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francs. Quantitatively, it was purchases of manufactured products that decreased the most; with regard to foodstuffs and raw materials this decrease was smaller. It may nevertheless be concluded that since the middle of 1951, that is to say the time when the period of building up and replenishing stocks came to an end, Swiss imports have dropped continually.

The adverse balance of trade at the end of 1952 amounted to 456.8 million francs, i.e. almost 800 million francs less than in 1951. This large decrease can be explained by the falling off in purchases abroad. However, the slight drop in the level of the prices of imported goods also had its effect. Let us further point out, in connection with the balance of trade, that in the last four months of 1952 Switzerland even recorded an excess of exports over imports amounting to 117.2 million francs, or a monthly average of 29.3 million francs.

Switzerland's principal supplier countries last year were Germany, followed by the United States, France, Italy, Great Britain, the Belgium-Luxemburg Union, the Netherlands and Canada. The principal buyer countries were the United States, Germany, Italy, France, the Belgium-Luxemburg Union, Great Britain, Sweden, the Netherlands, Brazil and Austria.

ELECTRICAL ENGINEERING AT THE SWISS INDUSTRIES FAIR

BASEL, April 11th to 21st, 1953.

For many years past, the products of the electrical engineering industry have occupied a place of honour at the Basel Fair, Switzerland's pre-eminent technical exhibition. It is common knowledge that the scarcity of raw materials in Switzerland compelled industrialists at a very early date to utilise to the best advantage the hydraulic power which nature has so bountifully endowed the country. As a result, electrical engineering has developed in Switzerland on a gratifying scale, both in respect of power production and distribution and in the infinitely wider field of the practical applications of electricity. The Swiss Industries Fair thus affords each year an excellent general survey of the progress that has been achieved.

Swiss manufacturers ceaselessly improve their structural designs in all that relates to the **production, transformation and distribution of electrical energy**, and carry out fruitful research in admirably equipped laboratories. As an example, a 57 KW, 2400 KV shock generating set with a column more than 26 feet high, for high-tension testing laboratories, will be exhibited at Basel

this year. The design of high-power alternators is also making progress, especially as regards the insulation of the windings and the methods of fixing the pole pieces. The transformation of electrical energy is a subject of unremitting research. The insulation, protection, and cooling of transformers are improved with each passing year; more powerful types of mercury-arc and pumpless, rare-gas-atmosphere rectifiers capable of supporting heavy overloads appear on the scene. A new product which is now commercially available after having been tried out in the metallurgical industry is the contact rectifier, the characteristics of which are such as to warrant the statement that an interesting future lies before it. Every year sees the advent of new or improved equipment for the distribution of electric power. Remote operation and control of sub-stations and even of power stations has become common, and the special equipment used for this purpose has reached an extremely high degree of perfection. Remote control by audio-frequency pulses in the distribution network enables the loads to be conveniently spread, and this method is undergoing constant development. Several companies will be displaying their systems, which have found numerous practical applications abroad. There are new developments—not spectacular, but interesting—in equipment for power generating and distributing stations; new measuring transformers coated with a plastic product; square-dial indicating apparatus which can be read from a considerable distance; relays of all kinds for the most varied uses; low-oil or air-blast circuit breakers; disconnectors in which not only the insulations, but the operating levers as well, are made of synthetic plastics; lightning conductors of a new kind; recording and totalising apparatus with mean-value indication, etc. This year it will be possible to inspect at Basel a meter calibrating station, a programme-controlled regulator enabling the voltage of a supply system to be varied according to a pre-established schedule, and a new universal measuring instrument which will attract much attention; it gives direct readings of voltage, current, active and reactive power, power factor, and frequency. Mention should also be made of cables and wires, the manufacture of which is undergoing far-reaching changes owing to the new insulating materials which are now being utilised.

The **applications of electricity** are already extremely diverse, and they are becoming more extensive almost every day. Switzerland occupies a prominent position in this field; her products enjoy a high reputation all over the world. There has been an important advance in electric traction: the production of motors driven by 50-cycle single-phase current, which has made it possible to build locomotives supplied with current directly

from the industrial networks. Among the electric motors designed for industrial applications, we draw attention to a new synchronous reaction motor suitable for a variety of uses in which a constant speed is required regardless of the load. Contactors and protection boxes are numerous, and the manufacturers display the greatest ingenuity in making them increasingly practical and reliable. A new switch, of small size, which can be operated by push-button, lever, pedal or roller, will make its debut, and will attract keen interest on account of its convenience.

The thermal applications of electricity multiply apace. In the domain of electrically produced heat for domestic purposes the designers make every endeavour, for example, to improve their existing types of electric cookers. One of the manufacturers fits the heating plates of his cookers with stainless steel rims and surrounds them with gutters to catch liquids; another offers heating plates controlled by 7-position switches. Industrial electrothermics does not lag behind. A three-phase electric-arc furnace with a capacity of two tons, for steel or iron casting, with automatic regulation of the electrodes, will be displayed at Basel this year, as will a one-ton induction furnace for the manufacture of tool steel. A new high-frequency, continuous circulation furnace with a 4KW generator will be shown in operation. Electric welding has been vastly improved in recent years; spot-welding machines in particular, controlled by electronic regulators, have developed into veritable automatons performing complicated jobs. The range of transformers for arc-welding has been extended by the addition of a new 180-amp model.

In the sphere of telecommunications, several manufacturers will exhibit telephon and signalling installations and apparatus. Exhibits will include a cordless switching arrangement for private telephone exchanges and apparatus for code conversion and for the automatic control and correction of poorly-intercepted signals in radio teleprinter transmission. Electronic transmitting and modulating tubes will be displayed in a wide variety of forms, and the same applies to fire-alarm and other alerting systems. Another interesting event is the appearance of a new electron microscope of more compact design than its predecessors; of two of its three lenses, two are hinged, thereby providing increased facilities for varying the magnification.

Among the thermostats, of which these are always numerous examples, there will be a new miniature thermostat which, having the shape and size of a button, is easily incorporated in various kinds of apparatus.

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