the stimulating climate of Australia was added half-an-ounce of tobacco daily for the use of the convicts in Western Australia. It was at that time urged by medical authorities, and indeed was so still by many, that dietaries containing high stimuli beyond those got by the hard working honest population were necessary to sustain the health of the prisoners. He found that the quality of the diets, as containing more or less of animal food, was very much represented by the cost, and this varied from 1s. 2d. to 5s. and even 7s. per head per week. Now, it should follow, from the medical recommendations, that the health of the prisoners would rise in proportion. To determine this question he resorted to statistics. Taking 104 prison returns—which enabled a comparison of the twenty gaols where the expense and the quantity of the diet were the lowest; the twenty where the expense and the quantity of the diet were the highest, and the twenty where they were intermediate between the highest and the lowest—the results came out as follows:—

	Ounces of solid food per week.	Cost per head per week.	Sick per cent.	Deaths per 1,000
Twenty Lowest Prison Diets ...	188 ...	1s. 10½d. ...	3 ...	1½
Twenty Intermediate Diets ...	213 ...	2s. 4½d. ...	18 ...	3
Twenty Highest ...	228 ...	3s. 2d. ...	23½ ...	4

The results were objected to on the grounds that in some of the larger prisons, where the lower dietaries were adopted, the terms of imprisonment were shorter than in others. But those objections were met by the trial of the simpler dietaries in the same prisons, with the same classes of prisoners, with labour and without labour, for the like periods, where the like results appeared. * * The meeting would, he was sure, give a unanimous vote of thanks to Dr. Edward Smith for his able paper on this nationally most important subject.

The vote of thanks having been passed,

Dr. Edward Smith, in acknowledging the compliment, said he thought that some of the remarks of Dr. Lankester had been made without due deliberation. He had characterised the experiments he (Dr. Smith) had made as limited and vague. He could say, having been appointed upon the committee of the British Association, that the experiments were made continuously for a month upon four persons in Coldbath Fields Prison, and likewise upon the same number of persons in Wakefield Gaol, the examination of what passed from the body being chemical, and not merely microscopical, as Dr. Lankester had assumed. He therefore thought those experiments were not open to the objection that they were either limited or vague. With regard to the constituent of hydrogen in food, he had not undervalued this element, but had said that if he were treating of the nutritive value of food in a chemical aspect only, apart from any daily measure of the amount required by the body, he should add the free hydrogen also, since by its combination to form water within the body it must generate heat; but we had no means of ascertaining how much heat is produced and required by the body; neither could we ascertain how much of the water which leaves the body is generated in this manner, and how much is due to that which was taken as food. No doubt the mineral matters contained in the food were of the highest importance, and in mixed diets these were found. With reference to the remarks of Mr. Frank Buckland as to the physical condition of the Irish recruits, he would say he was now engaged in a large enquiry, on behalf of the Government, to ascertain the exact amount of food taken by the different classes of the community in England, Ireland, and Scotland. At present he could not give the results of that inquiry, but in due time they would be published. The important question as regarded the Irish recruits was—not the potatoes, but the milk. The amount of milk taken by that class was generally large, and the great advantage to the muscular system was derived from this source, and not from the potatoes.

PROGRESS OF ENGINEERING SCIENCE.*

Water-Pressure Engines. — Recently a new application of water power has been effected by the inventive genius of Sir W. Armstrong. He first applied it at Newcastle, where the general level of the town is very much above that of the wharves of the harbor, and the water works in consequence provided a very tall column of water at the lower levels. Of this he availed himself by applying the pressure so obtained to force a piston along a water-tight cylinder, and with a simple multiplying gear the cranes on the quays were made, by the mere turning of a cock, to raise any weight their construction could support. By applying the water power alternately on both sides of the piston, and acting on a cranked axle—as done in the steam engine—a water engine was next invented, capable of exerting any amount of power that could be obtained from the height of the column of water and the amount of supply. When a sufficient head of water is available, or where the work is intermittent, this is certainly one of the most successful applications of water power yet invented. At Great Grimsby Dock, and at Birkenhead, pipes are laid under the pavement from a reservoir at the top of a tall tower, to every part of the Dock premises. At the foot of every crane, under the piston of every hoist, at every dock gate, unseen and noiseless, the power lies dormant; but a woman's hand, applied to a small handle, will set in motion a force sufficient to raise a mass weighing fifty or one hundred tuns, either to place it in the hold of a ship, or deposit it in any spot within reach of the arms of the crane. With equal ease the gates of locks 100 feet in width are opened or shut, and the smallest as well as the heaviest works of the dockyard done, without a stranger being able to perceive what it is that sets everything in motion.

As an accumulator of power, Bramah's hydraulic press surpasses anything that has yet been invented, and may be carried to any extent that the strength of the metal will stand. The presses which were used to raise the tubes of the Menai Bridge, when worked by a forty-horse power engine, were capable of exerting a power equal to that of 14,200 horses, and raised one-half the tube, or 900 tuns, slowly but steadily, through the 100 feet at which they were to be placed above the level of the water.

Air-Pressure Engines.—The tunnel under Mont Cenis is to be rather more than seven miles and

* Extracts from an article in the *Quarterly Review*.