speed drive to its supercharger, while the Daimler-Benz has an infinitely variable hydraulic drive which permits of the speed and therefore the charge being suitably adjusted to altitude. Prof. Davies stressed the need for improved superchargers and scavenging pumps, as increased efficiency of these gives the advantages of reduced power required to drive them, lower cycle temperature with increase of charge density and of volumetric efficiency.

A type of engine of which little has been heard in Great Britain is the coal-dust engine, a point of some importance since British coals are more suitable for the purpose than those found in Germany, where development work has been done on this type. Diesel himself originally proposed such an engine but was unable to make it practicable. The Schichau Company of Elbing has carried out researches on a single-cylinder engine developing 160 h.p. at 200 r.p.m. Commercially, it has found the delivery of coal-dust ready for use direct from the mine in trucks to be most suitable, and the special removal of ash from the coal-dust to be uneconomical. Ignition temperatures vary from 300° C. for lignite to 600° C. for anthracite. The dust is used in the same fineness as for boilers, finer grinding being unnecessary as only 2 per cent in calorific value is lost to exhaust.

An auxiliary ante-chamber attached to the cylinder serves as a lock in free communication with the cylinder, and the fuel is admitted to the lock chamber by the fuel valve during the later part of the suction stroke, at the end of which the valve closes. During the instroke, compressed heated air is admitted and partial combustion occurs in the lock chamber as top dead-centre is reached. The resulting excess pressure in the chamber evacuates the contents into the cylinder during the expansion stroke. A continuous brake thermal efficiency of 25 per cent has been attained, but the main difficulties include wear of cylinder liner, wear, leakage and fracture of piston rings, pitting, erosion and sticking of the fuel-valve, and burning and erosion of the ante-chamber nozzles.

Concluding with some remarks on future developments, Prof. Davies pointed to the importance of research. For the last Schneider Trophy races the improvements in the aerodynamic properties of the aircraft and in the performance and reliability of the Rolls-Royce engine were obtained from comparatively modest outlays privately provided. Such an example shows the vast possibilities of well-directed research, and the reward of funds provided for the purpose.

FORTHCOMING EVENTS

Tuesday, April 22

INSTITUTION OF CIVIL ENGINEERS (Road Engineering Section) (at Great George Street, London, S.W.1), at 5 p.m.—Mr. Arthur John Hamblin Clayton: "Road Traffic Calculations".

Wednesday, April 23

GEOLOGICAL SOCIETY OF LONDON (at Burlington House, Piccadilly, London, W.1), at 3 p.m.—Prof. T. Neville George: "The Development of the Towy and Upper Usk Drainage Pattern".

Friday, April 25

INSTITUTION OF MECHANICAL ENGINEERS (at Storey's Gate, London, S.W.1), at 2 p.m.—Mr. G. E. Windeler: "Mechanical Mishaps".

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS (at the Mining Institute, Newcastle-upon-Tyne), at 6.45 p.m.—Prof. J. F. Baker, and Mr. J. W. Roderick: "Plastic Theory: its Application to Design".

APPOINTMENTS VACANT

APPLICATIONS are invited for the following appointments on or before the dates mentioned:

GRADUATE TEACHER QUALIFIED IN ELECTRICAL ENGINEERING in the Blackburn Municipal Technical College—The Director of Education, Education Offices, Library Street, Blackburn (April 23).

CHIEF EDUCATION OFFICER to the Darlington County Borough Education Committee—The Chief Education Officer, Education Office, Darlington (April 28).

WOMAN GRADUATE LECTURER IN EDUCATION at the Bingley Training College—The Education Officer, County Hall, Wakefield, Yorks. (May 2).

ASSISTANT TO THE DIRECTOR OF EDUCATION with special reference to ELEMENTARY AND SECONDARY EDUCATION—The Director of Education, Education Offices, Leopold Street, Sheffield 1 (May 3).

CIVIL ENGINEERING ASSISTANT TO THE TEES VALLEY WATER BOARD—The Engineer and Manager, Water Board Offices, Corporation Road, Middlesbrough (May 5).

RESEARCH OFFICER IN THE MENTAL DISEASE RESEARCH DEPARTMENT—The Secretary, The University, Edmund Street, Birmingham 3 (May 16).

READER IN PHARMACOLOGY—The Secretary, The University, Edmund Street, Birmingham 3 (June 1).

ASSISTANT ENGINEER FOR THE SUDAN GOVERNMENT RAILWAYS—The Controller, Sudan Government London Office, Oxford Hotel, 261 Clifton Drive South, Lytham St. Annes, Lancs. (quoting 'Assistant Engineer').

REPORTS AND OTHER PUBLICATIONS

(not included in the monthly Books Supplement)

Great Britain and Ireland

Proceedings of the Royal Irish Academy. Vol. 46, Section A, No. 9: Boolean Algebra and Probability Theory. By T. S. Broderick and E. Schrödinger. Pp. 103–112. 1*s*. Vol. 46, Section A, No. 10: Matrices of the Finite Period. By Olga Taussky and John Todd. Pp. 113–122. 1*s*. Vol. 46, Section A, No. 11: The Region of Bright Nebulosity in the Coal Sack. By E. M. Lindsay. Pp. 123–128+2 plates. 1*s*. Vol. 46, Section B, No. 6: Note of the Cytology of Human Uterine Glands in the Gravid Phase. By J. Brontë Gatenby and Olive E. Aykroyd. Pp. 97–100+plate 7. 1*s*. Vol. 46, Section B, No. 7: The Effects of Ultracentrifuging Human Oocytes. By Olive E. Aykroyd. Pp. 101–108+plates 8–10. 1*s*. Vol. 46, Section B, Nos. 8, 9: Description of Six New Species of Bassine Ichneumon-Flies, with Notes of some Others; A New Species of *Blacus* (Hymenoptera: Braconidæ), with some Notes of other Species of the Genus. By A. W. Stelfox. Pp. 109–124. 1*s*. (Dublin: Hodges, Figgis and Co., Ltd.; London: Williams and Norgate, Ltd.) [113

Proceedings of the Royal Society of Edinburgh. Section B (Biology). Vol. 61, Part 1, No. 1: The Œsophagus of the Stenoglossan Prosobranchs. By Alastair Graham. Pp. 24. (Edinburgh and London: Oliver and Boyd.) 2*s*. [193

Other Countries

Report of the Secretary of the Smithsonian Institution and Financial Report of the Executive Committee of the Board of Regents for the Year ended June 30, 1940. (Publication 3600.) Pp. ix+115. (Washington, D.C.: Government Printing Office.) 25 cents. [113

Fisheries Research Board of Canada. Bulletin No. 59: The Chemistry and Technology of Marine Animal Oils, with Particular Reference to those of Canada. Edited by H. N. Brocklesby. Pp. 442. (Toronto: Fisheries Research Board of Canada, Toronto University.) Paper, 2.95 dollars; cloth, 3.80 dollars. [113

Imperial Council of Agricultural Research. Miscellaneous Bulletin No. 34: Some Practical Results of Sugarcane Research in India. Pp. 41. (Delhi: Manager of Publications.) 1.8 rupees; 2*s*. 3*d*. [133

Commonwealth of Australia: Council for Scientific and Industrial Research. Bulletin No. 135: Investigations on the Storage of Jonathan Apples grown in Victoria. By Dr. S. A. Trout, G. B. Tindale and Dr. F. E. Huelin. Pp. 96+4 plates. (Melbourne: Government Printer.) [143

Annals of the Carnegie Museum. Vol. 28, Art. 11: An Archæological Collection from the Belcher Islands in Hudson Bay. By Diamond Jenness. Pp. 189–206+plates 14–22. (Pittsburgh, Pa.: Carnegie Museum.) [143

Field Museum of Natural History. Zoological Series, Vol. 24, No. 16. Reptiles and Amphibians from Central Arabia. By Karl P. Schmidt: Pp. 161–166. 10 cents. Zoological Series, Vol. 24, No. 17: Malacological Notes, 2: A New Marine Prosobranch Snail from the Yucatan Coast. By Fritz Haas. Pp. 167–174+1 plate. 30 cents. Zoological Series, Vol. 24, No. 18: New Termitophilous Diptera from the Neotropics. By Charles H. Seevers. Pp. 175–194. 15 cents. (Chicago: Field Museum of Natural History.) [193