

or in milling machines with rollers. The fulling stocks have been known for several centuries, but the milling machine was first introduced by John Dyer, of Trowbridge, Wiltshire, who took out patents in 1833 and 1838. Mr. Kilburn Scott himself was brought up in the works of Kilburn of Leeds and has been familiar with textile machinery all his life. His paper contained much of interest to the anti-quarian, the inventor, and those connected with the cloth industry.

Progressive Science and Happiness.

AMONG the publications issued in the United States with the object of directing attention to the value of science and engineering in human progress, are the Research Narratives, published monthly as small folders by the Engineering Foundation, the joint research organisation of the four leading engineering societies of America. Hitherto, these narratives have covered a wide range of subjects, but the last three numbers contain the first contributions by various writers, dealing with benefits from engineering progress. Happiness, it is remarked, has ever been a condition that human beings have earnestly desired, but the question may be asked: How wisely has mankind used the means of happiness provided by engineering? One of the problems yet to be solved is the maintenance, without disastrous fluctuations, of the steady flow of enjoyment through well-ordered production, distribution, and consumption. "The present conditions", says one contributor, "are difficult to contemplate with mental serenity and undisturbed confidence, but they carry more of ultimate value than the prosperous years that preceded them." Many interesting views are expressed, and Dr. C. E. K. Mees, director of research of the Eastman Kodak Company, after remarking that happiness is not a thing which depends upon the possession of material things beyond a certain minimum, concludes his article by saying: "I believe that a large portion of mankind will abandon the feverish quest for material things and will employ its greater leisure in the development of art and the cultivation of its soul". The wise use of leisure is certainly one of the problems which is becoming of increasing importance, but perhaps the greatest problem of the moment is the provision for every one of that minimum of material things, the want of which is felt by so many millions.

Commercial Crystalline Vitamin D.

THE investigations carried out during the past few years by Bourdillon and his colleagues at the National Institute for Medical Research on the formation of vitamin D have now led to the preparation of a pure crystalline compound, as recently reported by Askew, Bruce, Callow, Philpot, and Webster, in *NATURE* for Oct. 31, p. 758. This compound, called by them 'Calciferol', is prepared by the irradiation of ergosterol in ethereal solution under strict anaerobic conditions, excess ergosterol being afterwards removed by fractional crystallisation and with the use of digitonin. The calciferol is separated from other products of irradiation by fractional crystallisation of the dinitro-

benzoates and subsequent hydrolysis of the ester. The process has now been repeated on a larger scale in the technical laboratories of Messrs. The British Drug Houses, Ltd., London, N.1. The sample of calciferol submitted is a white crystalline solid: it is stated to melt at 114.5° C., to have the same empirical formula as ergosterol, and to have the high vitamin D potency of 40,000 international antirachitic units per milligram. It is available for the use of research workers in tubes containing 100 mgm. The commercial production of pure vitamin D is a satisfactory culmination of the brilliantly directed but laborious research work of the Medical Research Council's investigators, and should lead to greater precision in therapeutics and to the possible discovery of new applications for its use.

69-in. Mirror for Perkins Observatory.

DR. HARLAN T. STETSON, director of the Perkins Observatory, Ohio Wesleyan University, Delaware, Ohio, informs us that the large 69-inch mirror for the new telescope was installed at the Observatory on Dec. 14. The disk of glass, weighing 3000 lb., was cast as an experiment in American glass making in the optical shops of the U.S. Bureau of Standards, in May 1927. The exceptional annealing of the glass, which required eight months of controlled temperature, facilitated greatly the polishing and figuring of the mirror's surface, which was executed in the factory of J. W. Fecker, in Pittsburgh. Exhaustive tests carried on at Pittsburgh by Dr. Stetson, Dr. J. S. Plaskett, of the Dominion Astrophysical Observatory, and I. C. Gardner, chief of the Division of Optical Instruments, of the U.S. Bureau of Standards, showed the surface to be of the highest order of excellence. Quantitative measurements revealed departures from the mean focus of twenty-five feet to be not greater than 0.01 in. for any zone. The completion of the Perkins telescope brings into the central States the third largest telescope in existence, the two other instruments of greater aperture being the 72-in. reflector of Victoria, B.C., and the 100-in. reflector at Mt. Wilson, California. These great telescopes in North America have all led the way to important additions to astronomical knowledge, and it may be confidently anticipated that the new instrument, under Dr. Stetson's direction, will carry on the tradition.

Sixth International Congress of Genetics.

ACTIVE preparations are being made for the sixth International Congress of Genetics, to be held at Ithaca, New York, in August 1932. A series of quarterly bulletins of information has been issued and a number of committees has been at work for more than a year. A recent bulletin outlines the arrangements being made with regard to exhibits in connexion with the Congress. Several laboratory rooms will be used for cytological and other genetical exhibits, including recommended varieties of various crop plants. A new feature proposed is a genetical garden of three and a half acres, in which extensive exhibits of *Zea*, *Nicotiana*, *Oenothera*, *Antirrhinum*, *Petunia*, *Brassica*, and *Melandrium* will be grown from

seeds sent by geneticists in all parts of the world who are investigating these genera. Exhibits illustrating fruit breeding will be shown at the Agricultural Experiment Station, Geneva, New York, and an extensive series concerning human genetics is being arranged in connexion with the Third International Congress of Eugenics, to be held in New York immediately before, on Aug. 21-23. A long series of animal exhibits, including domestic mammals and birds, fishes, insects, and molluscs, is also in preparation, the assembling of each group being in charge of a different person. Arrangements have been made for delegates to book passage on s.s. *Westernland* at a special rate of 200 dollars for the return voyage.

SUGGESTIONS have been made that the Congress should be postponed until world conditions improve, but Dr. C. C. Little, of Bar Harbor, Maine, Secretary-General of the Congress, has issued a communication stating that the Council, after prolonged consultation, has decided not to postpone the Congress. Among the factors which influenced the Council in deciding to carry on the arrangements as originally intended, are the facts that a number of prominent European geneticists have already indicated their intention to attend, that a large number of lectureships for visitors to the Congress are being arranged by American universities, that obligations have already been made and commitments undertaken, and that early improvement in economic conditions is uncertain, making postponement inadvisable. Now that the matter is finally settled, it is hoped that all geneticists who can possibly do so will plan to attend.

Electric Equipment of the Dolomites Railway.

THE narrow gauge Dolomites railway which joins Calalzo, in the Piave valley, to Dobbiaco, a distance of about forty miles, has now been working very satisfactorily for over two years. As the railway passes through Cortina d'Ampezzo, it is much frequented by tourists. The railway is operated by electricity and so there is no smoke and steam to detract from the beauty of the scenery. Fears were entertained in case, during heavy falls of snow, water would get into the motors and interfere with their working. A special arrangement was therefore devised for them so that when necessary they could be made 'enclosed' motors. Even in snow-clearing operations, when they were considerably overloaded, the motors suffered no damage. In the *Brown Boveri Review* for October, A. Brodbeck gives an account of the electric equipment of this railway. It receives its power from a three-phase network at Calalzo at a pressure of 18,000 volts; but for operating the railway, direct current at 2700 volts is adopted. This is done by the use of only one substation situated near Cortina, a little more than half-way from the power terminus. The conversion of the alternating to direct current is done at the substation by means of two mercury arc rectifiers each of 11,000 kilowatts capacity at 3000 volts. It is interesting to learn that a momentary load of 200 per cent does them no harm, and that they can withstand a 25 per cent overload for half an hour. Owing to

the comparatively small currents they take, they require little space and their efficiency is extremely high, being 99.1 per cent over a large range of output. The use of rectifiers in railway plants is increasing, and we anticipate a rapid increase in the future.

Novel Slot Electricity Meter.

WE learn from *A.E.G. Progress* for October that many hotel, boarding-house, and convalescent-home keepers now instal in their bedrooms a special slot meter to collect the cost of the electric energy consumed by the visitor. It is not uncommon for travellers to carry about with them all kinds of portable electrical appliances which are readily connected to the plugs in the bedroom, notwithstanding the printed regulations to the contrary. This sometimes leads to the blowing of fuses and is a source of fire risk to the building. It is therefore now not uncommon to put slot meters in the bedrooms, so that by the insertion of a coin the guest purchases a given amount of energy. Unlike an ordinary prepayment meter, the coin mechanism can be returned to the 'off' position by resetting a simple device. In this way the new visitor cannot consume at the expense of the previous one any energy that still may be available. The resetting device is actuated by a key, kept by the proprietor, who cancels for his own benefit the credit still due to the departing visitor. The company which makes this meter suggests that the constant source of revenue obtained in this way should be utilised to make the rooms more comfortable, and furnish them with plug points for all kinds of electric devices.

Indian Antiquities.

SIR EDWARD GAIT'S review of British research work in India in the fields of archæology, philology, and ethnology in his address to the first meeting of the Royal Society of Arts in the current session (*Jour. Roy. Soc. Arts*, Nov. 13) records a remarkable achievement, especially when it is taken into account that such research, often demanding intense application, in the majority of cases has been no more than the distraction of a busy official career. India can now boast of an ancient civilisation and a literature, of which the older elements may go back so far as 2000 B.C.; but when British rule began in the eighteenth century, Sanskrit literature and lore had lapsed into disrepute, the ancient monuments had been allowed to fall into decay, and the course of events in the Hindu period had been forgotten. From the time when the study of Indian antiquities was placed on an organised basis by Sir William Jones, who had gone to India as a judge of the Supreme Court in 1783, and the Asiatic Society of Bengal was founded, British officials have engaged in all branches of Indian studies with enthusiasm. Forgotten scripts, forgotten languages, and even forgotten empires have been rescued from oblivion, while the investigation of the customs, races, and religions of the people of India has been pursued in a scientific spirit without reference to racial or political prepossessions. Thanks largely to the efforts of