

of the properties of turbulent flow. He devised an exquisite technique in which tiny spots of hot air were produced by minute electric sparks at various points in the field of flow to be examined, and the subsequent motion of these 'hot spots', as he called them, was observed by cinema-photography. By these means he was enabled to follow the details of the turbulent motion, and the results of his investigations have been of great value in the subsequent development of the subject. He was a brilliant experimenter, one of those rare men who can improvise apparatus out of almost nothing, fit it up with their own hands, and produce important results by its use. This characteristic showed itself also in his private life, for one of his favourite hobbies was the invention and construction of very clever, but very simple, mechanical toys, some of which reached the Patent Office and the general public.

In 1937, Townend left the National Physical Laboratory and joined the staff of the Admiralty as an adviser on aerodynamic problems. The nature of his work was now completely changed, and instead of making experiments himself on a particular subject, he found himself supervising the experimental work of others and taking a broad view of the whole field of aerodynamics as it affected the problems of the Fleet Air Arm. That he was as successful in this as he had been as an original investigator is ample testimony to his great gifts and his clear vision. He maintained a very close contact with the National Physical Laboratory and was a frequent visitor to his many friends and former collaborators there. He had a delightful personality, and was a very interest-

ing conversationalist. His many friends will feel a deep personal loss, and the science of aerodynamics has undoubtedly lost one of its most brilliant exponents.

WE regret to announce the following deaths :

Dr. J. J. C. Bradfield, C.M.G., Australian representative on the Council of the Institution of Civil Engineers during 1936-39, formerly chief engineer of the Sydney Harbour Bridge, aged seventy-five.

Prof. A. E. Bunge, professor of statistics in the University of Buenos Aires and director-general of national statistics, aged sixty-three.

Mr. Paul R. Crimp, student probationer at the Laboratory, Plymouth, and whaling officer, Ministry of Agriculture and Fisheries, in North Africa, aged thirty-one.

Prof. H. Lundborg, professor of racial biology in the University of Uppsala.

Prof. J. M. MacFarlane, emeritus professor of botany in the University of Pennsylvania, aged eighty-seven.

Dr. E. J. H. Mackay, the well-known archaeologist, on October 2, aged sixty-three.

Prof. Peter Mühlens, director of the Bernard Nocht Institute for Naval and Tropical Diseases, Hamburg, aged sixty-seven.

Prof. A. A. Read, emeritus professor of metallurgy in the University College of South Wales and Monmouthshire, Cardiff, on September 24, aged seventy-five.

NEWS and VIEWS

Fisheries of Mauritius: Appointment of Dr. J. F. G. Wheeler

DR. J. F. G. WHEELER, lately director of the Bermuda Biological Station for Research Incorporated, has been appointed marine biologist in Mauritius. Dr. Wheeler was assistant lecturer in zoology at the University of Bristol and during 1924-31 was naturalist on board the R.R.S. *Discovery* engaged on whaling investigations in the Antarctic, before taking up his duties at Bermuda. The object of the Mauritius appointment is to obtain for Mauritius the services of an expert to examine the marine and freshwater fisheries with a view to the possible establishment of a permanent fisheries control organization to improve existing nutrition standards of the islanders. It is hoped that Dr. Wheeler's researches may be a prelude to the establishment of a Fisheries Department for Mauritius as a permanent institution. The present scheme for the development of the island's fisheries has been made possible by a free grant up to £4,500 under the Colonial Development and Welfare Act, 1940.

Copernicus

THE Selby Lecture, delivered on May 27 by Sir Harold Spencer Jones, the Astronomer Royal, at Cardiff was on Copernicus (Cardiff: Univ. of Wales Press Board. 1s. 6d. net). The lecture covers much the same ground as the article by the Astronomer Royal contributed to NATURE of May 22, but a few additional points are worth noticing. For a long time after the publication of "De Revolutionibus",

it was believed that Copernicus was the author of the prefatory note which stated that it was not necessary that the hypotheses advocated should be true or even probable; it was sufficient that they should lead to results in agreement with observation. Although Osiander wrote the prefatory note without Copernicus's knowledge, this was not known at the time, and there was a widespread belief in the sixteenth century that Copernicus had advanced his theory merely as a mathematical device which he did not consider corresponded to any physical reality. Another very interesting matter should be mentioned. Although Copernicus accepted the value for the solar parallax found by Hipparchus, namely, 3', which implied that an astronomical unit was about one twentieth of its true value, yet the relative mean distances of the planets from the sun, obtained by Copernicus, were remarkably accurate when compared with the most recent determinations. Objections to the Copernican system arose *inter alia* on the question of the distance of the stars, and opponents contended that Copernicus had assumed a great distance for the stars merely to obviate the serious difficulty that they showed no parallax. This was the main reason for the rejection of the Copernican system by Tycho Brahe, and his substitution of a geocentric system in which the sun and moon revolved round the earth, but all the other planets revolved round the sun. Copernicus would not commit himself to any definite statement regarding the infinite distance or otherwise of the stars, and Bruno is usually regarded as the pioneer of the conception of an infinite universe and an infinite number of

worlds, though he was anticipated in this by Thomas Digges.

THE recent issue of *Polish Science and Learning* (London: Oxford University Press) is devoted to articles dealing with the life and work of Copernicus, prepared in connexion with the quatercentenary celebrations held earlier this year. One of these is by Sir Harold Spencer Jones, the Astronomer Royal (see NATURE, May 22, p. 573); another, by Prof. H. Dingle, was referred to in the same issue (p. 576). In addition, Prof. St. Kot has contributed an address entitled "The Cultural Background of Copernicus", which shows how greatly indebted Copernicus was to the University of Cracow for his cultural polish. From letters written at the time, we learn that his university life was spent in an atmosphere which favoured independence of thought, enthusiasm for research, and provided the opportunities for developing universal, unfettered personalities. Mathematics and astronomy were predominant in the University, and humanist poetry also took a prominent place. Cracow was the only university north of the Alps in the fifteenth century which had two chairs of astronomy, and several of Copernicus's fellow-students devoted themselves to the study of astronomy and geography. Although he carried out prolonged studies after leaving Cracow in Bologna, Rome, Ferrara, and Padua, the University of Cracow was the first to take an approving interest in his discovery, and the professors there were the first to use Copernicus's astronomical calculations.

H. Kucharzyk has an article entitled "The First Disciples of Copernicus in England (Early English Copernicana)", which deals with the evolution of astronomy in England in the second half of the sixteenth century. The first English scientific man who was a real adherent and ardent supporter of the Copernican idea was Thomas Digges (1546-59), who was known as an astronomer and also as one of the leading mathematicians of Elizabethan times. His work, "A Perfit Description . . .", which appeared in 1576, is regarded as the principal English treatise on the Copernican system printed before the second quarter of the seventeenth century. H. Kucharzyk has also a short article with the title "Copernicus as Economist, Statesman, and Poet", and shows Copernicus's knowledge of monetary questions. In his treatise "De Monetæ Cudendæ Ratio", published in 1526, he formulated the principle which was later known as Gresham's Law, that bad money in circulation with good will drive out the good. His work in political spheres, as a physician, administrator, commander-in-chief of the beleaguered city of Olsztyn, and also as a poet, is dealt with very briefly in this article.

Mass Asphyxia

IN the tube shelter disaster in March of this year 173 people (28 men, 83 women and 62 children) lost their lives as the result, not of enemy action, but of a woman's fall with a child as the crowd was entering the shelter in a reasonably orderly manner. Others fell on top of the woman and the child, and within a few seconds there was a pile of people 3-4 ft. high. Some three hours later all casualties had been cleared. Some people at the top of the pile were dead, some at the bottom were living. Almost the last person extricated was a girl of about seven, who walked to the first aid post without help. These facts and many more of interest are given by Dr. K.

Simpson (*Lancet*, September 11, 1943) in what he claims to be the first detailed scientific record of this very rare type of accident. The paper records the results of autopsies done on the instructions of the Coroner on four selected cases and discusses the causes of the deaths. Simpson points out that the factors causing sudden deaths in the early stages of asphyxia are little recognized; such deaths are usually accidental or due to criminal action and can scarcely be reproduced for quiet physiological experiment.

The causes of the deaths of these people were found to be complex. The author points out that asphyxia is not a simple problem. The word means pulseless (from the Greek, *a-sphuxis*), and not prevention of breathing. Three of the cases autopsied showed changes quite out of keeping with prolonged asphyxia. Among other factors that may operate in such accidents are direct compression of the abdomen or chest, constriction of the neck, concussion head injuries, inhalation of vomit and "emotional, reflex neurogenic, local cardiac and more general tissue changes". Parallel factors operate in criminal strangulation and the author discusses these. People may die suddenly at the sight of approaching death or danger or even when they receive bad news or anticipate asphyxia. Impaction of food at the glottis or of water in drowning, garotting, strangling, blows or kicks on the neck, even a brisk current of cold air on the neck, may, in certain individuals, stimulate the carotid sinus reflex and, through this, may cause vasovagal arrest of respiration and the circulation. Bruises and violent hyperextension of the neck, inhalation of vomit, crushing of the chest or abdomen and similar injuries had occurred in the cases autopsied. The author adduces evidence of the rapidity with which local biochemical changes in the heart muscle and in the blood chemistry may occur in asphyxia. When some or all of the factors indicated above are operating together, death can occur very quickly, perhaps within thirty seconds. Apart from the public and biological interest of this paper, it should have, as the author indicates, considerable forensic value.

International Bird Preservation

A JOINT meeting of the British and Polish Sections of the International Committee for Bird Preservation was held in the hall of the Royal Geographical Society on September 25 with Mr. David Seth-Smith in the chair. Dr. Jul. Borucki, representing the Polish Section, spoke on the work for bird preservation done in the past in Poland, directing attention to the fact that Poland and Czechoslovakia set an example to the world by the establishment of the international reserve in the High Tatras. He spoke of the work of reconstruction which would be needed after the War and the peculiar problems of bird preservation which would have to be faced. In a message, Count Wodzicki, chairman of the Polish Section (now Consul-General in New Zealand) stressed the close links which had always existed between the British and Polish Sections; links which had been made closer by the British Section adopting the Polish Section for the duration of the War, an act which symbolized a tribute to the Polish naturalists who had not only lost property and all the results of their scientific work but also their lives.

Mr. Walter E. Higham showed his magnificent colour film of British birds. He took his representa-