

Paragrams.

Experiments made with small balloons by the French and Italians, who know them as *ballons soudés*, have proved successful. The balloons are furnished with self-registering meteorological instruments—barometers, thermometers, etc.—and they are set free and rise to enormous heights. They contain a notice to the finder that on their being returned to the sender a reward will be given.

The shadow clock, invented by Prof. Hirth, of Munich, seems to be pre-eminently adapted for the sick-room or hospital. By depressing a button, a small electric lamp placed under the dial of a clock is lighted up, so throwing the shadow of the clock face and hands upon the ceiling in a highly magnified state. Viewed from the bed of a reclining invalid, it obviates any irksome craning of the neck.

An addition of between 60,000 and 70,000-h.p., probably represented by 15,000 motors of various sizes, in one year is sufficient indication of the increasing popularity amongst occupiers of London factories of this method of obtaining power. But these figures by no means represent the total increase, as they do not take into account those factories where the supply of electricity is generated on the premises.

A metal casting process recently patented by John H. Forbes, Cincinnati, provides for making certain portions of a casting, such as the tread of a car wheel or the hub of a loose pulley, of different material from the body of the casting. This result is secured by placing in the mould a quantity of chips or turnings of the required composition, and retaining them in the desired position during the pouring by the action of electro-magnets suitably placed outside the mould or in the hub core, as the case may be. It is not known whether the process has worked successfully.

Switzerland has a great scheme in view—the conversion of all its State railways to electric traction. They cover 1520 miles of route, 242 being of double track. There exists, of course, an enormous water power in Switzerland, but it is very variable, and we are not aware how much of it can be utilised all the year round for the generation of electric energy. Tenders will be asked for shortly from some of the great electric firms. According to the "Electrician," the Confederation makes money by its railways, the receipts last year being £4,763,000, and the expenses £3,120,000; and the Government expects to make more (or to reduce fares) with electric traction.

The enrichment of coal gas with naphthalene, now rendered unnecessary by the use of the incandescent burner, was, in the first place, suggested by the fact that in winter gas piping was often obstructed by deposits of crystallised naphthalene. This crystallisation of naphthalene decarburised the gas, and consequently diminished its illuminating power, which was particularly noticeable because incandescent gas lights were not known at that time. It was therefore proposed to place the naphthalene in a small boiler close to and heated by the gas flame, so that the gas was recarburised before burning. The idea would have been not at all bad if, on extinguishing the flame, the naphthalene had not frequently clogged the openings in the burner tip, and it was necessary to clear out the tip before the burner could be lighted again.

About half a hundred years ago (more or less), when sewing machines were not; when reaper and binding machine were but a dream; when twenty miles an hour was tabooed as furious railway speed; when steamships hadn't ventured to Australasia; when the bicycle was in the womb of invention; when Roentgen's merciful rays were not, but bullets were; when woman's head-gear was secured by ribbons or elastic (not hat pins); when telephones were unheard of, and that promising stripling, electricity, friendless—to be more exact, in 1850, neither L. J. Aron nor J. W. Flowers had thought of improving electrical instruments. Such articles were almost unknown. But when they did turn their thoughts towards them they did so successfully. For, during June, 1905, there was formed in England the "Electrical Instrument Syndicate Lim.," whose £20,000 was to be employed in acquiring patents relating to the utilisation of electricity.

The distribution of electricity for power and lighting purposes is becoming increasingly easy. "Power Companies" in many directions are adding to the number of their generating stations, and the installation of sub-stations is also becoming more than ever the fashion. Local British authorities in some cases are now contracting for electricity from power companies instead of making it themselves, and it seems probable that this plan will be largely adopted in the future, especially by the smaller towns. These will be able to obtain the advantage of a supply of electricity at a known cost per unit, and without having to spend large sums of money on generating stations.

A similar development is in progress in London and other large cities. Here some of the larger undertakings are converting their existing and originally "central" generating stations wholly or partially into sub-stations. The advantage secured is to concentrate the primary generation of the power into one large station located in a favourable position, even though this matter may be at a considerable distance from the actual area of supply.

Professor Perry, in a lecture delivered at Oxford, contrasted the actual education given to youths of British ruling classes—an education confined to the study of languages and methods of thought which have been dead for nearly 2000 years—with the education which would fit these youths to govern a country dependent for its future existence on the excellence of its technical industries. The following passages occur in the course of the lecture:—

Are you aware that in one ton of coal there is as much energy, as much actual work, as may be done by 40,000 labourers in a 10 hours' day? Our best steam engines utilise only one-tenth of this energy at the present time. But even now we know that the cost of the most unskilled work done by man is 1000 times the cost of the same work wherever it may be done by the best steam engines. One fact of this kind properly considered is worth many long essays about the effect of the engineer in altering all the character of our civilisation. It is labour that is the true standard of wealth. The steam engine has added incalculably to the wealth of the world. We forget that man is no longer needed for unskilled labour, so that when we use unskilled labour we are using materials which God has given us in the most inefficient manner possible.

The Waipori river is being harnessed to supply power to Dunedin for its trams and private lighting. The plant for the first two units is now in Dunedin, and each unit consists of two double Pelton type wheels mounted on the shaft of a 1,000-kilowatt generator. The voltage at generator terminals will be 2,400, and will step-up to 35,000 by means of step-up transformers.

The dam at the intake is 14 ft. high and 75 ft. from shore to shore.

The fluming is constructed of red birch cut in the saw-mill on the works and is 6 ft. wide by 4 ft. high. The total length is 1½ miles, and a fall of 8 ft. to the mile has been allowed. Five tunnels have been cut, ranging from 72 ft. to 290 ft. in length. At the penstock two pipes, each 1825 ft. long, will convey the water to the power house 674 ft. below, each pipe being equipped with the necessary air valves and air receivers.

The transmission line, about 29 miles, will terminate at a substation at Half Way Bush, where the voltage will be reduced by means of step-down transformers, and the power brought from there to the converter station in Cumberland street, Dunedin, via Stuart street, by underground cables, where it will be converted from 3-phase alternating current to direct current, by means of rotary converter.

At present the hydraulic portion of the work is complete as far as the penstock, and the work is now proceeding with the pipe line. A start has already been made with the power house, but work has been necessarily slow during the winter months.

Samuel Crompton, the inventor of the spinning mule, was born in 1753. Crompton's life was one long struggle. He was helped by a splendid wife, and soothed by his violin, of which he was passionately fond.

The invention of improved spinning machinery cost him five years of patient labor, carried on for the most part in secret. The operatives were dreadfully jealous of anything in the shape of better machinery, for fear it would throw them out of employment.

When he had made the "mule" to his satisfaction he required money to patent it. This, of course, he had not. A gentleman interested in the cotton industry tried to pick Crompton's brains, and thus discover his secret, and the poor inventor was at last cajoled into giving his machine for the benefit of the public on the strength of

promises of liberal support and recompense. But the large manufacturers, who reaped huge profits out of Crompton's invention, turned the cold shoulder on the poor inventor, and left him in the lurch. Years later Crompton's friends brought his claims before the Government of the day, but unfortunately, when Mr. Percival, then Prime Minister, was passing down the lobby of the House of Commons to urge Crompton's claims before Parliament, he was shot by Bellingham, and thus the inventor's hopes were again dashed to the ground.

Eventually, however, Crompton was granted £5000 by the Government, which was very poor recompense considering the importance of his invention and in the light of the fact that £30,000 was granted to Dr. Jenner for his discovery of vaccination.

A splendid market for agricultural machinery is found in the South American States. There is news from Rio de Janeiro which foreshadows a still better market in the future Brazil. The intelligence is such as will be thoroughly welcomed by British agricultural engineers doing a South American trade. With the object of encouraging the development of agriculture and dairying, the Government of the State of Rio de Janeiro have just determined to provide a public school of agriculture, with lands attached for practical experiments in agriculture and grape-growing. They have also determined to provide for practical instruction on pupil's own lands, by furnishing travelling instructors in ploughing, and advice as to the use of agricultural implements and machinery of all kinds.

To get more heat from a radiator in cold weather, the small electric fan used generally only in hot weather can be employed. Set the fan where it can blow against a large part of the radiator's surface. Turn it on at low speed, or at high if necessary, and the room will soon be thoroughly warmed. Steam at a low pressure possesses much less latent heat than steam at a high pressure, and therefore warms the radiator so poorly that only a slight draught of air rises round the pipes, and condensation is slow. With the fan in operation there is a forced draught against the radiator that conducts a great deal more heat away from the iron, so cooling it that much more steam condenses inside it. The heat thus taken from the radiator is held in the circulating atmosphere of the room, which is soon changed from cold to warm at a trifling cost for electric energy.

Orders for machinery to be installed in the new Technical School building, Wellington, have already been sent Home, the list value of the orders being between five and six hundred pounds. Orders for machinery for the workshops are also being prepared, and it is anticipated that these will reach a list value of three or four hundred pounds.

Publications Received.

The Scientific Australian (Melbourne), for the current quarter, is full of interesting matter dealing with machinery, appliances, and the world's latest inventions. The typographical production of this journal is excellent. Our thanks are due to the proprietors, Messrs. Phillips, Ormonde & Co., for their loaning us many cuts which have helped to make the pages of *PROGRESS* attractive.

The Australasian Accountant and Business Man's Journal (Dunedin), completed its first year with November number. The contents are specially selected, and form an instructive medium for every business man. Permanent enlargement of the *Accountant* commenced with November issue.

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