micra in diameter. In a Purkinje fiber of the moderator band a cyst occurs which measures 170 micra. There are cysts in the fibers of the bundle of His ranging in diameter from 60 to 234 micra.

In the second case the cysts are found in the pectoralis major muscle of the turkey-buzzard. Fibers of this muscle measure 56 micra in diameter. Sections of three cysts measure, respectively, 52, 57 and 65 micra. Sections of the buzzard's heart were prepared and studied, but no cysts were found.

The spores within the cysts of the beef-heart measure 3 to 4 micra in diameter and 16 to 18 micra in length. Those in the buzzard measure 2 by 9 micra. In both the beef-heart and the buzzard-muscle the fibers adjacent to those containing cysts appear perfectly normal. Neither is there any connective-tissue-reaction to the presence of the cysts.

Although these parasites have been repeatedly described in the hearts of various species,[2] we have not found specific mention of their occurrence in the Purkinje fibers. Wenyon tabulates thirty-five species of Sarcocystis with four additional cases in which the species were not named. We have found no mention of these parasites occurring in the turkey-buzzard, either in the general literature or in Wenyon's book, although he lists nine other species of birds in which they have been found. The finding of these parasites in the buzzard is interesting in view of Crawley's statement[3] that "whereas the purely herbivorous cattle are practically invariably infected, records of the finding of sarcosporidian cysts in the muscles of carnivorous animals are very rare."

Alexeieff,[4] who studied these forms extensively, concluded that there is no means of telling what the species may be, and that, in spite of variations in size, all belong to the same species. Hence, we merely record that we found Sarcocystis sp. as described above in the Purkinje fibers of the beef-heart and in the skeletal muscle of the turkey-buzzard (*Carthartes aura septentrionalis*).

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2 Manifold, J. A., 1924–25, "A Case of Human Sarcosporidiosis." Trans. Roy. Soc. Trop. Med. & Hyg., London, xviii.

Hadwen, S., 1922, "Cyst-forming Protozoa in Reindeer and Caribou and a Sarcosporidian Parasite of the Seal (Phoca richardi)." *J. Am. Vet. M. Assn.*, Vol. lxi.

3 Crawley, H., 1916, "The Zoological Position of the Sarcosporidia," Proc. Acad. Nat. Sc., Phila., Vol. lxviii.

4 Alexeieff, A., 1913, "Recherches sur les Sarcospiridies." Arch. de Zool. exp. et gen., li, pp. 521–569.

QUAILS, POTATO-BUGS AND OTHER THINGS

Here in Beaufort, S. C., there are many potato-bugs and quails. It may not be generally known that quails eat potato-bugs. Even ducks and guineas refuse to eat them. The potato-bug seems to have very few enemies.

Quails here. eat acorns—scrub-oak and live-oak acorns. The agricultural department at Washington told me some time ago that they did not know of a live-oak strain carrying sweet acorns. There are three of these trees in Allen Park, Augusta, Ga., and I know one here on the Harvey place. The acorn is as sweet as the meat of a chinquapin, and by the way these chinquapin trees grow here thirty feet high and have bushels of chinquapins on them.

Another interesting tree which grows wild here is the Chinese tallow. Chickens fly up into the tree to eat these quite edible seeds. When the pods have burst and an oily seed is placed on a live coal it sends up a white flame six or eight inches high which burns steadily for three or four minutes.

In the up-country the *Magnolia grandiflora* is an ornamental lawn-tree. Down here it is a regular forest-tree only, with diameter of three or four feet and grows along with slash pine and live-oak in the forest.

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THE EARLIEST DYNAMO

I note in your issue of April 13 a notice of the approaching fiftieth anniversary of the invention of the dynamo. I desire to call your attention to the fact that in the Centennial Exposition of 1876 there were two dynamos on exhibition known as the Gramme Dynamo. These machines were made in Paris. At the close of the exposition, Professor Barker, of the University of Pennsylvania, bought the larger of these machines and I bought the smaller one for the young institution of learning, Purdue University. Following the close of the exposition my Gramme machine was sent to Lafayette and installed in the chemical laboratory. I also built a lamp which was very successful, mounted it in the cupola of the university and illuminated the city of Lafayette late in November with the first electric light ever shown west of the Alleghenies and generated by a dynamo. This machine remained in use in the physical and chemical laboratory of Purdue University up to a recent date, and is still in an excellent condition. It has now been installed in the museum of Purdue, properly labeled with the data which I have just described. Evidently the celebration of the fiftieth anniversary of the dynamo should have been held about two years ago.

H. W. WILEY

SCIENTIFIC BOOKS

Biochemical Laboratory Methods for Students of the Biological Sciences. By CLARENCE AUSTIN MORROW, PH.D., John Wiley and Sons, New York, 1927.

THIS book by the late Clarence Austin Morrow, until his death in 1926 professor of biochemistry at the University of Minnesota, is a volume which will be welcomed by all teachers and students in biochemistry, botany, general physiology, pathology, agronomy and bacteriology. It was written by a man who had had extensive teaching experience in biochemical laboratory methods. Each of the experiments given in the book, and there are two hundred and thirty-three, has been thoroughly tested out in the student laboratory by college classes.

The general field of physical and chemical biology is greatly in need of texts. This volume by Dr. Morrow fulfills one of these needs. As one reads the interesting experiments outlined, one wishes again and again that the author had wandered astray to discuss the theory of the behavior of nitrogen-containing compounds. It is hoped, therefore, that this laboratory manual of biochemistry will soon have a companion volume, by some equally capable teacher and writer, dealing with the theory of biochemical behavior.

Too often in laboratory manuals are the time-honored and time-worn methods given so that the student comes to think that this is the only way and these the only materials, but in Dr. Morrow's book this is not the case. The experiments are well chosen and depart in the main from stereotyped forms.

The first chapter is on the "Colloidal State" and covers the subject briefly but well. The only adverse criticism which I can make of Dr. Morrow's book has to do with subject-matter handled in this first chapter. The faults are not serious, and I call attention to them more because they happen to touch upon two subjects in which I, for some time, have had a personal interest. Morrow helps to perpetuate the now antiquated term "emulsoid." This expression has become so firmly established in physical and chemical biology that it seems difficult to eradicate it even though it has long since been discarded by most chemists and never was accepted by such colloidists as Zsigmondy and Donnan. There is not sufficient reason to believe, nor do many workers in the field now believe, that hydrophilic colloids of the gelatin type are fine emulsions. We can, however, partially forgive Dr. Morrow for continuing the use of this expression, a relic from the early days of colloidal chemistry, since he has done the very correct thing of putting the emulsions in a class by themselves, where they, as liquid suspensions, belong.

The second adverse criticism has to do with the support which is given to the attempt of others to draw a distinction between viscous and plastic flow; but here Dr. Morrow has numerous capable investigators on his side. The conception that plastic flow is fundamentally different from viscous flow is a sound one and is based on the fact that viscous substances flow no matter how low the rate of shear, provided the shearing force acts over a sufficient interval of time, while plastic substances do not flow until a certain definite shearing force has been exceeded. Plasticity is made up of two fundamental properties, yield value and mobility. The former is dependent upon the shearing stress required to start deformation, while the latter is proportional to the rate of deformation after the yield value has been exceeded. These properties and the distinction they emphasize between viscous and plastic flow are generally recognized and hold for such a substance as lead which does not exhibit viscous flow until a maximum stress is applied. The fact that lead will flow, as when forced through small holes under pressure, does not interfere with our conception of lead as a solid; but with colloidal jellies the case is different.

To call a thin solution of gelatin or soap a solid, because it possesses such solid properties as elasticity and rigidity, even though its viscosity may be but twice that of water, is as misleading and as meaningless as it would be to call metallic lead a liquid. The distinction between liquid and solid becomes purely arbitrary when applied to colloidal substances of the gelatin type.

But a more serious objection to the point of view that elastic colloidal solutions exhibit plastic flow is that plasticity already has a definite meaning in physics and refers to that property which permits a substance to be deformed and yet show no tendency to return to the original shape. This is not true of elastic colloidal substances such as gelatin, rubber, protoplasm or any jelly.

The whole difficulty in this matter seems to me to lie in the failure to realize that in solutions of gelatin and the like we are dealing with two properties, viscosity and elasticity, and the type of flow is determined by the presence of these two properties. Gelatin is not plastic. No elastic substance can be