimeter to the right or left will make the white lines slant in the same direction. These two shifts are for pica type and would no doubt be a little less for the smaller elite type.

Another optical effect has often forced itself upon the attention when carbon copies of letters were being handled. The copies are made on thin paper which most persons call green, but which has such a strong blue tone that at times what to call it is doubtful. If one of these sheets is lying in close contact on another on which the carbon copy is quite black, the writing can be seen through the upper sheet. In bright daylight the writing is sometimes quite noticeably red, sometimes reddish brown, or more often of no color to attract attention. For the benefit of those who may wish to think up a reason for this illusion it may be said that a thin smear of carbon black on white paper has a brownish tone, and to overcome this a violet or a red "toner," or sometimes both, must be added to the mixture that forms the coating on the carbon paper.

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DESIGNATION OF LOCATIONS ON MAPS

AN able plea in SCIENCE of February 16, 1940 (91: 169), for "increasing the usefulness of maps" asserted that "relatively few people are accustomed to making any use of latitude and longitude in the interpretation of maps." Doesn't this point to a lack in teaching emphasis?

Why propose new schemes of fractional subdivision in thirds, ninths, etc. (SCIENCE, 93: 68)? Does the superiority of decimal subdivision need further argument? Surely the measurement of two angles (SCIENCE, 93: 523) from the lower left and right map corners involves as much work to arrive at the "typical designation: Lake Nokoni, Rocky Mountain National Park Quadrangle, L 51½°, R 56½°" as does sliding a decimally divided scale along the even ten-minute map coordinate lines and reading as directly and without further computation 40° − 15.8′ N., 105° − 42.6′ W.

It is slight criticism of the almost universally used latitude-longitude subdivisions in degrees (and decimals or) minutes and seconds, that for military purposes an overprint is added to give precise plane rectangular coordinates in addition to the polyconic projection network. Or that geographers in laying out the map of the world on a scale of 1:1,000,000 prefer to designate the Boston sheet as North K 19. Division into "arbitrary regions . . . does not meet present needs," but designation, in hundredths even if warranted, makes minutes of arc as explicit as desired.

When confronted in the field with actual fences marking the quarter section lines, we are painfully reminded that in terms of customary land subdivision Lake Nokoni is in the N.W.¼, of the S.W.¼, of Section 31, of Township 4 North, Range 74 West, in Grand County, Colorado. And if this were farming country local residents may readily tell us in which sections their respective farms lie.

But why do we continue to follow the calf path backwards, just as we continue to address our mail, listing first the things we wish to know last? The postman sorting mail wants to know first the state, second the city, third the street, fourth the number, etc. Possibly that is why we are needlessly confused in trying to locate this particular 40 acres.

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GRAND RAPIDS, MICHIGAN

INTERNATIONAL COOPERATION

ON reading Dr. A. V. Hill's essay which appeared in SCIENCE for June 20, 1941, I am led to make one small comment amplifying a parenthetical statement of fact in that article.