the general field of experimental biology and medicine. Abstracts of the papers presented will appear in the *Proceedings* of the parent society.

The graduate women in the science departments at Cornell University have recently organized a sorority under the name of Sigma Delta Epsilon. The membership is primarily limited to women engaged actively in research work; honorary membership has been extended to several women who have gained recognition in the scientific world. The society will have a house at which the members may live while at Cornell. The organization at present consists of twenty-five active members and eight honorary members. The officers are: Adele Lewis Grant, *president;* Katherine Van Winkle, *vice-president;* Josephine Overton Souders, *secretary;* Hazel Elizabeth Branch, *treasurer.*

UNIVERSITY AND EDUCATIONAL NEWS

About $400,000 of the $500,000 appropriated for building purposes at the University of Iowa by the last general assembly is to be expended for the erection of the first units of a new chemistry building. When completed the building will cost $1,000,000.

Dr. C. L. Metcalf, for the past seven years professor of entomology in the Ohio State University, has resigned to accept the position of professor of entomology and head of the department of entomology in the university of Illinois.

Herschel C. Smith, formerly deputy state highway engineer of Oklahoma, has been appointed assistant professor of highway engineering and highway transport at the University of Michigan, from which institution he graduated in 1913.

Dr. Alfred H. W. Povah, assistant professor of forest botany and pathology in the New York State College of Forestry since 1918, has resigned to accept the position of associate professor of plant pathology and associate pathologist in the Alabama Polytechnic Institute.

Cleveland P. Hickman, M.A. (Michigan), has been appointed instructor in zoology in West Virginia University.

Dr. John Howland, professor of pediatrics at the Johns Hopkins Medical School and pediatrician-in-chief of the Johns Hopkins Hospital, has declined the offer of the Medical School of Harvard University to become professor of children's diseases at that institution. He will remain at Johns Hopkins.

DISCUSSION AND CORRESPONDENCE

A LIVING GALVANOMETER

That differences in electrical potential are produced by protoplasmic activity is a well-known fact. This is especially true of muscular activity. The existence of electrical currents in tissues was proved by Schweiger in 1824 and by Nobili, who discovered the galvanometer. The string galvanometer was first used to detect these currents, although it was reasonably believed that such currents were present before the galvanometer was discovered. Such evidence was correctly given in a more rudimentary way by Galvani and Volta. With the introduction of the various kinds of galvanometers these electrical currents were easily demonstrated. At the present the various modifications of Einthoven's galvanometer are used in detecting electrical currents produced by the activity of various muscles and especially the heart and in obtaining electrocardiograms. In fact it is a very accurate method of obtaining a clinical picture of the condition of the heart in man.

The discussion and demonstration of the production of electrical currents by living organisms and especially man, never fail to fascinate students, however teachers have found themselves handicapped by the lack of a suitable galvanometer. In laboratory experiments of this kind, such as Galvani's experiment and the rheoscopic frog experiment an outside stimulus is necessary to demonstrate this. In the experiment where the sciatic nerve of a muscle nerve preparation is laid across the beating heart, the results are very

striking, but the demonstration of electrical currents in the human body would be usually regarded as impossible without a galvanometer. These difficulties are solved by the rather simple experiments cited below.

Recently, while making a nerve muscle preparation, the thigh muscles of the left leg of the frog were removed and the nerve on the same side isolated but not sectioned. The body was well moistened with physiological saline and lay on a glass plate which was also well moistened. The toes of the left foot were held in the left hand, while forceps, held in the right hand, were accidentally placed upon the body of the frog. Immediately a violent contraction of the muscles of the left leg occurred. This was so unusual that we investigated this further. The same results were obtained repeatedly. It must be noted here that one metal was used instead of two as in Galvani's experiment, and in place of the other metal the human hand was used. The current stimulating the nerve might have been due to the difference in potential between the metal and the hand, and for that reason we substituted the right finger for the metal previously used and obtained the same results. We therefore concluded that the nerve was stimulated by the action current of the human body, the electrodes being the fingers of the right and left hands and the indicator or the galvanometer being the contractions of the frog's muscles.

The same experiment was tried on a number of frogs and in every case we obtained the same results, although more striking in some preparations than in others. We found that by making contact with any part of the frog's body or even the saline solution on the plate the muscles contracted.

When a non-conductor was interposed between the toes and the hand we found that no contraction took place. When a non-conductor such as wood was used for the right electrode no contraction took place. We at first thought that the action current involved was that produced by the beating human heart, but the absence of the rhythmical contractions in the muscles of the frog negates this.

It has been noted in some cases that the contractions were very violent, even tetanic, and immediately afterwards hardly noticeable. We have no explanation to offer for this other than the varying electrical currents in the body.

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AN EXCEPTION TO DOLLO'S LAW OF THE IRREVERSIBILITY OF EVOLUTION

IT has been claimed that most cases of apparent reversion to a primitive type in specialized organisms—such as the occurrence of three toes in the horse that Cæsar rode, or a reversion to the primitive number of petals in flowers, etc.—are to be explained simply as additions of supernumerary parts, comparable to polydactylism, or the addition of supernumerary digits to those normally present in man, cats, etc. Since so many cases of an apparent reversing of the evolutionary process apparently have to do with the number of the various structural features present, and are therefore open to the objection that we may be dealing with merely an addition of supernumerary parts to those normally present, it may be of some interest to cite a clear case of reversion to the primitive condition in structures in which there can be no possible question of the addition of supernumerary parts.

In the fruit fly *Drosophila*, as is true of practically all Diptera, there has been such a marked specialization of the metathoracic region that the sclerites of this segment of the thorax have been profoundly modified and reduced, especially in the tergal region; and the metathoracic wings have been reduced to mere knobbed threads, the halteres, which would not be recognized as the vestiges of wings, if we did not know that they are modified wings from their mode of development, etc. Dr. Morgan, however, has recorded a mutant of *Drosophila* which he describes as having a "double thorax," apparently not realizing the true nature of the parts in the