difficulty is to evolve some method of charging which will apportion to each consumer his proper share of the standing charges. He made a most ingenious suggestion for constructing meters the rates of which would depend on the times of the day at which the consumer would be taking his loads. We foresee that there would be great difficulties in explaining this system of charging to new consumers and serious difficulties with electric motor-clocks, and humming noises would have to be overcome.

ANOTHER suggestion made by Prof. Walker for improving the load factor of our central stations and thus enabling prices to be reduced is to utilise the potential power load of motor-cars and omnibuses for equalising the load. Much has been said about the advantages of making petrol and oil from British coal; but if the problem is to transfer the energy stored in our coal to the axles of our motor-cars, it is very much more efficient to generate electrical energy by means of big turbo sets, store it in batteries, and empty it in electric motors, than it is to convert only a fraction of the coal into petrol and employ that in internal combustion engines. If the distribution of electricity were on a national scale, we should have to dot about the country hundreds of battery stations at distances not greater than ten miles apart. Electric cars could be built taking batteries of a standard size. The driver of the car would only have to stop at a station every 20 miles or so and change his battery. It could be mounted and wheeled about in such a way that the process of changing it would be as easy as filling up with petrol. If it were necessary to have a tax, it could be imposed upon the charged battery. The gain to the State would be millions of pounds per annum, at present paid to foreign countries for petrol. Our central stations would be kept busy during the early hours of the morning in charging the traction batteries. It would lead to increasing the output of our central stations without increasing their capacity. Another help for reducing the price of electricity would be to educate consumers to reduce their bills by keeping down their maximum demands by using a special indicator.

Electrical Equipment of Automobiles

THE electrical equipment of a motor-car is now an essential portion of the whole vehicle. This is proved in a paper by Mr. E. A. Watson (*J. Inst. Elec. Eng.*, March) describing the progress made during the last three years in the electrical equipment of cars. In the modern car, the driver should never be called upon to resort to hand-starting. The starter handle is carried separately in the tool kit, and in many designs can only be inserted with difficulty, its main function being to turn the engine round for adjusting purposes and not for starting. The ignition now is almost always by electric coil and not by a magneto. To assist the convenience in driving, electric petrol pumps, windscreen wipers and horns are used. Recently the remarkable progress made in the combined textile and rubber driving-belt has led to a reversion to the belt-driven dynamo. These are entirely satisfactory and have a normal life of 20,000 miles or more. This drive possesses the advantage of quietness and simplicity, as compared with the gear or chain drive. The modern head-lamps, designed with a parabolic reflector and a focused filament, produce a beam which is slightly divergent. By means of prisms, some of the light is diverted on to the sides of the road and some in front of the car. The anti-dazzle problem has been partially solved, but the greatest problem of all has been, and it looks as if it always would be, driving in fog. The only alleviation seems to be to use a fog lamp which throws the light directly downwards on the road. This eliminates any rays in an upward direction which might be reflected back to the driver's eyes.

Discoveries at Sakkara

DISCOVERIES of great interest and importance are announced from Sakkara, where excavations are being carried on by the Egyptian Department of Antiquities under the direction of Mr. Walter Emery and Zaki Effendi Saad. These discoveries were made in a tomb of the first dynasty, which was partially excavated in 1931 and then appeared to have been completely rifled. Further excavation in the present season, however, in a series of forty-two store chambers in the superstructure of the tomb which previously had escaped notice, has brought to light the complete grave furniture of Hamaka, the Vizier of Pharaoh Den of the first dynasty (*c.* 3,000 B.C.). At present about half these chambers have been cleared. They have yielded a large number of objects. Among them are numerous jars for containing wine, which bear seals giving the names of Hamaka and his king, implements, such as wooden sickles with flint teeth, the wooden handles of large adzes, and a number of large flint knives of advanced technique, of which some are more than a foot in length. A quiver contains reed arrows with tips of bone or flint, and a spear has a head of ivory, while an inscribed ebony tablet bears the name of the Pharaoh Zer. Remarkable as are some of these objects, such as the flint knives, in coming from a tomb, the discovery is given a unique character by a large number of disks of stone, bronze or ivory, for which the excavators are as yet not prepared even to conjecture the purpose. Some of the disks are inlaid with different varieties of stone, and one showing hounds chasing a gazelle is in a style which is said to remind the observer of the products of Minoan art of some fifteen hundred years later.

Road Testing

THE Department of Scientific and Industrial Research has just completed a road testing machine which is stated to be the largest of its kind in the world. According to *The Times* of April 8, road making and upkeep cost Great Britain about fifty million pounds a year, and thirty thousand pounds is being spent annually by the Department on research work on road engineering. The new testing machine consists of a 12-ton lorry, tethered to a central post by a 5-ton structural arm driven by a 180 horse-