SURFACE ACTIVITY

THE Second International Congress of Surface Activity was held in the Senate House of the University of London during April 8–13. The enthusiasm shown by participants emphasized that the popularity of this subject in both the scientific and industrial interests throughout the world had in no way diminished since the First International Congress, held in Paris in 1954. Since the United Kingdom had the largest foreign contingent to the First International Congress, the International Union of Pure and Applied Chemistry asked the United Kingdom to undertake to arrange a second congress.

The late Dr. L. H. Lampitt, the British representative on the International Union of Pure and Applied Chemistry, and also the vice-president and honorary treasurer, gathered together a meeting of British scientists, both academic and industrial, who might be interested in the subject. This meeting elected an *ad hoc* committee under the chairmanship of Dr. Lampitt to proceed with the organization of a congress along the lines of the First International Congress in Paris. This committee decided that the subject-matter of the Second International Congress should be extended to include other aspects of surface activity than those discussed at the first world meeting, which was mainly on detergency. The Comité Français de la Détergence sponsored and organized the First International Congress. It arranged the first programme on industrial lines, in so far as the subject-matter was chosen from the industrial applications of surface chemistry rather than from the basic science. Moreover, the subjects were subdivided into seventeen divisions, which were run concurrently, necessitating a serious overlap of interests.

This the *ad hoc* committee for the Second International Congress now decided to change. The organizing committee accepted a programme drawn up with a scientific bias, with contributors both from academic and industrial research laboratories throughout the world. The contributors were asked to place their work under sections derived from surface activity taking place at specific interfaces, such as gas–liquid interface, liquid–liquid interface, solid–liquid interface, solid–gas interface and cell–water interface. Furthermore, to avoid overlap of interests, the sessions were to be run concurrently in only two lecture theatres, and the programme was so chosen that, so far as possible, sessions on allied subjects would not clash.

It was originally hoped to have approximately one hundred contributions, which it was thought possible to discuss in two lecture theatres over four days; but such was the world enthusiasm for this subject that more than two hundred contributions had already been received by the closing date, and late contributions were more than sufficient to start a Third International Congress. It was considered, after much hesitancy, that the two hundred papers should be accepted and that they should be run approximately twenty-five a day for the four days, in each of the two lecture theatres. It was decided that contributions should be pre-published and pre-circulated throughout the world to participants, so that the papers could be taken as read at the Congress meeting. It was considered that by this method two hundred papers could be fully discussed.

It was estimated that approximately one thousand people would attend such a meeting, which restricted the choice of venue to the Senate House of the University of London, where two large lecture theatres, the William Beveridge Hall and the Institute of Education, each seating more than five hundred, are available. It turned out that approximately one thousand people paid to come to the Congress, and since both lecture theatres were consistently full (sometimes over-full) throughout each of the four days of the meeting, it would appear that many more attended.

The contributions were sent in from nineteen countries, and were fairly evenly distributed throughout the world. Apart from the United Kingdom, which contributed eighty-three papers, they included the following countries, with the number of papers in brackets:

United States (32)	Australia (7)	Poland (2)
U.S.S.R. (21)	Belgium (6)	India (1)
France (9)	Canada (5)	Kenya (1)
Germany (8)	Italy (3)	Sweden (1)
Holland (8)	Finland (2)	Switzerland (1)
Japan (8)	Israel (2)	Yugoslavia (1)

The programme was arranged in the two lecture theatres *A* and *B* in the following sections:

A		*B*	
First day			
Gas/Liquid and Liquid/Liquid Interface (32)		Solid/Gas Interface (39)	
Insoluble films	14	Physical adsorption	26
Soluble films	7	Chemisorption	13
Foams	4		
Evaporation retardation	3		
Monolayers liquid/liquid interface	4		
Second day			
Gas/Liquid and Liquid/Liquid Interface (24)		Solid/Gas Interface	
Solubilization and micelles	13	Chemisorption (continued)	
Emulsions	7		
General phenomena	4	Electrical phenomena (15)	
Third day			
Solid/Liquid Interface (22)		Solid/Liquid Interface (28)	
Washing	14		
Suspensions and agglomerations	8	Contact angles, spreading and wetting	10
		Flotation	18
Fourth day			
Cell/Water Interface (Biological) (13)		Solid/Liquid Interface (25)	
		Flotation (continued)	
		Adhesion	6
		Adsorption	9
		Lubrication	5
		Nucleation	5
Total 91		Total 107	

The long-suffering publishers of the proceedings of the Congress have arranged to print the discussion in four volumes: Vol. 1 to include gas/liquid and liquid/liquid interfaces; Vol. 2 to include washing, suspensions and agglomerations and cell/water interface; Vol. 3 to include solid/gas interface, physical adsorption and chemisorption; and Vol. 4 for solid/liquid interface, including electrical phenomena. It was considered that dividing the interests in four volumes, offering reasonable economic units for those interested in selected topics, was preferable to publishing the whole proceedings of the meeting in a more expensive single unit. The written discussion of the transactions at the meeting has been found to be unexpectedly voluminous, but the proceedings of the Congress should appear in the near future, while world interest is focused on modern surface activity.

The entire proceedings should give a very useful up-to-date version of modern surface chemistry in all its aspects, both pure and applied, and will take several years to digest.

The discussion at the Congress seemed to specialize in classical surface chemistry at the air/liquid and liquid/liquid interfaces, such as thermodynamics of adsorption at interfaces and micelles, evaporation retardation, transport of material across liquid/liquid interfaces, formation of emulsions, the meaning of contact angles at the solid/gas/liquid line interface, long-range forces at solid surfaces and nucleation phenomena. It was truly astonishing to listen to the thermodynamic specialists expressing opposing views, with complete confidence that the opposing side was wrong and that they were fundamentally correct. It was somewhat horrifying to notice that the thermodynamic concepts and terms were frequently misused. For example, Harkins free energy term was repeatedly misquoted as a Gibbs free energy term, and systems used by Hill, Guggenheim, Harkins and Everett freely intermixed. It seems essential that some common system with defined symbols should be established once and for all.

There was relatively little discussion on the solid/gas interface, presumably since there were very high-geared participants in the audience which possibly frightened off discussion, and unfortunately the chairmen were conscientious and ruthless about being on time with their programme. But there were some very interesting papers in this section, especially those dealing with perturbation effects of the adsorbing molecules on solid surfaces, and also of the solid surface on the adsorbing gas molecules. This was shown experimentally by infra-red adsorption of the molecules in the adsorbed phase. This work has immediate application to studies in catalysis and possible means of measuring changes in bulk properties of solids by changes in surface phenomena. There were some interesting papers, partly in review, on the surface energies of solids in relation to their chemistry, which has interesting possibilities for future work in this intriguing field.

Some workers in the solid/liquid interfacial field related all the occurring phenomena to the inherent roughness of the solid surfaces. Others seemed to have such smooth surfaces that they could measure attractive forces between solid surfaces at molecular distances apart. Each party was completely unconvinced by the arguments of the opposing side.

One of the applied subjects which aroused interest was the use of long-chain hydrocarbon alcohols in the form of condensed monolayers in retarding the evaporation of water. On the laboratory scale this is successful up to 90 per cent; on field trials on areas of about an acre the efficiency is about 30–40 per cent, using alcohols spread from floats containing solid beads of the material. Hope was given that by using liquid spreaders in which the long-chain alcohol is soluble, the film could be spread and held on areas of square miles. Since water evaporates in Australia at the rate of about six million tons a year per square mile, the economic stimulus to this type of work is most pronounced. Papers dealing with the role of water molecules selectively adsorbing at crystal surfaces, either soluble in saturated water solutions or insoluble in the form of powders in the atmosphere, have very interesting practical implications: in the first case for the selective flotation of soluble salts, and in the second case for nucleation in cloud seeding experiments, where copper sulphide is shown to be the best seeding agent, and zinc sulphide, for example, one of the worst.

The meeting presented a great opportunity for scientists of the Western world to listen to and to learn the methods of the Russian and Polish scientists, expressed mainly in English. This was invaluable, since the Russians are more active in the field of surface chemistry than their Western colleagues, and their papers with references present a good record of their recent research.

From the enthusiasm shown by those producing original manuscripts and by participants at the discussion, there should be no difficulty for the organizers of the next International Congress to start thinking soon on a programme for the third world meeting.

J. H. Schulman

STUDIES ON FERTILITY

THE seventh annual conference of the Society for the Study of Fertility was held in Exeter on July 5 and 6. As in the past, papers were read on clinical, basic scientific and veterinary subjects covering the field of fertility in its broadest sense.

From the Liverpool School, already well known for its contributions to testicular and male accessory-organ anatomy and physiology, came two further papers. E. J. Clegg studied changes in the coagulating glands and seminal vesicles in rats by killing litter mates at weekly intervals. He found the former to be histologically more labile than the latter and, since there was no simple relation between age, testicular histology and the fructose content of the coagulating gland, concluded that fructose content was not a reliable indicator of hormone production. In discussion, it was pointed out by T. Mann that the fructose content of the secretions, rather than of the gland cells, was likely to be of more significance, while J. Macleod drew a parallel with Leydig cell secretion rather than numbers as of importance from the point of view of testis hormone production. E. W. Macmillan, also from Liverpool, has continued his studies on sperm transport through the epididymis of the rat. Since ipsilateral orchidectomy after the introduction of radio-opaque medium into the vasa efferentia does not affect the time of passage through the vas deferens, it is concluded that the *vis a tergo* from the testis is of no importance. The rate was similarly unaffected by ligation of the terminal efferential tubule or by high ligation of the ductus epididymidis. Trypan blue particles are transported in the same way as radio-opaque media.

A symposium on the methods of testing for spermicidal activity was opened by T. Mann (Cambridge), who pointed out that no single biochemical mechanism was affected by all spermicides, and that there were at least three groups of these: enzyme and competitive inhibitors, sulphydryl-binding substances, and surface-active agents. Clare Harvey (Exeter) discussed the dichotomy of opinion on whether the end-point for tests should be the concentration required to kill within a fixed time, or the time required to kill at a fixed concentration. She preferred the former (modified Baker test of total spermicidal activity). B. Carruthers (London) said that at the Family Planning Association Laboratories, satisfactory results had been obtained with the modified Baker test. He also mentioned his studies with the Davidson contact test and how the results could be affected by various factors, especially