the discussions sometimes seemed to show difference rather than unity of opinion, at the last meeting it was felt that there was common agreement in rejecting the objects of devotion put forward by the military States and in seeking to unite men to serve some worthier purpose, which has been known by various names. Valuable interludes were provided by Dr. R. N. Salaman, who spoke on the Society for the Protection of Science and Learning, and by Mrs. Beer, who described a recent visit to Germany and Austria. Further information on the Unity Schools can be obtained from Mr. F. S. Marvin, Pantiles, Coneydale, Welwyn Garden City, Herts.

Experimental Work on A.R.P.

DR. R. E. STRADLING, chief adviser for research and experiment, A.R.P. Department, Home Office, delivered the first of three lectures arranged by the Institution of Civil Engineers on air raid precautions. After referring to the creation some months ago of the special Research Branch of the A.R.P. Department of the Home Office, and to the recent appointment of a Civil Defence Research Committee under the chairmanship of Dr. E. V. Appleton, which would ensure that the full resources of the scientific world would be enlisted in the services of that section of Government activity, Dr. Stradling dealt with the question of protection from the effects of the high-explosive bomb. On detonation, a very high pressure is produced which causes the metal case to expand to possibly one and a half times its original size and then burst into fragments. In addition to the formation of splinters, the expanding gases have two effects: actual movement of gas giving the effect of a very 'high wind', and a wave sent out through the air which is similar to a sound wave. The first effect causes major destruction on a surprisingly local scale; about 30 feet from a large bomb, the effect has practically disappeared. Outside that zone the acoustic type of wave can spread a very long distance. Its effects on a structure can be disastrous, but more especially on those portions which have a high natural frequency, such as windows and the like. Experiments show that the effect is dependent upon the structure itself, as well as upon the form of the wave. Due to the adoption of basements as shelters, the question of earth movements around an exploding bomb is also of importance. There is a zone around the bomb in which few normal structures can be expected to stand, but it is very limited in extent. The wave which is effective at longer distances is somewhat similar to a very slight earthquake and has little effect upon a normal building. Further lectures in the series will be given by Colonel F. J. Wyatt, on camouflage, on June 12; by D. Anderson, on the design of bomb-proof shelters, on June 20; and by Brigadier C. A. Bird, on the work of the military engineer in war, on June 27.

Roman Frontiers in the East

SIR AUREL STEIN has recently completed a survey of the boundary line of the ancient frontier of the Roman Empire in Iraq and Transjordania. This is a part of a projected survey of the eastern frontier of the Empire, of which the Syrian section, with which Sir Aurel Stein's work connects, has been surveyed by Father Poidebard. Sir Aurel Stein's expedition was supported by the British Academy and the Society of Antiquaries of London and carried out with the co-operation of the Royal Air Force and the Iraq Petroleum Company. In a summary account of the survey (*The Times*, June 1) Sir Aurel states that he traced the line of forts along the south and north sides of the Jebel Sinjar. Between Nisibin and Mosul he found the old defences, which had commanded the road of invasion between Mesopotamia and northern Syria. Turning thence to Kirkuk, he visited and determined to his satisfaction the exact site of the battle of Arbela in Alexander's campaign, and along the middle Euphrates had made the remarkable discovery of a comparatively well-preserved castle, which was clearly Roman, and had at its side a barrage, which bore the stamp of Roman work. This affords evidence of the protection given to the trade route so far down as central Mesopotamia, possibly in the reign of Septimius Severus. The Roman track was traceable from the air and in places even on the ground. The last month of survey work covered the Via Nova, constructed in the reign of Trajan from the port of Aqaba on the Red Sea to Petra and the great centres of Syria. This route has now been determined and mapped for a distance of about 120 miles. Several old Roman milestones, from which the inscriptions had almost disappeared, were found in the Wadi Yitm. The distances between the milestones is remarkably accurate. Thence the road climbs to the top of the chain of mountains above the rift valley of the Wadi-el-Arabah, south of the Dead Sea, and follows the line of cleavage to Petra.

Finds from British Bronze Age Barrows

FINDS from the recent excavation of two bronze age round barrows, one at Stockbridge Down, Hampshire, and one at Reffley Wood, King's Lynn, Norfolk, are now on exhibition in the Prehistoric Saloon of the British Museum (Bloomsbury). Both barrows belong to the Early Bronze Age and date from about 1700 B.C. The Hampshire barrow was excavated by Dr. N. Gray Hill, and that at Reffley Wood by Mr. P. L. K. Schwabe and Mr. I. J. Thatcher. While the sites exemplify the two types of ground on which such barrows are found, namely, chalk down and sandy heath, in their characteristics they exhibit a striking similarity. In each the body had been laid approximately in the centre in the contracted position and accompanied by earthenware beakers. At Stockbridge the skeleton was in a remarkably good state of preservation and was accompanied by an almost intact beaker, but at Reffley Wood the skeleton had disappeared and no complete beaker was found, although the whole area under the mound was strewn with fragments. At both sites there were secondary interments in the mound, belonging to the later period of the Middle Bronze Age about 1400 B.C., when cremation was

practised. In both barrows examples of the small segmented Egyptian faience beads were associated with the secondary burials. About eighty finds of Egyptian beads have now been made in Britain. The segmented type occurs in Egypt in the Eighteenth Dynasty from about 1600 B.C. onward, and is especially abundant at Tell el-Amarna (1380–50 B.C.). These beads have also been found in Hungary, Moravia, and Holland, and are thought to have reached Britain through Greece, travelling across Europe along the amber trade-route.

Journal of Endocrinology

A NEW journal, to be devoted to endocrinological subjects, under the title *Journal of Endocrinology*, has recently been founded. Its scope will be the publication of communications which advance knowledge concerning the internally secreting glands, the mode of their actions, the nature of their secretions, and the disorders of their functions. It is hoped that strong support will be given by contributors from abroad. There may be some who question the desirability of any step which might seem to accentuate the division of the field of medical and biological sciences into specialized departments and groups, but there can be little doubt as to the necessity for this new journal. The large and rapidly increasing amount of work on endocrinology published by British investigators, and the lack, hitherto, of a British journal specifically devoted to this subject, has led to the overcrowding of journals having other and more general interests. As a result, there has been increasing difficulty for endocrinologists who have work to publish, as well as for those who need ready access to the published work in this field. The foundation of this new journal was preceded by consultation with the editorial boards of a large number of journals, and it is significant that, without exception, these boards were in favour of the project. The control of the journal is vested in a Council of Management, and it will be edited by Prof. E. C. Dodds, who will be assisted by an editorial board consisting of Dr. P. M. F. Bishop, Prof. C. R. Harington, Prof. G. F. Marrian, Dr. A. S. Parkes, Dr. F. G. Young, and Dr. S. Zuckerman. Dr. R. L. Noble has been appointed as assistant editor. The journal will be published, in the first place, four times a year, and the subscription is 30*s*. or six dollars. The first number is due to appear during this month.

Society of Rheology

THE Society of Rheology was founded in 1929 to further the study of the deformation and flow of matter in the broadest sense. The tenth annual meeting was held at the end of last year. At the banquet it was pointed out that expenses were not being met, and a discussion took place on the status of the Society and its publications programme. The policy favoured, almost unanimously, was to continue publication of the *Rheology Leaflet* and to enlarge it to include invitation review papers, while ordinary research papers would be published, as at present, in the *Journal of Applied Physics*. It was agreed that abstracts and bibliographies should be limited to those covering specific topics (not specified in the report) and that no attempt should be made at any complete covering of rheological literature. The co-operation of members was sought for increasing membership, but it was not mentioned how far this drive was to be international. The obvious method of circularizing authors of papers on rheological subjects, which does not seem to have been carried out in the past, was not mentioned. Rheology is one of those fields which include several sciences—physics, chemistry and physical chemistry and, of late years, biology. Its importance and scope are only now beginning to be generally recognized. Given the necessary increase of support, the Society should then fulfil a very useful function. It would be especially valuable if its finances reached the point where it became possible to list (without full abstracting) all papers bearing on the subject. Now the Society is staking its reserves on the drive for increased membership in such manner that they will be exhausted in two years if the drive fails. It is to be hoped that the Society will receive the required support. Those interested should apply to the American Institute of Physics, 175 Fifth Avenue, New York. The subscription for associate members, who will receive the *Rheology Leaflet*, is 2.50 dollars.

University of Minnesota Hydraulic Laboratory

IN *Engineering* of May 26 is an illustrated article on the large hydraulic laboratory recently completed on the Mississippi River at St. Anthony Falls, Minneapolis, for the University of Minnesota. The laboratory is on Hennepin Island, which is joined to the banks of the river by a dam constructed for the purpose of power development at the falls, and it is designed to operate practically entirely by water diverted above the falls. There is a natural drop of fifty feet and the laboratory can handle for experimental purposes rates of flow in excess of 300 cusecs. Flows up to this amount can be accurately measured by volumetric basins. The laboratory consists of five units, namely, the main experimental laboratory, the hydraulic machinery and pump laboratory, the turbine testing laboratory, the large-scale volumetric tanks, and the lecture room and administration rooms. In the first of these units is a river model section where at present there is under construction a working model, 160 ft. long and 36 ft. wide, of the Mississippi in the vicinity of St. Anthony Falls. The lecture room has been arranged so that large quantities of water can be handled readily at the platform. Below the platform runs the main overhead supply flume of the laboratory, while above it is a head control room containing a constant-level reservoir situated in the tower above the auditorium. The experimental flume which runs through the main laboratory can be used for experiments with ship models.

Improvements in Submarine Telephony in 1938

IN the Engineering Supplement to the *Siemens' Magazine* of May, an account is given of three submarine cables laid last year to the order of the