and often fruitless. Negative results are rarely to be found, and the literature could not hold the myriad details of procedure and the rich flow of ideas that pass continuously between investigators working together.

The advantage is not one-sided. The younger investigators can carry on with dispatch those lines of research too numerous, too tedious or too strenuous for the senior scholars. We hope, too, that the students would bring with them a vitality and interest that would stimulate their teachers.

This program is definitely not conceived as a make-work or a post-war employment project, but it could at present serve effectively in reestablishing young scientists released from the armed forces. In a research-saturated environment they can more quickly catch up with new trends and suffer less from the incubus of forgotten techniques and unread literature. With particular regard to scholarships for returning service men, such a program is already under consideration for the Marine Biological Laboratory at Woods Hole. Here is an ideal situation for the biologist returning to take up individual research. Among the many investigators he could find an inexhaustible fund of information without being hampered by direct supervision. Others will prefer to work in some unified research project or along with some established investigator.

For the future, however, a plan to increase special research training must include the more normal trend, with funds and facilities continuously available, particularly to post-doctorate students and young instructors. Obviously this will require not only cooperation of research foundations and scientific institutions, but also a willingness of college administrations to allot adequate leave to the younger members of the faculty. They would all profit, not only from the heightened scientific stature of those trained, but more immediately from the energy and originality of youth.

IVOR CORNMAN

WASHINGTON, D. C.

TRANSMISSION OF TRYPANOSOMA EQUIPERDUM TO THE DUCK

A HIGH degree of specificity for certain hosts is recognized for many parasites. To test the possible transmission of a mammalian parasite to an avian host, mouse blood heavily parasitized with *Trypanosoma equiperdum* was injected intravenously into week-old ducklings. The parasite dose in each case was approximately 500 million organisms per kilo. Four groups of ducks followed for 8 to 12 days showed no microscopic evidence of parasites surviving in the peripheral blood. Two ducks followed for a longer time died on the 14th and 15th day, respectively. The latter showed a high parasitemia of very active organisms. These parasites appeared morphologically the same as those in the mouse. Five mice inoculated with blood from the duck developed fatal parasitemias on the 4th post-inoculation day.

Ten one-week-old ducks were inoculated intravenously and followed for a period of 18 days. Parasites could not be found in the peripheral blood by the 3rd day but reappeared in two birds by the 10th day. Fatal parasitemias developed in these on the 12th and 14th days. Blood from the 8 surviving ducks, showing no parasites after a careful search, was injected intraperitoneally into mice. All mice developed fatal parasitemias by the 8th day, showing all ducks to be harboring the parasite.

The implications of these findings as to possible avian reservoirs for similar mammalian parasites is obvious.

LLOYD D. SEAGER

DEPARTMENTS OF PHARMACOLOGY,
UNIVERSITY OF TENNESSEE
SCHOOL OF MEDICINE
WOMAN'S MEDICAL COLLEGE OF
PENNSYLVANIA

CRASPEDACUSTA IN MISSISSIPPI

ON August 14 numerous fresh-water medusae were observed in a concrete pool on the campus of Belhaven College in the city of Jackson. In early morning and late afternoon they were so abundant that the water at the west end of the pool was white. Specimens were collected at regular intervals and placed in large and small aquaria in both the Millsaps and the Belhaven laboratories. Some were preserved for further study. They disappeared from the pool on August 31 and from the aquaria five days later. Many of them did not mature.

The pool is 30×50 feet and is about 3 feet deep. It is supplied with water from the city main, and its water is lost only by evaporation. The flora of the pool consists of water lilies, Elodea and an abundance of algae on the sides and on the surface of the "ooze" at the bottom. Among the algae were numerous ciliates, rotifers, oligochaetes, nematodes, Bryozoa and flatworms.

The size of the medusae varied from 0.4 mm (youngest) to 10 mm in diameter. Numerous examinations revealed that all were males. The gonads of sexually mature forms varied in size, but all were very small after the spermatozoa were discharged.

The hydroid stage was found in scrapings of algae from submerged flower pots and from stems and leaves of water lilies, dead or alive. Hydroids were most abundant on small dead stems, but none grew on pine needles. When expanded they were 1.5 mm long and 0.2 mm in diameter. In the laboratory they produced medusoid buds until September 2.

These specimens are apparently *Craspedacusta ryderi* (Potts.) According to Schmitt's[1] summary of the American records of *Craspedacusta,* and a recent note from him, this is the first report of its occurrence in Mississippi. It is possible that the hydroids were brought here on some water lilies from Independence, Ohio.

JOHN A. FINCHER
MILLSAPS COLLEGE
KATHRYN S. BUCHANAN
BELHAVEN COLLEGE

SCIENTIFIC BOOKS

MINERS' DISEASES

The History of Miners' Diseases: A Medical and Social Interpretation. By GEORGE ROSEN, M.D. With an introduction by Henry Sigerist, M.D. New York: Schuman's. 490 pages. $8.50.

DR. ROSEN'S book covers the history of metal and coal mining from the earliest records, of Egypt and Greece, down to the beginning of the nineteenth century. The forty-odd years of this century, with their important contributions to our knowledge of the diseases of metal and coal miners, are not covered, and since American contributions to industrial medicine belong to this later period, the reader will find no citations from American sources in Dr. Rosen's book, our interest in such matters having been slow to awaken.

We usually think of coal mining when we speak of mines, but metal mining was far more important up to the nineteenth century, when coal began to be mined on a large scale, but in England only. Copper, tin, lead, sulphur, gold and silver have been mined from earliest times and metal mining has always been far more dangerous than coal mining, because the ores are more likely to contain the harmful free silica. Then too, such metals as lead, quicksilver and manganese are poisonous, while others, such as copper and zinc, may be rich in arsenic, and any metal ore may contain less familiar but poisonous metals, such as cadmium, selenium, tellurium.

Dr. Rosen finds in the earliest writings on mining and in those of the Middle Ages descriptions of miners' diseases which show that those which we still regard as occupational were recognized and attributed to conditions in the mines. These are "miners' asthma," silicosis; "miners' consumption," silico-tuberculosis; metal poisoning; sudden death from fumes of sulphuretted hydrogen or carbon monoxide; anemia from hookworm infestation; deformities of the joints caused by unnatural posture; pneumonia from the sudden change from the heat of the mine to the cold, winter air; rheumatism, from the dampness, and miners' nystagmus, a rapid, involuntary oscillation of the eyeball.

In Greek and Roman days, miners were slaves or convicts who sometimes staged violent revolts, as when, in the Peloponnesian War, 20,000 Athenian slave miners went over to the Spartans. The richest mines acquired by the Romans were the silver, gold, mercury and copper mines of Spain. Diodorus tells us that the life of the miner was brief, but so terrible were the conditions of his life that death was preferable. The quicksilver mines of Almaden in Spain are still the richest in the world and there the metal occurs in pure form, so that the air is always full of poisonous fumes. According to the latest published report (DeKalb, 1921) the miners' working time is still kept down to eight days of four and a half hours each in a month, this being the only method devised to keep down mercurialism. Justinian wrote that a sentence to these mines was almost equal to a death sentence, and Plutarch criticized a mine owner because he employed in his mines slaves who were not criminals.

Throughout the Dark Ages mining suffered a decline, as did all industry, and there is no writing concerning it, but in the sixteenth century two very full descriptions appeared, one by Agricola (whose real name was Georg Bauer) and the other by that extraordinary man, Bombastus ab Hohenheim, or Paracelsus. Agricola sees the dust, water and stagnant air of the mines as causes for the wasting disease of miners, which carries off so many young men that he has known women in mining villages who had had seven husbands. Stirring up stagnant water may set loose a gas which causes instant death, (H_2S?); firing to break the rock face produces another deadly gas (CO?) so that the prudent miner does it only on Friday evening, to give time for the air to clear over the week-end. The miner's day in 1556 was only seven hours and his week only five days, but the conditions under which he worked were evidently deplorable. Agricola describes various kinds of nervous diseases, which probably were caused by arsenic. He also warns against demons of ferocious aspect which haunt the mines and can be driven out only by prayer and fasting. Paracelsus also recognized the air of the mines as the chief source of injury, though he called it "chaos" and wrote about it in his usual chaotic manner. However, he is the first one to write a monograph on the occupational diseases of a definite group of workers, for Agricola was more interested in labor and economics than in medicine.

These two stand out as the great figures in indus-

[1] W. L. Schmitt, *American Naturalist,* 73: 83–89, 1939.