the strains. The testing machine employed was the 100-ton Buckton machine in the Walker Engineering Laboratory. Hoop tension and compression were obtained by applying hydraulic pressure to the inside and outside of the tubes respectively; in the latter case a special jacket surrounded the tube under test. The experiments show an approximate agreement between the maximum shear stress at the yield point in compression and the yield-point stress in pure shear, the mean difference in the tests of annealed specimens being about 3 per cent. It appears, then, that mild steel in compression yields by shearing; and, to a first approximation, the value of this shear stress is independent of any normal compressive stress on the planes of the slide.

The second paper was contributed by Mr. C. A. M. Smith, of the East London College, University of London. Solid mild steel test specimens were used under combined tension and torsion, and also under combined compression and torsion. The 50-ton machine at the college was used, and the strains were measured by means of the author's sphingometer, by means of which readings are obtained on three planes at 120 degrees. The results obtained give further confirmation of Guest's law for mild steel. The author's remarks regarding the difficulty of obtaining axial application of the load, both with pull and push, were of special interest. Ordinary wedge grips are of little use in securing this; even spherical seatings are bad. Sphingometer readings with the latter show great divergence from regularity in the strains on three planes, although the means are perfectly regular. Often in a test the ball joints slip into new bearing positions, thus producing a new eccentricity of the load. These facts emphasise the necessity of employing an instrument of the sphingometer type in tests of a scientific character for loads within the yield point.

THE PARASITES OF THE GROUSE.

SOME valuable results of the work of the Grouse Disease Inquiry Commission are published by Dr. A. E. Shipley, F.R.S., in a series of papers on the parasites of the red grouse (Proc. Zool. Soc. Lond., 1909, pp. 309–368, plates xxxv.–lx.), in which the ectoparasites, the thread-worms, and the tape-worms are successively described and illustrated.

Ninety per cent. of the birds examined were infested with two species of Mallophaga (*Goniodes tetraonis* and *Nirmus cameratus*) which feed on the barbules of the feathers. "The number on each bird is to some extent an inverse measure of their health." Though not a parasite, the larva of the common dung-fly (*Scatophaga stercoraria*) is described and excellently figured—a noteworthy contribution to the scanty literature on larval Diptera—because it was hoped that these maggots, which are found in numbers among the droppings of the grouse, might prove to be intermediate hosts for the grouse tape-worms; the results, however, were entirely negative. With the same object in view, the crops of many grouse were examined, and although gamekeepers and sportsmen believe that these birds eat no insects, their animal food was, in fact, found to be "fairly abundant and very varied," comprising caterpillars of moths and saw-flies, frog-hoppers and Diptera, spiders and slugs. Although no bladder-worms were found by these investigations, Dr. Shipley has incidentally thrown light on the feeding habits of the grouse, and has shown that mere external observation in such questions is often to be distrusted.

The grouse tape-worms, the cysticercus stages of which are thus still unknown, comprise a larger species (*Davainea urogalli*) and a smaller one (*Hymenolepis microps*). This latter, "so transparent when alive as almost to be invisible," is nevertheless very abundant in the duodenum, where its presence appears to be often fatal to the birds, so that it is a far more serious pest than its larger companion.

Of the Nematoda that infest the grouse, *Trichosoma longicolle* and *Trichostrongylus pergracilis* are the most important, and the latter of these, at least, requires no intermediate host for its development. By soaking heather and then centrifuging the drawn-off water, Dr. Shipley showed that "heather is, so to speak, crawling with thread-worms"; the means by which the nematode larvæ, hatched from eggs passed out of the birds' intestines, enter the food canal of new hosts is thus plain. Another fact of interest is the presence of larval thread-worms in the lungs and liver; these are believed to be derived from eggs hatched while still in the intestine of their parents' host-bird, and to wander through the latter's body. Readers who have followed Dr. Shipley's recent suggestions as to the importance of parasitic worms in certain human diseases will be prepared for his belief that these wandering larval nematodes may be responsible for pathological conditions in the organs of the grouse.

G. H. C.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The general board of studies has appointed Mr. L. A. Borradaile to be university lecturer in zoology from January 1, 1910, to September 30, 1914.

It is proposed, in accordance with the recommendation of the special board for moral science, to appoint a syndicate to make arrangements for the building of a laboratory of experimental psychology.

DR. J. L. SIMONSEN, assistant lecturer and demonstrator in chemistry in the University of Manchester, has been appointed professor of chemistry in the University of Madras, and Dr. A. Holt has succeeded him at Manchester.

A LECTURE by some man eminent in letters, science, or art, to be delivered annually in the Lent term, has been established at Queen's College, London. Her Majesty the Queen, patron of the college, has allowed it to be called the Queen's lecture.

UNDER the Irish Universities Act, 1908, graduates of the Royal University of Ireland may be registered as graduates of the National University of Ireland. We are asked to announce that as the first meeting of Convocation must take place within six months from the date of the dissolution of the Royal University of Ireland, it is very advisable that application for registration as graduates should be made without delay. All information may be obtained from Dr. Joseph McGrath, registrar of the University, the National University of Ireland, Dublin.

COURSES of afternoon lectures on aëronautics will be held after Christmas at the Imperial College of Science and Technology. Sir George Greenhill, F.R.S., will lecture on the dynamics of an aëroplane; Mr. H. R. A. Mallock, F.R.S., on fluid resistance; and Colonel H. C. L. Holden, F.R.S., on light petrol motors for aërial work. The courses will begin respectively about the middle of January, the early part of February, and after Easter. Research scholarships will be awarded by the college to advanced students desirous of undertaking research work in scientific problems connected with aëronautics. The scholarships are to be tenable for one year at the Imperial College, and provision may be made for part of the work to be undertaken at the National Physical Laboratory. Scholars will be entitled to free admission to the college and to a maintenance allowance.

THE next annual conference of teachers arranged by the London County Council will be held on January 6–8 inclusive at Birkbeck College, Chancery Lane, London. Among the subjects for discussion, we notice that during the afternoon of the first day the training of engineers will be dealt with. Sir William White, K.C.B., will preside, and addresses will be delivered by Prof. D. S. Capper on the training of engineers, by Dr. R. M. Walmsley on the sandwich system as applied to day engineering students, and by Mr. R. Bunting on higher elementary education and the preliminary training of engineers. The next afternoon Sir Lauder Brunton will preside, and the teaching of domestic economy will be discussed. Mr. John Wilson will deliver an address on the correlation between the teaching of domestic economy and experimental science. Other subjects of discussion will be:—the organisation of higher schools; the teaching of number; methods of teaching in schools for the mentally