the summer session of 1930 at Western Reserve University. These lectures will deal with two related subjects, namely, "Genetics of Populations" and "Genetics and Evolution."

J. L. ST. JOHN, state chemist and head of the division of chemistry, Agricultural Experiment Station, State College of Washington, Pullman, is arranging a trip to be undertaken by Dr. H. E. Howe, editor of *Industrial and Engineering Chemistry,* for the purpose of addressing various groups at certain educational institutions, local sections of the American Chemical Society and other audiences. It is anticipated that the tour will begin the first of February, extend through the northern tier of states to Seattle, thence south to Los Angeles, and eastward through the southwestern states, occupying in all about six weeks. Those who may be interested in this project are invited to correspond with Professor St. John.

DR. M. M. LEIGHTON, chief of the Illinois State Geological Survey, Urbana, began a series of lectures at the department of geology, Northwestern University, on December 4 and 5. Dr. Leighton had for his subject "The Weathering Characteristics of the Glacial Drift Sheets of the Mississippi Valley States." On December 5, under the auspices of the Dip and Strike Club of Northwestern University, he delivered a lecture of popular nature on "The Economic Importance of the Glacial Drift of Illinois." The series was continued on December 10 and 11, with lectures on "The Relations of the Loess Deposits to the Various Drift Sheets and Their Chronology," and on "The Drainage of Ice Sheets and Its Influence on Morainal Building."

PROFESSOR DOUGLAS JOHNSON, of Columbia University, has recently delivered addresses in South Africa, Australia and New Zealand as follows: "The Face of the Waters," British Association, Cape Town; "Methods of Physiographic Research," geological department, University of Perth; "Studies in Shoreline Physiography," geological section of the Royal Society of New South Wales, Sydney; "Shore Problems," Royal Society of Queensland, Brisbane; "Physiography of the Atlantic Shoreline," geological section of the Philosophical Society, Wellington.

PROFESSOR P. EHRENFEST, of the University of Leiden, has accepted an invitation to participate in the Symposium on Theoretical Physics at the University of Michigan during the coming summer. In addition to giving a series of lectures, he will direct the informal conferences which accompany the lectures. Subsequently Professor Ehrenfest will visit several other universities throughout the country.

THE General Education Board, New York, has authorized grants to Duke University School of Medicine, amounting to $300,000 over a period of five years. It is also announced by the dean that the new medical school will open on October 1, and will admit first and third year students. The school will follow the four-quarter plan.

DISCUSSION

OVERHEAD SOUNDS OF THE YELLOWSTONE LAKE REGION

IN *Nature Notes from Yellowstone Park,*[1] Mr. L. S. Morris, ranger naturalist, describes aerial sounds which were heard by himself and companions over Grebe Lake, near the canyon of the Yellowstone in the park.

After reading Mr. Morris's narrative, I looked over a communication of my own to SCIENCE.[2] I also reread the notes upon which that communication was based.

Since there are some items in these notes which were not included in the published account it seems to me, especially in view of recently awakened interest in these phenomena, to be worth while to make a record of them.

Following are all the references to overhead sounds which I find in the diary which I kept during the six weeks of our stay in the park. I copy from the diary without making any changes in the text, such comments as seem to be called for being enclosed in parentheses.

(1) July 23 (1890). Yesterday, when (Elwood) Hofer and I were on our way to the upper (western) end of the lake (Shoshone), I heard a strange noise, which I supposed was off to the southward and echoing among the mountains. (At the time, about 8 A. M., I was seated in our Osgood canvas boat, with the oars in my hands, but not rowing. I was probably ten or twelve feet from the shore, where Hofer was seated measuring off our dredge rope, which we were going to use for a sounding line. As I remember the situation we were from twenty to thirty feet apart.) Hofer asked me what I thought it was, and where it seemed to be. I told him the apparent direction and asked him what it was. He replied that it was the most mysterious sound that was heard in the mountains. Since then we have talked about the sound a good deal in camp, and this morning heard it again very plainly. (My recollection of this event is that it occurred just after we had had breakfast, and

[1] 6: 2–4.

[2] First series 22: 244–6, November 3, 1893.

before we had separated for the day's work.) This time it appeared to be directly overhead, and to pass off across the sky, growing fainter and fainter toward the southwest. Hofer and Dave Rhodes, both of whom have had wide experience in the mountains, agree in their testimony in regard to it. They say they have never heard it anywhere out of the park, except to the south, about the forty-fourth parallel, some thirty miles south of here. He (Hofer) does not remember to have heard it farther west than Shoshone Lake, or east than Yellowstone Lake—not to the north of these points. It is heard mostly in the morning, shortly after sunrise, and up to, perhaps, half past eight, or nine o'clock. Hofer says he has heard it in the middle of the day, but usually not later than 10 o'clock A. M., doesn't remember to have heard it before sunrise. The description given of the sound before I heard it and since agree with my observations with regard to it. (The meaning of this somewhat obscure sentence is that the descriptions which Hofer and Rhodes give of the sound as they have heard it on previous occasions and their description of the sound as they have heard it here on Shoshone Lake agree with my own observations.) When heard best it appears to be a rather indefinite, reverberating sound in the sky, with a slight metallic resonance, which begins, or at least is at first perceived, overhead; at least, nearly every one in attempting to locate it turns his head to one side and glances upward. (I remember that while I was having my first experience with this sound in the sky I noticed that Hofer was watching me very closely. Later I found that he had been observing my reactions. He told me that people invariably behaved that way when they were trying to locate the source of the sound. I had at first looked up, and then had tried to follow the diminishing sound toward the southwest.) The sound is as difficult to describe as an echo, which has been repeated several times in quick succession. Each time I have heard (it) here on Lake Shoshone it appeared to begin to the southward, or, when first noticed, beginning overhead, or, as some one (Dave Rhodes) expressed it, "all over," and moving off toward the south.

(2) Camp on the "Thumb," Yellowstone Lake. August 4. While out on the lake this morning Professor Forbes and I heard again the strange noise which we heard several times on Shoshone Lake. It was about 8 A. M., morning still and clear, lake quiet, sun beginning to shine with considerable power (this mention of overhead sounds was preceded by an entry, which may, of course, have nothing to do with this phenomenon: "minimum temperature last night 33.5° F."); sound loudest almost overhead—seemed to pass to the southeast (so it stands in my diary. Since my other entries, where the apparent direction of these elusive sounds is recorded, indicate a direction west of south, which is in accord with my recollection of these events, I am inclined to think that this may be an example of those slips which Oliver Wendell Holmes cites in "Over the Teacups," where one writes north when he means south, and the like); sound of same nature as that heard on Shoshone (Lake)—very hard to describe—a certain metallic resonance—Professor Forbes calls it a kind of twisting, yow-yow vibration, resemblance to sound made by telegraph wires, but not a steady, uniform volume. The sound lasted probably half a minute, time not noted. As I have heard the sound here it seemed to begin at a distance, something like a mixture of wind in pine tops, in telegraph wires, the echo of bells, after being repeated several times, the humming of a swarm of bees and two or three other sources of sound, all making a not loud, but easily recognized sound, not at all likely to be mistaken for any other sound, but easily overlooked if one is surrounded by noises. The party on shore heard the same sound at the same time that we heard it on the lake. (On this occasion Professor Forbes and I were in our canvas boat, one hundred yards, more or less, from shore. Hofer was on the beach at the water's edge. The others were at the camp, which was some fifty feet or more back from the edge of the lake terrace, in a grove of pine-trees. I have a kodak picture of the scene which was taken from our boat as we were nearing shore on our return from this trip.) Hofer says he doesn't remember to have heard it when the sky was cloudy, has heard it when "quite considerable breeze" was blowing. Remembers that he has usually heard it when the sky is clear, or with few clouds, and the morning calm; as a rule in the morning, but has heard it as late as noon. Dave Rhodes thinks he has heard it only in the mornings, and when the sky is clear, or with light, fleecy clouds.

(3) August 8. Professor Forbes and I rowed up to Bridge Bay (northwest end of Yellowstone Lake), where we collected—back (to hotel) about 12:30 (P. M.). . . . We heard our mysterious sound again this morning, at 10 and 10:15, while out (on the lake) collecting. There is reason to believe that it is caused by the steamboat *Geyser* (on east shore of the lake), and heard through some peculiar condition of the atmosphere at distances of several, perhaps thirty to fifty miles away. (Here I seem to have arrived at that state of mind where consolation is derived from belief in a theory.)

(4) August 9. 2:20 P. M., at head of southeast arm of (Yellowstone) lake. While in boat heard sound overhead, like rushing wind traveling very rapidly or like something rushing through the air, did not have the semimetallic sound, or like echo; seemed to travel from east to west; clear, except light, fleecy and feathery clouds, enough wind to ruffle the surface of the water. (On this occasion I was one of a party of five which had left the Lake Hotel on the afternoon of the eighth in two rowboats, with tent and camp outfit. My companions, who were engaged on the construction of a new building, were Mr. L. D. Boothe and Messrs. Couglin, Curl and Thomson. Mr. Curl and I were in one boat, the three others in the other. We were making our way from the east to the west side of the east arm of the lake, and were rowing slowly in the very shallow water of this part of the lake when the sound attracted our attention.)

The following note is included in Mr. Morris's article: "In the *Ranger Naturalists' Manual* for 1928 there appears a rather complete summary of the re-

corded observations of this weird phenomenon by Ranger Marguerite Arnold."

EDWIN LINTON

ZOOLOGICAL LABORATORY,
UNIVERSITY OF PENNSYLVANIA

THE NORMALITY OF THE MATURATION DIVISIONS IN THE MALE OF DROSOPHILA MELANOGASTER

IN a recent article in SCIENCE, "Recent Discussions of the Reduction Division in *Drosophila melanogaster*," Jeffrey[1] has assailed Belar's[2] conclusion that the maturation phenomena in this form are normal. For the past six months the writer has been studying maturation and allied phenomena in the male gonads of *D. melanogaster* and, since my observations seem to explain quite simply the anomalies reported by Jeffrey in his preparations, a brief description of my results is given below.

The gonads of larvae of varying ages were quickly dissected in a 2 per cent. urea solution and transferred immediately to strong Fleming's fluid containing 1 per cent. of urea by volume. After fifteen to thirty minutes the tissue was placed in Herman's fluid containing 1 per cent. urea and fixed for three hours. This is the technique used by Painter in his translocation studies.

When primary spermatocytes stained with iron hematoxylin were first studied, the number of darkly staining elements observed was larger than was expected from the diploid chromosome number in the male, but further examination revealed a great variation in the number and size of these stained bodies. On close study, these structures could be separated into two groups, the first made up of the four tetrads, identified by their shape, and the second containing the other bodies which did not stain so intensely as the tetrads and whose shape was usually spherical. Often these spherical globules appeared quite hollow, and they exhibited no definite relation to the equatorial plane. It was variation in the amount of this second type of material which gave the impression of variable chromosome number. As these observations suggested that the material included in the second group was not chromatin, differential strains were used. After being stained with Auerbach's acid fuchsin-methyl green, the tetrads were green, while the other elements were bright red. More extensive study of numerous preparations gave the following facts: (*a*) a very large acidophilic nucleolus is present in the growth period of the first spermatocyte. It is usually spherical but it may appear as a mass of globules. (*b*) There is no regularity in the time at which the nucleolus breaks up and loses its capacity to retain the stain. In some instances it ceases to stain before the first maturation spindle is formed, while in other cells it breaks up into a number of globules which take the stain well, even as late as the telophase of this division. This behavior of the plasmosome explains the variation in the amount of the apparent chromatin in the first maturation spindle. If it disintegrates before the spindle is formed, only the tetrads are present at the time of division, while if it has fragmented but has not lost its capacity for staining, the products lie in the region of the spindle and stain with iron hematoxylin, giving the appearance of true chromatin.

There are four tetrads in the first maturation spindle, conforming in size to what might be expected from the diploid chromosomes. They divide normally with the X and Y elements segregating to the opposite poles. If plasmosomes are present in the cell, they tend to be roughly distributed to the two poles, but they are never included in the new nucleus. By the second maturation division the plasmosomes have usually disappeared and the chromosomes are easily studied. Their division at this time is normal.

These facts seem to give a simple explanation of the figures published (and demonstrated) by Jeffrey. In his cells there were two types of material, chromosomes and plasmosomes; but, due perhaps to the preservative used, the true tetrads could not be identified by their shape, as in my material. The structures described by him as "chromosomes . . . far removed from the equatorial line" are obviously the same as the deep-staining bodies which I have found in similar cells and which give an acidophilic reaction with differential stains. The irregular distribution of the plasmosome material to the cytoplasm of the two daughter spermatocytes, in my opinion, has been misinterpreted by Jeffrey as the elimination of true chromatin.

From my observations I am forced to conclude that the maturation process in *Drosophila melanogaster* is normal as far as chromosomes are concerned. Why the plasmosomic material should show such variation in the time it loses its staining capacity is not clear, unless it be due to the great rapidity with which maturation is carried on in this form.

BESSIE B. LEAGUE

DEPARTMENT OF ZOOLOGY,
UNIVERSITY OF TEXAS

[1] SCIENCE, 70: 579–580, December 13, 1929.

[2] "Die cytologischen Grundlagen der Vererbung," Berlin, Gebrüder Borntraeger, 1928.

SAND-STORM ELECTRICITY

I HAVE read with much interest the discussions on atmospheric electricity in SCIENCE for March 30, 1928; May 3, 1929, and October 18, 1929. On June 23, 1927, I read a paper on "Some Remarkable Elec-