propounder. These factors—intense loyalty to his theories and his friends—detracted at times from the balance of his judgment; but when this has been admitted, there is much to be grateful for. His criticisms were courageous in expression and stimulating in effect. My own experience is coloured by the memory of his insisting on my being called to give my views on the reality of the *V*2 rocket threat, to a War Cabinet meeting of 1943, despite the fact that he knew that I—much his junior and his pupil—was going to differ completely from his own conclusions; and although he was not right about the rocket, it was in part due to his prescience that we were not blind to the parallel threat of the flying bomb.

As a relaxation from the strain of Whitehall during the War, he pursued a long-standing interest in the theory of numbers. In 1933 he had published a very direct and elegant proof of the fundamental theorem of arithmetic, and he now followed this by a heuristic proof of formulæ for the frequency of occurrence of prime-pairs, prime-triplets and other combinations. Unknown to him, these formulæ, which he confirmed by counts, had been found by much more elaborate (and equally non-rigorous) methods by Hardy and Littlewood and by Staeckel, but Lindemann's methods were much simpler and more illuminating; no rigorous proof has yet been found.

In the field of nuclear energy, his advice must have been vital. For a long time it was doubtful whether he was convinced that a nuclear bomb was possible. The idea of such destructive power being available to human hands seemed to repel him so much that he could scarcely believe that the universe was constructed in this way; and it is perhaps against this background that some of the war-time decisions about nuclear energy should be construed.

After the War, he keenly supported the setting up of a separate Atomic Energy Authority, and he was a member of the Authority for the last three years of his life. He was also much concerned with general policy in science and technology, and he was intensely anxious to see both the cultural and material value of science more adequately appreciated in Britain and the status of men of science enhanced. He made speeches of impressive content on all these matters in the House of Lords. They sometimes resulted in controversy, but there will surely be universal agreement with this confession of faith which he made in a debate on university education on May 14, 1947:

"The function of a university teacher, as I see it, is to develop in young people the habits of exact and logical thought, to show them how and where the underlying facts can be ascertained on which conclusions are to be based, to indicate how the great minds of the past have tackled problems, to show what conclusions they have reached and how they have justified them, and, above all, perhaps most important of all, to arouse the students' curiosity and interest and stimulate them to the point of making the students desire to spend laborious days and nights in an effort to contribute themselves something towards the advance of knowledge."

Cherwell had an unusual range of honours. He was elected to the Royal Society in 1920, and he was awarded the Hughes Medal for 1956. He was created Baron Cherwell in 1941, a Privy Councillor in 1943, a Companion of Honour in 1953, and he was raised to a Viscounty in 1956. He received the Messel Medal of the Society of Chemical Industry, and the LL.D. degree of the University of Aberdeen.

He was not a professional physicist in the sense of having to make his living by physics, since he was wealthy enough by inheritance to have lived in comfort without working. His interest in physics was thus all the purer, and his independence the greater; at times he accepted no salary for his work for the Government. His will provides for substantial bequests to Christ Church and Wadham College, Oxford, and expresses the wish that these bequests be applied to the foundation of fellowships or studentships for teaching and research in the physical sciences, including astronomy.

Something of his personality will have been evident from this appreciation. His loyalties to Britain and to science transcended all his feelings and permeated the great width of his interests. His wit, his anecdotes, his arguments and his aloofness were the subjects of many 'high-table' stories. His aloofness, however, was easily penetrated by anyone in misfortune; he would go to much trouble to answer a request for help, or to provide help before it had been asked. He placed surpassing value on his friendship with Sir Winston Churchill and on the tenure of his chair; and he faithfully returned to Oxford in 1953 because, he said, the chair was the substance and politics the shadow. The very fact that at critical periods he was in the innermost circles of government and of international relations gave confidence to other men of science that their language and their thoughts would be understood in those circles: and as an ambassador of science when it was first entering directly into the destinies of nations, he commanded the respect and earned the affection of the statesmen with whom he so loyally worked.

R. V. JONES

Dr. Irving Langmuir, For.Mem.R.S.

IN an age of ever-increasing specialization, it is given to few to open up new vistas in many fields and to make notable advances in both academic and industrial worlds. Such a man was Irving Langmuir, whose recent death at the age of seventy-six has left such a gap in the select band of the élite of modern scientists.

Langmuir, who had been a teacher in the small academic Stevens Institute, Hoboken, New Jersey, was invited by Dr. Whitney, director of the Research Laboratory of the General Electric Co., Schenectady, to enter that Laboratory in the summer of 1909. Instead of being assigned some particular problem, Langmuir was given a free hand in following the various investigations current at that time. He was attracted to the problem of the cause of brittleness in drawn tungsten wire, which Coolidge had then recently developed, and suspected that gaseous impurities occluded in the wire might be the cause. Whitney suggested that he might examine this possibility in more detail, and thus started that series of monumental investigations on the interaction of gases with, and at, the surface of metals, with which the name of Langmuir will always be associated.

Apart from the implication of this work for the problem of heterogeneous catalysis, there emerged, in the form of as it were by-products of his work, fundamental inquiries such as the rigorous computation of the loss of heat from hot filaments, the mercury-jet vacuum pump, the nitrogen gas-filled incandescent electric lamp, the evaluation of the heat of dissociation of hydrogen and the use of atomic hydrogen in welding.

It is interesting to note that Langmuir extended his investigations on the processes of evaporation and condensation to the case of the alkali metals on tungsten, where evaporation of atoms, ions and electrons can be observed and the phenomenon of surface mobility most readily demonstrated. The recent developments in our theories of heterogeneous catalysis are beginning to emphasize the importance of these contributions carried out nearly thirty years ago.

Langmuir soon discovered that these reactions taking place with heated tungsten filaments and gases at low pressures involved but a single layer of atoms on the surface of the metal, which he likened to a checker-board of free valencies. Furthermore, from his studies on the reactions of carbon and its oxides at high temperatures, he concluded that the properties of adsorbed films should in general depend on the orientation of the molecules or radicals in the film with respect to the substrate, and that this hypothesis could be examined most conveniently at liquid surfaces. These inquiries resulted in the now famous series of papers published in 1916 and 1917, in which the concept of the orientated monolayer was developed and the evidence for molecular orientation at the surface of liquids tested by a series of ingenious and simple experiments.

It is of interest to note that this concept of molecular orientation at interfaces was being developed simultaneously but by very different paths by Prof. Devaux in Paris and Sir William Hardy in Cambridge.

Such molecular orientation is due to the operation of short-range forces which vary in magnitude over different portions of the molecules concerned, and Langmuir extended this view of surface orientation to computation of the properties of binary liquid systems, making use of the hypothesis of independent surface action.

During the Second World War, Langmuir was engaged on the problem of screening by means of smoke and of the de-icing of aircraft. For a few years before his death, he, together with his colleague Dr. V. Schaefer, took up the problem in a new form, namely, the modification of clouds and the control of weather by the method of chemical seeding.

Those of us who have had the honour and the pleasure of long acquaintance with him and Mrs. Langmuir, and have seen both his experiments on the clean-up of nitrogen in the laboratory and his detection of black widow spiders with the aid of a flash lamp at Lake George, will always carry in their minds the memory of a man unspoilt by the many honours bestowed upon him, a man unrivalled in his power of observation and directness of thought, one who could impart his ideas to others with that simplicity which is the mark of the truly great and one whose friendship did not change with the years.

ERIC K. RIDEAL

NEWS and VIEWS

Union Astronomer at Johannesburg: Dr. W. H. van den Bos

DR. W. H. VAN DEN BOS, who retired at the end of 1956 from the post of Union Astronomer at Johannesburg, is one of a considerable number of astronomers who went abroad after studying astronomy under Prof. W. de Sitter at Leyden. He went to Johannesburg as Leyden observer in 1925, and shortly afterwards was taken on to the permanent staff as chief assistant. In 1941 he was promoted to the directorship of the Observatory. His chief interest has been in double stars, and it may fairly be claimed for him that he did for the southern hemisphere what Aitken had done for the northern—complete the survey of all stars down to a definite brightness and measure systematically at two or more epochs all the double stars he found. He has been recognized for many years as the leader in his chosen field, was president of the commission on double stars of the International Astronomical Union and kept up to date a compilation of all measures of southern double stars, now being incorporated with a similar compilation for northern stars. After his retirement he is spending a year in the United States measuring at the Lick, MacDonald and Yerkes Observatories the most important double stars, for which there are not adequate observers in the northern hemisphere. Astronomers look forward to the results of his new labours.

Dr. W. S. Finsen

DR. W. S. FINSEN, who has succeeded Dr. van den Bos, is an astronomer trained in South Africa, whose chief observing activities have also concerned double stars. He is, moreover, extremely interested in instrumental design and has himself constructed new delicate pieces of apparatus. He is best known for his stellar interferometer for measuring the closest and therefore the most important double stars. By the observation of the brightest stars, he has discovered new and very close doubles. He should prove a useful director of the Observatory in undertaking a new exact time service and in the construction and erection of a large reflector at a site away from Johannesburg at Hartbeespoort.

Regius Professorship of Physic in Cambridge: Prof. J. S. Mitchell, C.B.E., F.R.S.

PROF. J. S. MITCHELL, who has been appointed regius professor of physic in the University of Cambridge in succession to the late Sir Lionel Whitby, was born in 1909. He entered the Medical School of the University of Birmingham in 1926, and later won a scholarship to St. John's College, Cambridge ; here he took a double first, including Part II physics. After completing his clinical training at Birmingham he qualified with the Cambridge M.B. in 1933 and became house physician to Prof. K. D. Wilkinson. A Beit Memorial Fellowship in the Colloid Science Laboratory at Cambridge under the supervision of Sir Eric Rideal was followed by a fellowship at St. John's in 1936, and he eventually became assistant in research in radiotherapy at Addenbrooke's Hospital, where he was closely associated with the late Prof. J. M. Ryle in the Department of Medicine.

During the War, after a period in the Emergency Medical Services, he was in charge of medical