The second group of investigations includes those in which attempts have been made to deduce the mechanism of these reactions from investigations on the formal relationship between concentrations and reaction velocity. The abnormal effects of strong acids as well as the effects of the addition of non-electrolytes have long been known and different interpretations of the accelerating effects have been advanced from time to time. In this discussion the summaries presented by Drs. Brönsted and Dawson respectively may be said to have been representative of the difference in point of view.

According to Dawson, the catalytic effect of an acid in aqueous solution may well be ascribed to the sum total of a number of several effects, those due to the acid and its components and of the medium. We may represent the velocity of such a reaction by an equation of the following type :

$$v = R_1H^+ + R_2\bar{A} + R_3OH^- + R_4HA + R_5H_2O.$$

In this equation $R_1 \ldots R_5$ represent the specific activities of the various catalytic reactants. In order to justify such an equation it is necessary to evaluate with accuracy the actual concentrations of the reactants ; this is, in the case of electrolytes, no easy matter.

The view advanced by Brönsted and by Bjerrum is based upon the hypothesis of the existence of a quasi-complex or very unstable combination between reactants and catalyst and in mass equilibrium with them, the rate of change of this complex being so slow that the mass equilibrium is always established. This hypothesis leads to a very simple formulation of the reaction velocity :

$$v = k\mathrm{A} \,.\, \mathrm{B} \,.\, \frac{f_A f_B}{f_{AB}},$$

where f_A, f_B, f_{AB} are the activity coefficients of the reactants and complex. Whilst the theoretical evaluation of the relationship between the values of the activity coefficients and the concentrations in the case of electrolytes has not yet been completely solved, in spite of the progress achieved by Milner, Debye, and Hückel, yet their experimental determination by a number of methods does not present serious difficulties.

Brönsted and his co-workers have presented a number of investigations in which this formulation of the reaction velocity has been shown to be justified, and in the case of weak acid and salt mixtures the differentiation between primary and secondary kinetic salt effects is clearly exemplified, although the contribution by Harned and Åkerlof demonstrated the complexity of the changes introduced when strong salt solutions are employed. The termination of the second day's discussion likewise proved too abrupt for either of the protagonists to make many converts to their views.

ERIC K. RIDEAL.

New Buildings at the University of Leeds.

AN important stage in the ambitious but urgently necessary development scheme of the University of Leeds was reached on Tuesday, Oct. 2, when the foundation-stone of the new buildings was laid by Her Grace the Duchess of Devonshire.

After the ceremony, honorary degrees were conferred upon Her Grace The Duchess of Devonshire; Sir Albert Ernest Bain, chairman of the Finance Committee of the University ; Mr. Alexander Campbell, chairman of the House and Estates Committee of the University ; Mr. Morton Latham, Master of the Clothworkers' Company, 1912–13, and chairman of the Trusts and General Superintendence Committee of the Company, 1915–28.

The Mining Block is the first of the new buildings to be erected under the scheme for the enlargement of the University, which was designed by Messrs. Lanchester, Lucas, and Lodge, the winners of the architectural competition. The Department stands at the extreme north of the University's site and forms the right wing of the new University front as seen from Woodhouse Lane. Towards the cost of this building the Yorkshire Coal Owners' Association has contributed £25,000, and the Miners' Welfare Committee, £10,000. In accordance with a decision reached by the University authorities after very careful consideration, the front of this building, as well as the other buildings, will be of Portland stone. The back elevation will be of a good local brick with stone dressings. The building is 158 feet long. The general width of the building is 44 feet, but the central portion stands farther back in the form of a single storey glass-roofed shed which is capable of easy modification should the necessity arise owing to the development of the work of the Department. In common with the other buildings in the scheme, the block will have a flat roof, and the height of the parapet above ground level is 46 feet.

The work of construction is in the hands of Messrs. William Airey and Son (Leeds), Ltd. The building is in three main floors with a partial basement. In the basement a gallery is being built the full length of the building, especially designed for carrying out experiments in mine ventilation and similar problems. The ground floor accommodates the main laboratory, machinery room, crushing shed, and subsidiary rooms for stores and other purposes. The first floor houses laboratories for research, gas analysis, photometry, and general assay work, together with rooms for the staff. The second floor is devoted to the lecture theatre, drawing office, museum, and staff rooms.

The building will be heated by hot water, unconcealed panels being used partly in the ceilings and partly on the walls instead of the ordinary type of radiator. The department will be equipped with the most up-to-date apparatus and machinery designed to give students a complete scientific training before entry into this important branch of industry.

Cotton Growing in the Sudan.

THE Sudan Government, in collaboration with the Empire Cotton Growing Corporation, has issued the " Report for 1926–27 of Agricultural Work in the Sudan," in which the programmes of work for the following season are included. The Gezira Research Farm, which was established in 1918 in connexion with the irrigation project, comprises an area of more than 400 acres and possesses well-equipped laboratories. Considerable progress has been made during the year in bringing the farm up-to-date, and the establishment of two more stations where similar problems could be tested under different conditions is now suggested.

Cotton is the principal crop dealt with. In the chemical section the salt content, salt and moisture movement, and nitrate content of soils in relation to plant growth, are under investigation. The beneficial effect of heavy applications of gypsum on the permeability of Gezira soil is most marked, the uptake, penetration, and distribution of water being greatly improved ; further work on this important question is in progress.

On the botanical side, the effect of climate and other factors such as time of planting on growth, is being

studied, a close correlation being found between excessive flower bud shedding and water deficiency. Length of lint may be influenced by meteorological conditions, low temperatures tending to induce the production of short lint. Longer lint also appears to be produced by the first formed bolls rather than those developed later. Blackarm and Root rot are the principal diseases, and white ants and thrips the chief insect pests of cotton under investigation.

Developments have been made in the plant breeding section, surveys being carried out to determine the districts most suitable for cotton growing in connexion with the establishment of variety testing stations. The actual composition of the soil appears to be of little importance provided it is capable of holding water and is reasonably penetrable by roots; the natural vegetation affords a fairly trustworthy index of the soil nature. Further, although a sufficiency of water is essential, areas subjected to flooding or undue surface erosion are unsuitable. Variety tests include both Egyptian and American type cottons, and spinning and grading tests are to be included in order to obtain information as to the relative value of the varieties to the grower.

University and Educational Intelligence.

CAMBRIDGE.—W. L. Edge and N. A. de Bruyne have been elected to fellowships at Trinity College.

LONDON.—A course of nine free public lectures will be delivered on Wednesdays, at 5.30 P.M., at King's College, on "The Indebtedness of Industry to Pure Science." The course begins on Oct. 17 with an introductory lecture by Sir Oliver Lodge. Succeeding lectures will deal with the rôle of chemistry in the life of the nation (Prof. A. J. Allmand); electrical science and industry (Prof. Ernest Wilson); the human factor (Dr. F. A. P. Aveling); physiology and national efficiency (Prof. R. J. S. McDowall); electrical communication and its indebtedness to physics (Prof. E. V. Appleton); the practical applications of zoology (Prof. Doris L. Mackinnon); the relation of botany to the grain, rubber, and cotton industries (Prof. R. Ruggles Gates); the influence of geology on modern life (Prof. W. T. Gordon).

Eng. Capt. Edgar C. Smith will deliver a course of three lectures in the Department of Engineering, King's College, at 5.30 P.M. on Oct. 16, 23, and 30, on "A Hundred Years of Naval Engineering." Students of the College Faculty of Engineering are admitted free, and other students at a reduced fee.

THE London School of Hygiene and Tropical Medicine is continuing its courses of lectures and practical demonstrations for employees of business firms and other bodies who are about to proceed to tropical and sub-tropical countries or are home on leave. These courses of instruction, in addition to providing simple rules for guidance in regard to preparation for life in the tropics and personal hygiene, also embrace a short account of some of the more common diseases, with advice in regard to measures of protection against such diseases, and some guidance in simple methods of self-treatment. One such course was given in July, and another has been arranged beginning on Oct. 22 at 11.30 A.M.; an evening course will also be given if there are sufficient applicants. Full particulars can be obtained from the Secretary, London School of Hygiene and Tropical Medicine, 23 Endsleigh Gardens, Euston Road, W.C.1.

THE Royal Technical College, Glasgow, which many of our readers have no doubt visited while attending the meeting of the British Association, is now entering upon its hundred and thirty-third session. The College offers in its day classes four-year degree or diploma courses in all branches of engineering, naval architecture, chemistry, dyeing, sugar manufacture, metallurgy, and building, and a three-year course in textile manufacture. In connexion with its courses of study in engineering, which are held during the winter session, thus leaving students free to spend the intervening summers in works, the College has enlisted the co-operation of a large number of firms interested in the training of engineers. These firms allow selected apprentices facilities for carrying out a scheme of study conjoined with practical work. The studies of the first and second years are common to all branches of the degree courses in engineering, specialisation beginning in the third year in the civil, mechanical, electrical, mining, and chemical branches. By means of a scheme connecting the evening science classes conducted by local education authorities with the corresponding classes of the College, it has become possible for evening students within thirty miles of Glasgow to qualify for admission to third year and even more advanced courses at the College. Last session these affiliated classes were conducted in more than one hundred centres with an enrolment of 4101 students, exclusive of preparatory classes. The David Elder evening lectures in astronomy to be given in the College during the coming session will include courses on "Speculative Astronomy" by Prof. George Forbes, who hopes to develop a speculation as to the existence of an unknown planet outside the orbit of Neptune, beginning Oct. 17, and on "Modern Cosmologies," by the Rev. Hector Macpherson, beginning Jan. 9.

ENGLISH and American secondary schools are to form the subject of a co-operative study organised by the University of Pennsylvania in consultation with prominent educationists in both countries. The scheme, an outline of which appears in the June issue of *School Life*, the official organ of the United States Bureau of Education, embraces not only a comparison of the main facts and tendencies in the recent development of secondary education, but also a detailed comparative study of some thirty schools in each country, namely, twenty public high schools and ten private (independent) schools—five for boys and five for girls—in the United States, and twenty municipal and county secondary schools and ten independent schools in England. An outstanding feature of the scheme is the careful provision for obtaining a factual basis, as complete as possible, for useful comparison of the working out in actual practice of the systems of teaching in force in the two countries. In order to test the results of teaching, English pupils will take American examinations and vice versa, and papers will be graded both by English and American teachers independently; results will be compared and comments exchanged; questions, answer papers, and results of joint matriculation board examinations in England will be compared with those of the college board in America. Prof. E. D. Grizzell, of the University of Pennsylvania, will be in residence in England during the year 1928–29, and will actively participate in the study of the English schools. Any principal of a school of one of the types above mentioned who is interested in the study and, especially, any who would like to co-operate in the detailed plan for comparison of certain schools, is requested to write to Prof. Arthur J. Jones at the University of Pennsylvania, Philadelphia, Pa., U.S.A.