has already been completed. Now, with the approach of the Third Five-Year Plan, the activities of the Academy in this field are to undergo a decided change. Attention will be concentrated on key positions, and the number of the Academy's branches will be reduced, or handed over to the local authorities. A further function of the Academy is to study the cultural and economic achievements of mankind and to help in their rational application for the building-up of the new society. The main responsibility for this work falls upon the Social Sciences Section.

The work of the Academy in the immediate future is to aid the State Planning Commission in the drawing up of the Third Five-Year Plan. The main efforts of the Academy's various institutes will be directed towards the solution of the following ten problems, outlined at a session held last March. (Needless to say, these problems do not comprise the whole work of the Academy and its research workers but, for the moment, they are the leading and dominant ones.)

(1) To develop geological, geochemical and geophysical methods of prospecting for useful minerals, particularly tin, rare metals and oil.

(2) To solve the problem of power by creating a unified electric power system throughout the U.S.S.R., with high-voltage transmission.

(3) To rationalize and extend the use of natural gas and by-product gas from industrial plants.

(4) To find a new type of fuel for internal combustion engines (study of chain reactions and explosion processes, internal combustion motor and electric automobiles).

(5) To rationalize technological processes in chemistry and metallurgy.

(6) To help in raising the grain yield of the country (research in seed selection, soil chemistry, plant biology, fertilizers and the mechanization of agriculture).

(7) To establish scientific bases for the development of animal husbandry and fisheries.

(8) To develop telemechanics (long-distance control of machinery) and to extend automatic processes in industry through application of theoretical physics.

(9) To draw up the balance sheet of the national economy of the U.S.S.R. so as to serve as a scientific basis for the Third Five-Year Plan.

(10) To study the history of the peoples of the U.S.S.R.

Science News a Century Ago

Robert Macnish (1802–37)

DR. ROBERT MACNISH, a brilliant physician and man of letters, who died on January 16, 1837, was born at Glasgow on February 15, 1802, the son and grandson of medical men. He obtained the degree of master of surgery at the early age of eighteen years, and first served as assistant to a general practitioner for eighteen months. He then went to Paris, where he attended the lectures of Broussais and Dupuytren and made the acquaintance of Gall, who pointed out Macnish to his fellow students as presenting a remarkable development of the organ of comparison.

On his return to Glasgow in 1825, Macnish obtained the degree of M.D. with a thesis on "The Anatomy of Drunkenness", which was published in 1827. Enlarged editions afterwards appeared and enjoyed a wide popularity. The work is of some historical value as being the first attempt to study drunkenness in its physiological aspects rather than as a crime. Macnish's next most important medical publication was "The Philosophy of Sleep", and was mainly based on the doctrines of Gall. His interest in phrenology is further shown by the publication in 1836 of an elementary treatise on the subject in the form of question and answer. At about the same time, he brought out a new edition of Amariah Brigham's "Remarks on the Influence of Mental Cultivation and Mental Excitement upon Health", to which he added numerous notes. He also contributed numerous articles to various periodicals, the best known of which, published in *Blackwood's Magazine*, was the tale entitled "Metempsychosis", which he wrote under the *nom de guerre* of "Modern Pythagorean". His collected tales, essays and sketches were afterwards published under this title with an account of his life by his friend Dr. David M. Moir. His premature death was due to an attack of influenza.

Production of Minerals in France

AT a meeting of the Statistical Society held on January 16, 1837, a paper by the chairman, G. R. Porter, was read entitled "A Statistical Account of the Mineral Products obtained in France during the year 1834; taken from official documents". In his opening remarks, the author said, that though in Great Britain no systematic effort had been made to gather statistics on the iron and coal mines, the French Government had recently deputed M. Le Play to ascertain the capability of every iron works and nearly every coal-field in England.

Mr. Porter's review of the mineral resources of France was divided under the following heads: ironworks; fuel; metals; salt, alum and copper ore; quarries, and operations connected with mineral substances. The quantity of iron ore obtained in France in 1834 was 1,551,473 tons, the number of smelting furnaces 374 and the weight of iron produced 221,886 tons. There were in use 97 furnaces for converting ore at once into malleable iron and steel, by a peculiar process used in Corsica, the production being 8,531 tons of iron and 399 tons of steel. There were also 1,230 forges for converting cast into malleable iron, and 1,556 rolling, drawing and slitting machines. The total value of the French iron manufacture was £3,492,519, and the number of men employed 31,704. Five sixths of the fuel used in iron manufacture came from the French forests. During 1834, 140 coal mines were being worked, and the coal produced was 1,550,530 tons.

George Richardson Porter, the author of the paper, was born in 1792 and died in 1852. Failing in business as a sugar-broker, he devoted himself to economics and statistics, and the Statistical Department of the Board of Trade was established mainly under his supervision. Among his writings was "The Progress of the Nation from the Beginning of the Nineteenth Century", the third edition of which appeared in 1851.

Rev. Baden Powell on the Dispersion of Light

AT a meeting of the Royal Society held on January 19, 1837, the Rev. Baden Powell, then Savilian professor of geometry at Oxford, read a paper entitled "Researches towards establishing a Theory of the Dispersion of Light". An abstract of the paper said:

"The author here prosecutes the inquiry on the dispersion of light which was the subject of his former papers published in the Philosophical Transactions for 1835 and 1836, extending it to media of higher dispersive powers, which afford a severer test of the accuracy of M. Cauchy's theory. He explains his method of calculation and the formulæ on which his computations are based. On the whole he concludes that the formula as already deduced from the undulatory theory, applied sufficiently well to the case of media whose dispersion is as high as that of oil of anise-seed : or below it, such as nitric, muriatic and sulphuric acids, and the essential oils of angelica, cinnamon, and sassafras, balsam of Peru and creosote. It also represents, with a certain approximation to the truth, the indices of some more highly dispersive bodies."

Faraday on the Views of Prof. Mossotti

THE evening meetings of the Royal Institution, said the *Athenæum*, began on January 20, 1837, when considerable interest was excited by its being known that Faraday was to deliver a lecture on the views of Prof. Mossotti, of Corfu, who has lately promulgated an opinion, that one general law would account for those forces of matter which are exhibited in universal gravitation, cohesion, and electrical attraction and repulsion. Faraday began by observing that the want of such general law had been strongly felt, and had latterly been more than hinted at by Babbage, Roget and other philosophers. He went on to speak of the nature of the forces of gravitation, cohesion and electrical attraction and repulsion, and then, according to the *Athenæum*, said : "Hence there is such an adjustment of these forces, that at certain distances, matter acts inversely as the square of the distance, producing gravitation ; but when the particles are nearer to each other, the powers are balanced, producing the state of cohesion ; and when they are still nearer, they exert that repulsion, which keeps the particles of every solid and fluid body out of actual contact".

Robert Thornton (1768–1837)

DR. ROBERT JOHN THORNTON, who was a prolific writer on botany and medicine, was born in 1768 and died on January 21, 1837. He received his medical training at Trinity College, Cambridge, where he attended Prof. Thomas Martyn's lectures, and at Guy's Hospital, where he was a pupil of the eminent surgeon Henry Cline. He qualified in 1793, and after further professional studies in Edinburgh, Dublin and Paris, and also in Holland and Germany, set up in practice in London, where he was for some time physician to the Marylebone Dispensary and lecturer on botany at Guy's Hospital.

At an early stage of his career, Thornton ruined himself by the publication of a magnificent folio in which contemporary artists and poets collaborated entitled "The Temple of Flora or Garden of the Botanist, Poet and Philosopher ; with picturesque plates in illustration of the Sexual System of Linnaeus" (1799–1804). He was also the author of "Practical Botany" (1808), "The Philosophy of Botany" (1808), "Outlines of Botany or an Introduction to that Science" (1810), and "A Grammar of Botany" (1811). His medical writings included "The Philosophy of Medicine" (1799–1800), "Vaccinae Vindiciae or a Vindication of the Cow Pock" (1806) and "The Prevention and Cure of the Venereal Disease" (1817).

Societies and Academies

Paris

Academy of Sciences, December 14 (*C.R.*, 203, 1301–1406).

LOUIS BOUVIER : Complementary observations on the claws of decapod crustaceans belonging to the Astacomorph section.

SERGE BERNSTEIN : The formula of approximate quadrature of Tchebycheff.

JEAN ANDRÉ VILLE : The convergence of the median of the n first results of an infinite series of independent experiments.

FRÉDÉRIC ROGER : The limits of a function at a point.

ALEX. FRODA : The properties characterizing the possibility of measuring multiform and uniform functions of real variables.

BERNARD SALOMON : Certain classes of reducers of oscillations of machine shafts.

DOUCHAN AVSEC : The ratio λ/h for vortices in longitudinal bands.

JEAN LABAT : The importance of Reynolds number in trials on small models. Results of an experimental study, using chronophotographs of particles of aluminium in suspension in water.

CHARLES CHARTIER : The structure of the general flow round a helix. Two diagrams based on a study by chronophotography.

L. CAGNIARD : The propagation of intumescences in directions with or against the current in rivers.

BERNARD LYOT : The spectrum of the solar corona in 1936, wave-lengths and the intensities of the emission lines.

DANIEL CHALONGE and HORIA SAFIR : Study of the variations of γ-Cassiopeia.

MME. MARIE ANTOINETTE TONNELAT-BAUDOT : Relation between the action function and the force which acts on the electron.

PAUL SOLEILLET : The interpretation of phase in the matrices of quantum mechanics.

GABRIEL DUCH : The determination of the surface tension of a liquid by the formation of drops at the end of a capillary tube in which the elongation of the meniscus is observed.

JAMES BASSET : Thermal exchanges in nitrogen and in hydrogen at ultra-pressures up to 6,000 kgm./cm.^{2}.

MARCEL LAPORTE : The production of white light by the electrical luminescence of gases. The method is based on the production of discharges of very high intensity of very short duration through a gas (xenon), the discharges being repeated with a frequency sufficiently high to make use of the persistence of light impressions. In the arrangement described, the oscillating discharge has a period of 8×10^{-6} sec.

J. J. PLACINTEANU : The electronic nature of light.

CLAUDE CHARMETANT : The electrolysis of ferrous chloride, bromide and iodide and of ferric chloride in mixtures of water and ethyl alcohol.

JEAN JAFFRAY : The discharge spectrum in air of high-tension magnetos.

B. ROSEN and MLLE. NINA MORGULEFF : Spectroscopic study of the constitution of sulphur vapour. Additional proofs of the existence between 3600 A. and 6000 A. of two absorption systems of sulphur vapour, one of which forms part of the principal system of S_2.