

thermodynamic process which gives no information as to the dimensions or orientations of the surface phase. That within certain ranges of bulk concentrations, however, the Gibbs' layer is unimolecular, is made probable by experiments on sparingly soluble fatty acids and the analogy between the properties of the surfaces of solution and three-dimensional gases.

This simple idea, however, does not appear to be applicable to all types of binary mixtures; it is possible that in some solutions the Gibbs' layer is thicker than one molecule, but reasons for and against are founded as yet on but slender arguments. The kinetic interpretation of the lowering of the surface tension by two-dimensional liquids, vapours and gases does not, however, meet with universal acceptance, and we find the concept of a negative surface tension developed on the assumption of a molecular halo or wide zone of molecular attraction. This idea is based upon the view that a material spread upon the surface of water will cover but a definite area, and not expand indefinitely, as is assumed on the kinetic hypothesis, a problem clearly susceptible of experimental solution.

As is the case in solutions, the adsorption of ions at liquid interfaces is attended with the operation of electric forces resulting in an ordered distribution of the ions in the interfacial phase. The nature of this distribution is of great importance in an interpretation of the phenomena of electric endosmose and electric cataphoresis. Freundlich has shown quite definitely that the potential difference or electro-kinetic potential of which those phenomena are manifestations is in no way related to the total potential difference across the interface, the one considered by Nernst in his development of a mechanism of operation of electric cells. It is thus necessary to conceive an ionic distribution the total amount of which can be calculated by Gibbs' method, such as will give rise to those two well-defined potential differences. Whilst this problem still awaits a detailed solution, it appears clear that the old and well-known conception of Helmholtz of a condensed double layer, as well as the idea of a diffuse double layer developed by Gouy, must both be rejected in favour of some composite type combining the advantages of both.

Attempts have not been lacking to show that the free surface of a liquid presents an ordered arrangement. Whilst consideration of the mean life of a molecule on the surface of a liquid, as well as the dependence of the surface energy and the Eötvös constant on the molecular structure, show that some orientation does in fact exist, it is clear that the total surface energy of a liquid is not defined entirely by the nature and orientation of the surface layer of molecules.

The nature of the free surface of a solid and the phenomena attending adsorption are more complicated. Whilst unimolecular films are the rule rather than the exception on liquid surfaces, the building up of secondary films, *i.e.* multi-molecular in thickness, is quite frequent on solid surfaces, although the loss in free energy attending the formation of each molecular layer is greatest for the first layer. It is not, however, a simple matter to calculate the film thickness from the amount of material adsorbed, since the surface of a solid is by no means uniform in character, and breaks in the adsorption isotherm may indicate merely the covering up of a fresh portion of the surface possessing a different surface energy. The variation in surface texture, dependent upon the presence of different crystal facets and edges, as well as the presence of broken crystals, is accompanied by a variation in surface energy, the interrelationship for heteropolar materials having been investigated by Born and Lennard Jones. For metals, however, we are not yet in a position to make the necessary calculations. Whilst both catalytic activity and adsorptive powers are dependent on the nature of the surface, the almost specific nature of many of these processes shows that both surface energy and surface structure are necessary factors to be taken into consideration in dealing with these problems.

The Faraday Society is again to be congratulated in promoting a highly successful meeting, at which it was possible not only to listen to a number of distinguished foreign visitors, but also to obtain the point of view which has led different investigators in certain fields to diametrically opposed conclusions.

E. K. R.

The Wellcome Historical Medical Museum.

AFTER closure for nearly a year for reorganisation and enlargement, the Wellcome Historical Medical Museum, Wigmore Street, London, W.1, was reopened on October 14 by Sir Humphry Rolleston, in the unavoidable absence abroad of the founder, Mr. H. S. Wellcome. Sir Arthur Keith delivered a short address, and Sir Frederic Kenyon and Sir D'Arcy Power also spoke in proposing and seconding a vote of thanks to the previous speakers. A brief tour of the Museum discloses the great variety and interest of the collection, but does little more than whet the appetite for return visits on future occasions, when selected objects could be more fully studied.

The visitor first enters the Hall of Primitive Medicine, in which are displayed the paraphernalia of the medicine-man, including his masks and costumes; a reconstructed skull-hunter's hut from south-east New Guinea is here a prominent feature. In the same section are also arranged a large number of charms, amulets, and talismans used by both primitive and modern man. In the Anatomy Room the history of anatomy is illustrated by means of drawings, paintings, and sculpture: there is a fine collection of bone and ivory mannikins used in the teaching of anatomy in the sixteenth and seventeenth centuries. Proceeding through a short picture gallery, the visitor enters the Hall of Statuary, containing statues and

casts of the deities associated with medicine in ancient times. In addition, the hall and its gallery contain collections of surgical, scientific, and dental instruments, arranged to illustrate the evolution of each particular instrument. Special mention may be made of the collection of microscopes and that illustrating the development of the modern spectacles.

One of the most interesting collections in the Museum is found at the end of the Portrait Gallery, where the Jenner relics are arranged: there one can see the original manuscripts in which Jenner's views on vaccination are set forth, and also the instruments used by him in his work; a homely touch is provided by the presence of his favourite arm-chair. Passing from the Alchemy Room, a flight of stairs is descended to the ground floor; the main hall contains a varied collection of pictures and material illustrating the War in both its naval and military aspects. At the far end is found the Lister Collection, including a portion of the actual Lister Ward from the Old Infirmary in Glasgow, in which he developed the practice of antisepsis in surgery. Passing sections illustrating methods of torture, the plague, and a lying-in room of the sixteenth century, the visitor enters a large hall devoted to the history of pharmacy. Here will be found a sixteenth-century alchemist's laboratory, a London chemist's shop of the eighteenth

century, a barber-surgeon's shop, and Chinese and Turkish drug stores.

Two impressions remained with us when we left: the great boon to mankind the discovery of anaesthetics has been, after inspection of the pictures illustrating surgical operations in pre-anaesthetic days, and the persistence of a belief in charms through many centuries up to the present day, in spite of the increase in scientific knowledge.

In the course of his address at the reopening of the Museum, Sir Arthur Keith said that a museum should fulfil two functions: it should serve the needs of students, fostering research, and at the same time it has a duty to the public, that of direct education. One way to write a history is by the study of the writings of others which have been preserved to us; the other is by the examination of the objects of man's handiwork, many of which have been retrieved through excavations, when their situation throws light on the periods at which they were in use: thus the existence of stone, bronze, and iron ages was discovered by this means. History, then, can be written on the shelves of a museum. But a history of medicine is the most difficult of all to write, since the use of a primitive medicine-man's emblems of his art is only really understood when we have a knowledge of his beliefs. On these he bases a theory of medicine, which guides him in the practice thereof; in general, the spirit is the real person and illness is due to the attack of baneful spirits, so that his practice is directed to the driving out of these immaterial beings.

A museum can only fulfil its main function of encouraging research if it is itself a centre of research. It can be seen when a museum is successfully fulfilling this function, by the appearance of members of its staff at scientific meetings, by the publications issuing from it, and by the number of students who make use of it.

In the education of the public the curator of a museum should be an able 'case-dresser.' The average man has little time or inclination for a detailed study of the exhibits, so that he requires his history to be put before him in a few well-chosen and salient objects. Since the best elementary treatises are usually written by the most learned men, it is probable also that the educational function of a museum will be directed equally well with research by the most learned of our curators.

Money is an essential item in the work of a museum, so that the thanks of all are due to those who contribute service to mankind by founding and maintaining it as a centre of research and education.

University and Educational Intelligence.

CAMBRIDGE.—Mr. L. H. Thomas, Isaac Newton student and Smith's prizeman, has been elected to a fellowship at Trinity College. Mr. H. M. Robertson (Leeds) has been elected to a research studentship in economics at Emmanuel College, and Mr. A. H. Wilson to an honorary research studentship in mathematics. The Hon. Bertrand Russell, Trinity College, will lecture on "The Analysis of Matter" at Trinity College, giving the Tarner lectures on the philosophy of the sciences.

Dr. A. C. Haddon, Christ's College, has been appointed honorary keeper of the New Guinea collections in the Museum of Archaeology and Ethnology. J. A. Ratchiffe, Sidney Sussex College, has been elected to the Stokes Studentship for research in physics at Pembroke College.

The Commissioners have offered to the University for discussion new statutes modifying the statutes

with regard to various trust emoluments to bring them into line with the new statutes. They propose a new statute, throwing open scholarships and prizes to women on the same terms as to men, leaving the University power to exclude women from any one or more of the emoluments for which they have not hitherto been eligible.

EDINBURGH.—Prof. E. Shearer, in his inaugural address as professor of agriculture, spoke on "Agricultural Education and the Community." He stated that our system of agricultural education is based on lines which are sound and well adapted to the general circumstances of the country. Useful work has been accomplished in the past, but present efficiency and future progress are unduly handicapped by meagre financial provision. Nothing is more certain than that the agricultural future, amidst ever-increasing competition, will lie with those nations that take the fullest advantage of scientific knowledge.

ST. ANDREWS.—The Court has appointed Dr. J. D. McBeath Ross to the lectureship in physical chemistry in University College, Dundee, vacant by the resignation of Dr. O. R. Howell, appointed to a post in Manchester Municipal Technical College. Mr. J. M. Hay has been appointed to the lectureship in mechanical engineering and machine design in University College, Dundee, vacant by the resignation of Dr. W. J. Walker, appointed to the chair of mechanical engineering in the University of Witwatersrand, Johannesburg, South Africa.

ON Wednesday, October 20, H.R.H. the Prince of Wales opened a new women's hostel, a teaching dairy, and farm buildings at the Cheshire School of Agriculture, Reaseheath. These buildings complete the equipment of the institution, and render possible centralisation of a comprehensive scheme of agricultural education, hitherto somewhat scattered. The school lies in the centre of a small estate, the mansion on which serves as a residential hostel for forty men students and as the headquarters of a scientific staff. There are two farms, the larger, 210 acres in area, being used for teaching and commercial ends, and the smaller, which extends to 50 acres, being devoted to experimental work. A 6-acre holding within the estate has been equipped as a poultry department, and the original gardens have been extended and stocked to illustrate various phases of horticultural work. An extensive range of stabling has been adapted as chemical, botanical, and bacteriological laboratories. The dairy, now added to the buildings, has been built primarily for teaching purposes; it has been equipped with the ordinary apparatus of a good cheese-making farm, and also with sufficient examples of dairy machinery to demonstrate the possibilities of mechanical devices. The Women's Hostel is a pleasing structure which perpetuates the half-timbered style so characteristic of the county. There is accommodation for thirty students. A county institution, the school aims primarily at instruction suited to the needs of farmers' sons and daughters, and others taking up rural pursuits for a livelihood. Separate courses, all of three to six months' duration, are provided in agriculture, dairying, horticulture, and poultry-keeping. Though the end in view is severely practical, instruction is largely on the traditional lines of scientific institutions; for it is characteristic of the Cheshire farmer that he wants his son to be taught "something he cannot learn at home," rather than to be trained in manual operations. The school also maintains an extensive advisory service throughout the county.