

will cause difficulty in the event of a great revival of trade. So far as the electrical industry is concerned, those employed in manufacturing, contracting and supply have grown in number from 200,000 to 330,000 in the last ten years. Scientific and technical development soon find a remedy for any potential shortage of work by increasing the rate at which power is developed and utilised. He reminded his hearers that electricity is a commodity in everyday use, and that it is unnecessary to fill up complex forms before it can be supplied. If the present rate of progress is to be maintained, more intensive effort and in many cases an appreciable reduction of tariffs is required.

School Diets

THROUGH the laxity of their parents in nutritional matters, nearly all children go to boarding schools as 'damaged goods'. This accusation, which is broadly true, is made by Prof. H. E. Armstrong in No. 7 of the gastronomical quarterly *Wine and Food*, in which he reviews Dr. Friend's book "The Schoolboy. A Study of his Nutrition, Physical Development and Health". Schools may not be able to repair the injury inflicted by parental carelessness, but at least they should not add to it, as they commonly do, by providing ill-planned dietaries during the crucial period of adolescence. For more than twenty years resident medical officer at Christ's Hospital, Dr. Friend has striven to better the physical condition of the boys passing under his care by improving the biological quality of the school diet. These experiments have been watched and encouraged by Prof. Armstrong in his capacity as a governor of the school. Prof. Armstrong is constantly directing his stinging wit and pungent criticisms at first one and then another public nuisance. The problem with which he is exercised at the moment is:

"How should the little busy boy
His belly daily fill?"

Prof. Armstrong urges the introduction of wholemeal bread; far more vegetables, particularly in a raw state; a comprehensive sausage including some of every kind of 'innards'; milk and milk products, of course. For the better provision of bone-forming minerals and vitamins, the milk should be from herds on lime-treated pastures, and in winter-time the cows should be fed on hay made from rapidly dried young grass.

THE large boarding school of the future will call for the exercise of special activities and of special intelligence on the part of the staff. The training of the child's character will be through that most wonderful House of Assembly, the 'tummy', and not through the pursuit of cricket and foot balls and dead languages. The school farm will be as carefully watched as the school classroom. Precious hours of sunlight will not be wasted indoors or the health-giving power of light be annulled by over-clothing. Dr. Friend initiated a great work, and Prof. Armstrong has been his staunch supporter, but

how many boys' or girls' schools have such enthusiastic medical officers or governors? Though it is an improvement on customary school diets, the Christ's Hospital diet is still far from ideal: sugar is too plentiful; fresh fruit and vegetables too scarce; not all the bread is wholemeal, and more milk and potatoes might with advantage be included. The progress of experiments with improved diets is hampered in schools, and may be invalidated by the unintelligent opposition of the school teaching and domestic staff, and by lack of co-operation from the boys and girls, who resent food changes, and protest if their expenditure on the 'tuck shop' is curtailed. In spite of these obstacles, we hope the time is near when schools will ensure health not by fighting disease with an array of clinical thermometers and antiseptics, but, by means of proper food and sunlight, building sound bodies resistant to infection.

An Experiment in Political Education

THE 'educated electorate' dreamed of by the liberal statesmen of two generations ago is still to seek; the great mass of voters to-day are probably no better qualified than their ancestors of Gladstone's day to form independent judgments of the merits of rival candidates for election to Parliament. A similar deficiency stultifies democratic government on the other side of the Atlantic. The problem how to help the masses to achieve that critical thinking postulated by democratic theory was discussed in a stirring address delivered on July 26 at the University of Minnesota by Dr. J. W. Studebaker, United States Commissioner of Education. Attention was directed in the address to a remarkable experiment now in operation in Des Moines, Iowa, where the local education authority has inaugurated a public forum for adults. Its objectives are, (1) exchange of information and points of view, (2) development of tolerance and open-mindedness and (3) development of critical intelligence. It is recognised that the leader of such a forum must be a man of eminence in the academic world, with both the theoretical and practical knowledge of current affairs which would command respect and, above all, "that serene detachment which alone can guarantee clarity of judgment". The basic conception of the forum is educational with emphasis upon critical thinking as opposed to the emotional appeal and obscurantism of the demagogue. Such forums, Mr. Studebaker thinks, ought to be found in every city and village throughout America; and he forecasts support by the Federal Government for schemes for establishing them. University extension discussion classes in Great Britain were started with similar aims, but failed to attract as participants more than a minute proportion of the electorate. It will be interesting to see whether Mr. Studebaker's suggestions fructify.

Origins of Some Mechanical Inventions

FOR his presidential address to the Newcomen Society delivered on October 16, Mr. C. F. Dendy Marshall took the subject of "The Germs and

Development of Some Mechanical Inventions". His address, he said, followed a well-beaten track, but as many uncritical accounts and inaccurate illustrations have been published regarding the early history of pumps and engines, he thought it would be of interest to consider some of the earliest printed records. Recent research has shown that much less is known of such men as Ctesibius and Heron than our fathers thought they knew; and even in the case of Heron, the earliest manuscripts are posthumous to the extent of more than a thousand years. The first printed edition of his "Spiritalia" was in Latin and was published at Urbino in 1573. In this is described the first known application of heat to produce motion in fluids, a device for opening temple doors by the agency of heat, and the famous æolipyle. The word 'æolipyle' has been used by writers in three senses, namely, (1) for a vessel shaped like a retort for producing a jet of steam, (2) for Heron's engine and (3) for a wheel impelled by steam as invented by Branca. The word means the doorway of Æolus, that is, that of the cave in which the winds were kept. After touching upon some of the inventions described by Agricola, Porta, de Caus, Branca, D'Acres, von Guericke, Boyle and the Marquis of Worcester, Mr. Dendy Marshall made some interesting remarks on Papin and his invention of the safety valve. To the plug valve, Papin added the lever and moveable weight, but he did not propose it as a safety valve or hint that it might be useful to prevent explosions. From Papin, Mr. Dendy Marshall turned to the work of Savery and Newcomen on the steam engine, and concluded with some remarks on the early history of tramways, railroads and mechanically propelled vehicles.

Road Traffic in the United States

In a recent radio talk given over the Columbia Broadcasting System, Prof. S. S. Steinberg, of Maryland University, discussed the highways of the United States. With more than 25 million motor vehicles, the business of highway transportation is one of the largest in the country. Last year, holiday motorists in the United States spent almost 600 million pounds. Highway facilities are still far from complete; only five per cent of the three million miles of rural roads are hard-surfaced, while only thirty per cent have received any kind of improvement. In many places, need for reconstruction is urgent, and the mileage of secondary light traffic roads required is very great. The loss of life due to accidents is high, as almost a hundred persons are killed every twenty-four hours, and last year one out of every hundred of the population was injured in a road accident, one of the gravest risks being the 'railroad grade' crossings, of which there are 240,000. About 1,500 persons are killed annually at these crossings; at least 30,000 such crossings are dangerous, and it will take many years before they can be made safe. Congress has provided sixty million pounds of emergency relief funds for this purpose, and the development of 'farm to market' roads will be a great boon to the country. The work will provide

employment for many at present unemployed as the cost of constructing roads is mainly for labour. Mr. Robinson points out that the highways affect everyone vitally as they are the arteries which carry the life-blood of agriculture, commerce and industry, as well as bringing many social and educational amenities.

London and Home Counties Joint Electricity Authority

UNDER the Electricity Acts of 1919 and 1922, joint electricity authorities were set up, which were to be representative in these districts of the authorised undertakers, the local authorities, the county councils, the large consumers and other interests. In a pamphlet describing the opening of new electricity showrooms in Sutton, a list of those composing the Joint Electricity Authorities for London and the home counties is given, and a record of the progress that has been made since the Authority took over the undertaking. The list of the members is thoroughly representative, and wonderful progress has been made in developing the industry. By instituting two-part tariffs, assisted wiring and hire and hire-purchase schemes, the electric supply has been made available to the poorest people in the district served, which is mainly residential. The supply area covers 190 square miles and is divided into an inner and outer zone, consumers in the latter having to pay slightly more. The work was taken over in July 1932, and in July 1935 the number of consumers had increased by 89 per cent, the load having more than trebled. The Authority has done much useful work in standardising the apparatus and systems it has inherited. The whole of Surbiton has been changed from direct current to alternating current, and in Sutton the supply is being converted from 200 volts to the standard 230 volts. Practically the whole of the supply is being received in bulk from the Central Electricity Board. The bulk supply from the Grid is taken at 33 kilovolts, transformed at the Grid substations to 11 kilovolts and then transmitted to the Authority.

Climate and Health

At the Harrogate Congress of the Royal Institute of Public Health, Mr. L. C. W. Bonacina delivered an address on "The Study of Weather and Climate in Relation to Public Welfare", which has been published in the *Journal of State Medicine* (43, No. 10). He points out that the effect of climate on general well-being is so complex that it is not possible to discriminate between the different elements, but that in Great Britain the general effect is distinctly favourable. Hence it follows that the effect of a marked change of climate, even if superficially an improvement, as for example a doubling of the amount of bright sunshine, might not really be to our advantage. The great importance laid on sunshine is "probably only an exaggerated response to the evil consequence of smoke-vitiated light and air in the great industrial centres, and the curative results in proper doses of natural or artificial sunlight". The wind and the rain, by cleansing the air, are also of great value,