

substantially reduced if the demand became large enough. As the auxiliary apparatus required is not excessive, and can be assembled from standard components, the system is quite practicable for domestic use.

New Electric Lamps

IN a paper read to the Royal Society of Arts on March 7, Mr. J. W. Ryde of the G.E.C. Research Laboratories, Wembley, gave a full account of the working of the new electric discharge lamps. The sodium discharge lamp is practically monochromatic and of a brilliant yellow colour. Hence coloured objects illuminated by it all appear to be various shades of brown. Its efficiency, about 40 lumens per watt, although three times that of the ordinary filament lamp, is yet only about a tenth of the maximum possible yellow light that could be obtained for the same power. It is well known that the efficiencies of all kinds of electric lamp vary with their life. The problem of candle power maintenance is one that constantly engages the attention of every lamp manufacturer. In spite of years of research, the light output of incandescent filament lamps still drops by a certain amount after several hundred hours burning. The candle power maintenance for the new lamps has now been raised to a reasonable figure, but it is recognised that considerable improvements are possible. It is rapidly approaching that of the filament lamp. At present there is no sign that the eminently simple and highly developed filament lamp will shortly be replaced by discharge lamps for purposes of indoor illumination; but it must be admitted that discharge lamps will play an ever increasing part in the future of electric lighting. Already there are 65 street lighting installations for which these lamps have been adopted. Street lighting is the one use of artificial lighting for which we have never produced enough light. The use of the new lamps is an excellent opportunity of improving the lighting of our streets at little, if any, increase in the cost.

Importance of Deep Borehole Surveying

DESIGNERS of apparatus for surveying deep boreholes have in the past consistently underestimated difficult engineering problems necessarily attendant on such surveys. On April 10, W. E. Bruges read a paper before the Institution of Petroleum Technologists in which he made some pertinent remarks on the usefulness of well surveys as an adjunct to drilling logs and geological data. Geologists can utilise the results of accurate surveys for correcting underground contours, choosing such surface locations as will ensure economic spacing of wells in the oilsand below and making deductions as regards the formation as a whole from direction, deviation and irregularities of the hole as portrayed by the survey. Administration is facilitated by a knowledge of exact spacing of wells in an oilsand. Decisions regarding drilling activities can be taken with confidence, and the risk of overcrowding, hence decreasing production, is minimised. Recent experiments in Burma have shown

that of available apparatus for this work, that designed and manufactured by Martienssen is the most satisfactory. The instrument is fitted with a gyroscope for obtaining direction and two pendulums for inclination, results being recorded photographically. It has the advantage that the gyroscope is unaffected by magnetic influences, while the pendulum method of obtaining inclinations allows a number of readings to be taken at one run. Photographic recording of results means that the instruments below ground can be light, obviating necessity of following-up gear; moreover, their relative places in the well can be photographed without disturbing position or setting.

Automobiles Run by Charcoal Fuel

IN Italy, automobiles have recently been operated on a gas fuel made in transit from charcoal and steam. It is recalled in a recent paragraph issued by Science Service, of Washington, D.C., that similar experiments were made in France and other European countries several years ago. The principle involved is the same as that used in the manufacture of some kinds of gas employed in operating stationary internal combustion engines. A carbon-containing material, usually coal, is heated, and then water in the form of steam is passed over it. Carbon monoxide and hydrogen are formed in this process and both these gases burn with high heat output. Mixtures of this sort are known as 'water' gas or 'producer' gas. This gas can be used as fuel in internal combustion engines. The drawback to using these gas engines in motor vehicles is the difficulty of carrying the fuel supply. In permanent locations they can be used very effectively for power generation. To a limited extent, vehicles that run on wood or charcoal and manufacture their own gaseous fuel as they go along are used commercially in France. Science Service points out that this type of self-propelled vehicle may become important in countries like France and Italy which have no petroleum supplies within their borders. In the United States, on the other hand, owing to the cheapness and availability of petroleum, there would be no need for this kind of vehicle. In those countries where imported oil supplies are likely to be interrupted in war time, automobiles using charcoal fuel would have advantages.

Science and Industry in the U.S.S.R.

IN a recent publication entitled "Organisation et Principes de L'Enseignement en U.R.S.S." (Paris: Hermann et Cie, 6 Rue de la Sorbonne) Prof. Jean Trillat gives an interesting description of the relations between science and industry in Soviet Russia. One of the most important transformations brought about by the Russian revolution has been the establishment of compulsory education, and this in turn has led to a considerable development of scientific studies. Prof. Trillat points out that in order to understand correctly the nature of educational and scientific progress in Russia, it is essential to remember that there such developments have been