

## NEWS AND VIEWS

## Klondyke Again?

THE increasing pace of exploration for uranium in the United States is evident from an address by Mr. Rafford L. Faulkner, Director of the Division of Raw Materials at the United States Atomic Energy Commission, at the recent NUCLEX meeting at Basle, Switzerland. The starting point for these calculations—which are being made elsewhere as well as in the U.S.A.E.C.—is that the cost of nuclear power is now low enough for it to be attractive in much of the industrialized world. Mr. Faulkner mentioned the Tennessee Valley Authority reactors which are likely to produce 1,100 MW of electricity each at a cost of 2.37 mills per kW hour. Even though the cost of power may be greater when reactors are built by private utility companies in the United States—the TVA is a public authority—it now appears that the forecast of installed capacity amounts to no less than 95,000 MW in 1980 (compared with 10,000 MW now almost certain to be operating by 1970). Outside the United States, and outside the orbit of the Soviet Union as well, Mr. Faulkner estimated that there would be a further 130,000 MW of nuclear electricity generating capacity by 1980. On this basis the annual consumption of uranium by civil power stations would rise from 12,000 short tons of uranium oxide in 1970 to 65,000 tons by 1980 (by which time more than 400,000 tons of uranium oxide, much of it enriched, would be locked up in nuclear power stations of all kinds). In practice this means that the present rate of production—about 18,000 tons a year—will have to be doubled by the mid-seventies and increased still further by the end of the decade. This is the origin of the recent revival in and public encouragement for uranium prospecting in the United States and elsewhere.

As things stand, the known reserves of uranium oxide (excluding the Soviet Union, China and eastern Europe) amount to nearly 700,000 tons of ore which may be extracted at a cost of between \$5 and \$10 a lb. The same reserves may well yield nearly as much again at the same sort of price, particularly in the United States and Canada. It appears that the deposits of uranium which can be mined at a price of between \$12 and \$15 a lb. are nearly as great, and that a much larger amount of uranium oxide could be obtained at costs ranging from \$15–\$30 a lb. The urgent need, however, is to find ways of increasing the supply of uranium ore at low cost, chiefly because neither the constructors nor the owners of nuclear power stations want at this stage to start dipping into the more expensive reserves of fuel.

One intriguing statement by Mr. Faulkner will help to account for some of the costs of uranium exploration. In the past, apparently, it has been necessary to drill 1 ft. of exploratory bore hole to recover 8.5 lb. of uranium oxide. In the future everybody is reconciled to less productive exploration, chiefly because the more obvious ore-fields have already been explored. So far as the owners and operators of power stations are concerned, in reactors of the kind being installed in the United States (with light water as moderator) an increase in the price of uranium oxide of \$1 a lb.

corresponds to an increase in the cost of power of 0.08 mills per kW hour.

## Whose Ionosphere?

ONE of the hazards of scientific publication was referred to by Mr. J. A. Ratcliffe, President of the Institution of Electrical Engineers, in his inaugural address on October 6. Referring to the origin of ideas on the ionosphere, he pointed out that Heaviside in Britain and Kennelly in America independently and almost simultaneously suggested that an overhead reflector was the only way of explaining the long distance transmission of radio waves, and that free electrical charges in the upper regions of the atmosphere were probably responsible. In his article in the 1902 edition of the *Encyclopaedia Britannica*, Heaviside wrote: "There may possibly be a sufficiently conducting layer in the upper air. If so, the waves will, so to speak, catch on to it, more or less. Then the guidance will be by the sea on the one side and the upper layer on the other." Mr. Ratcliffe understandably raised the question of how Heaviside's name is associated with the ionosphere on the basis of this somewhat vague statement. The explanation is apparently that Heaviside's fuller account was sent for publication as an article in *The Electrician* and turned down by a referee, with the result that it was never published. Only in 1912 did Eccles—who knew Heaviside's unpublished paper—associate Heaviside's name for all time with the reflecting layer.

## Communicating Research

THE Research and Development Society, which started life in 1962 as the London Group of Administration of Research and Development, held a one-day symposium on September 29 at Imperial College. The subject of the symposium, which was the Society's most ambitious meeting so far, was "Communicating the Results of Research and Development". Papers were read by the Professor of Psychology at the University of Leeds, Dr. G. P. Meredith, the Visual Aids Officer of the British Association, Mr. A. M. Hughes, the Director of Beecham Research Laboratories, Mr. F. P. Doyle, and the Director of the British Welding Research Association, Dr. R. Weck. As Professor Meredith observed, "The research worker lives in his phenomenon, and resents the need to communicate . . . the research worker needs not only the basic methods and skills of investigation, but the control and understanding needed to do justice to his work in his communications".

This is an important theme, and the Research and Development Society deserves congratulation for encouraging scientists to discuss it. Many other problems in the organization of the research effort need similar airing. The Research and Development Society should be well placed to fill this need if it can resist the temptation to become a dining society.

## Teaching by Seeing

A PROGRAMME intended to help with the teaching of engineering subjects in technical colleges and in industry has been launched by a company formed specially for the purpose by Industrial and Commercial Education Limited and by Macmillan and Co.,