

of metallurgy: "In 1914 the quantity of energy used in electric furnaces in Britain, excluding those used for aluminium, was probably less than 6000 h.p., but on the day of the armistice the total capacity was in excess of 150,000 h.p." The author held that furnaces of more than 25 tons or above 3000-kw. capacity are not advantageous, and that the arc furnace has practically displaced the induction furnace. He pointed out the various existing applications of the electric furnace, and indicated the probable future development of this valuable appliance.

Dr. E. F. Armstrong read a paper on "Catalytic Chemical Reactions and the Law of Mass Action," in which he reviewed the present state of our knowledge of catalytic reactions, particularly as applied to the hydrogenation of certain oils. He held that the curve of catalytic action is linear and not logarithmic, and that the latter curve has been obtained by a number of observers owing to the fact that they had been working on substances in which some poison formed part of the substance to be hydrogenated, which destroyed the catalysts and thus gave the curve a logarithmic form. He further claimed that catalytic action is not a purely physical phenomenon, but is due to the formation of loose additive chemical compounds, of the existence of which he produced some evidence.

At the conference of the Chemical Engineering Group the theory of filtration was discussed in two papers, "The Principles of Technical Filtration," by Dr. E. Hatschek, and "The Design of Mechanical Filters," by Mr. Balfour Bramwell, whilst the filtration of gases was dealt with by Mr. J. M. Brown. Mr. E. A. Alliot contributed a paper on "Recessed Plate and Plate-and-Frame Types of Filter Press: Their Construction and Use," in which he compared the two types and the details of their construction; he also discussed various methods of feeding, the selection of filter-cloths, and other important points in the use of filter presses, and gave data as to the results obtained in certain typical examples.

Three papers dealt with centrifugal machines, namely, "The Sturgeon Automatic Self-Discharging Centrifuge for Separating Solids from Liquids," by Mr. R. A. Sturgeon; "The Sharples Super-Centrifuge," by Mr. S. H. Menzies; and "A New Process for Centrifugal Filtration," by Mr. W. J. Gee. The last-named appliance differs from most centrifugal machines in that it makes use of a filtering screen, so that it does really perform a process of filtration. Dr. W. R. Ormandy in his paper, "The Filtration of Colloids," showed the effect of electro-osmotic action on colloids and suspensions, and illustrated these by a series of experiments with a suspension of clay.

Imperial Cancer Research Fund.

THE eighteenth annual meeting of the Imperial Cancer Research Fund was held on July 22, the Duke of Bedford presiding. Sir William Church, in moving the adoption of the report, gave a summary of the investigations during the past year; in this he stated that the Director had continued the autologous grafting experiments, in which by transplanting an animal's own tumour to a part of its body away from the site of the primary growth an artificial secondary growth is established. The formation of secondary growths is the most certain evidence of the cancerous nature of a growth. It is to be hoped, therefore, that this method will be more widely applied as a control in the experiments on the production of cancer by chronic irritants which are being undertaken in so many laboratories throughout the world. In these experiments the most definite proof of malignancy is essential to progress.

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Dr. Cramer has examined the action of a number of inorganic substances on cancer cells. The first step in these investigations is to expose emulsions of a transplantable tumour to the reagent in the test-tube and find out by inoculating the treated emulsion into susceptible animals the amount of damage produced. Salts of cerium were found to be the most active of those tested. Manganese and uranium salts were less potent, and the other elements experimented with were without effect in strengths which could be tolerated by the experimental animals. None of these substances, however, had any influence on growing tumours—a failure probably due to the irregularity of the circulation in the tumours, which delays the access of the reagents to the cells, coupled with their rapid elimination by the kidneys and bowels. This is one of the difficulties constantly met with in direct therapeutic experiments on cancer. The cancer cell is so like the normal cells of the body that agencies which destroy it are also dangerous to life.

Before we can plan a rational method of treatment it will be necessary to know more of the vital processes in cancer cells and the nature of the very delicate differences between them and the normal. A beginning has been made with the study of cell-respiration. Respiration is essentially a combustion process, oxygen being taken in and carbon dioxide given off. These are only the first and last terms, however, of a series of chemical equations, so that there is room for great variety in the intermediate stages, even if the final result should be the same.

Dr. Drew has approached the problem by studying the rate of decolorisation of dilute methylene-blue solution by normal and cancer cells. With this method there is a wide difference between the two, decolorisation being much more rapid with normal cells. Dr. Russell and Dr. Gye have suspended the tissue emulsions in fully oxygenated defibrinated blood and measured the rate at which oxygen is abstracted on incubation at body-temperature. By this second method the differences are much less pronounced, and it is found that the more rapidly growing tumours, with significant exceptions, absorb more oxygen than those which grow slowly. The investigations are being continued, and give promise of interesting light on this fundamental feature of the life of cancer cells.

The Duke of Bedford, in moving a vote of thanks to the executive committee and to others who have assisted in the work of the Fund during the past year, referred to the wide range of investigation, covering such important researches as those relating to (1) experimental induction of cancer; (2) respiration in normal tissues, which is a fresh line of research in connection with cancer; and (3) experiments on the action of chemical substances on cancer cells in the test-tube and in the body; and to the very technical investigation of the Director on grafting; and noticed with satisfaction that the Fund is again in a position to assist investigators at home and abroad with tumour material for experimental purposes.

Liverpool School of Tropical Medicine.

THE Sir Alfred Jones Laboratories of the Liverpool School of Tropical Medicine were formally opened by Lord Leverhulme on Saturday, July 24, Sir Francis Danson, chairman of the School, presiding. Prof. J. W. W. Stephens announced the award of the Mary Kingsley medal to the following distinguished scientific workers:

DR. A. G. BAGSHAWE, C.M.G., well known for his researches on sleeping sickness in Uganda. Since 1908 Dr. Bagshawe has been director of the Tropical Diseases Bureau and general editor of the Tropical Diseases Bulletin. This publication occupies a unique