

SCIENCE BY THE UPPER FORM IN SCHOOLS

AT the annual meeting of the British Association for the Advancement of Science the section devoted to matters of general scientific interest, Section X (Assembly of Corresponding Societies), has for some years provided an opportunity for sixth-form scientists in local grammar and public schools to present papers on scientific studies carried out as a result of group or individual investigation. One whole morning session is set aside to allow the presentation of four topics, and large adult audiences flock to listen to the young embryo scientists.

This year at Cardiff, "Science by the Upper Form" was represented by Robert Riden, of Cardiff High School for Boys, who read a paper on "The Caves of South Wales"; Colin Rees, of Cathays High School for Boys, who discussed "The Increase of Herring Gulls at Worms Head, Gower, and its Effects on the Razor Bill and Guillemot Populations"; Glanffwrdd Phillips and Clive Davies, of Ferndale Grammar School, Glamorgan, who presented a joint report on investigations into the presence of "*Craspedacusta sowerbii*—Fresh Water Medusa of Microhydra" in Darran Lake, Ferndale, and by Roger Williams, of Tredegar Grammar School, Monmouth, who surveyed the vast subject of "Astronomy" in half an hour.

Each talk was admirably illustrated with slides or projected photographs as well as by other visual material.

Robert Riden gave a vivid account of his adventures in exploring a number of caves of different types which border the South Wales Coalfield. He indicated their relationship to the geology of the coalfield, gave details of their structure and physical grandeur, with particular reference to three to be found in Breconshire, in Carmarthenshire and in Gower, and showed how young people with a spirit of adventure and a disregard for the discomforts to be faced could carry out much useful exploration underground, providing their expeditions were properly organized.

Colin Rees, with the help of some delightful coloured slides, exposed the ruthless habits of the herring gull on Worms Head in the Gower Peninsula. He unfolded an interesting story of variations in the population of bird life on the headland over the past twenty years, beginning with the rapid decline of the gull population during the war years due to human raids on the eggs as an additional item of food until rationing came to an end in 1947. The eggs of razor bills and guillemots escaped as they nested on the inaccessible cliff face, so that these birds multiplied at the expense of the herring gulls. But when the eggs of the herring gull were no longer in demand it reasserted itself very rapidly, laying, as it does, three times as many eggs a year and nesting wherever it can at the expense of the razor bills and guillemots, until herring gulls were once more swarming over the headland by 1959. To-day, Colin Rees stated, there are 150 pairs of herring gull to about 100 pairs of guillemots and 50 pairs of razor bills—he considered that the herring gull would go on increasing while the others would remain in equilibrium. He gave some interesting information about the feeding and nesting habits of the various birds, discussed the dangers of oil pollution, and showed how the prolonged and intensive study of one particular area of a

coastline can bring much valuable information about the habits in general of certain birds, the inter-relationships between the species, and the effects of human interference on their lives and numbers.

The third topic of the morning concerning the fresh-water medusæ found in 1959 in the Darran Lake, Ferndale, was illustrated by some excellent diagrams prepared by Pamela Evans and Moira Morgan of the same school as the speakers, Glanffwrdd Phillips and Clive Davies. There was evidence throughout of careful preparation and good group organization by the senior biology mistress, Miss M. G. Lewis, who had also been responsible for the investigations in the field. The paper gave an account of the discovery of small, transparent jelly-fish-like creatures in the Lake near the school at the height of the very dry summer of 1959. At first thought to be sea urchins, the creatures were eventually identified as medusæ of *Microhydra*. Evidence was found of their previous location in other parts of Britain on rather rare occasions, always associated with hot, dry summers, but no clues could be discovered to account for their appearance at Ferndale in spite of much careful investigation of all the relevant factors. The series of slides revealed the wonders of the structure and variations in the shape of the medusæ and showed how they reproduced by forming simple buds. Microscopic specimens were also available for examination. It was a well-presented topic, indicating how much useful research can be carried out as the result of the chance discovery of one small strange creature in a lake.

The final paper was a discourse on "Astronomy" by Roger Williams. It was a quite masterly survey of this vast subject within the short time at his disposal and ranged from the history of the science to the analysis of the rival theories of the origin of the universe—"the explosive hypothesis" and the theory of continuous creation. Without being drawn into any religious controversy, Roger Williams pointed out that it is "no more absurd to postulate the supernatural as always creating than to contain the creative act to a single instant". He went on to consider the techniques at the disposal of the modern astronomer, referred to the importance of the work of the amateur, and thought that while inter-planetary exploration by man could not be far away it was not likely to provide us with many new clues as to the origins and structure of the universe. The pursuit of research into its mysteries will long remain of the utmost import to the pure astronomer, but Roger Williams concluded that the problem of what to believe and what not to believe must always remain a matter for the individual, unmodified by scientific knowledge.

Thus the session, "Science by the Upper Form", ended on a philosophical note. It is good to know that some sixth formers not only study their text-books, and listen to the experts, but also carry out their own investigations and learn to think for themselves. In encouraging these habits among our young scientists still at school, the British Association in this and many other ways is doing a notable work for the better understanding of science by the younger generation. "Science by the Upper Form" to-day may be the basis for scientific advancement to-morrow.

G. S. CAMPBELL