

## JOACHIM JUNGE (1587-1657)

## A FORGOTTEN GENIUS

THE name of Junge, known also as Jung or Jungius, is to be found in few biographical dictionaries, and is seldom mentioned by historians of science. Nevertheless, his contribution to scientific thought and knowledge was significant and considerable. He lived at a time when alchemy became chemistry, astrology gave way to astronomy, and other sciences assumed a new appearance as the old scholastic approach to learning was replaced by a return to the use of experimental methods. Junge published little or nothing during his life-time, and for that reason his work has been overshadowed by that of his contemporaries. To-day, after a lapse of three centuries, his achievement is beginning to receive a well-merited recognition.

The main events of his career may be summarized as follows. Born at Lübeck in 1587, the son of a schoolmaster who died while his son was still a child, he was enabled, by the sacrifice and wisdom of a far-seeing mother, to enrol as a student at Rostock in 1606, and then at Giessen, where his brilliant intellect became so obvious that he was offered, and accepted, the chair of mathematics. This academic position did not afford him the scope for wider study which he desired, and in 1614 he resigned, and went to study medicine at Padua, where he graduated M.D. in 1618. On his return to Rostock he hoped to found an academy of sciences, and although he did succeed in establishing the *Societas Ereunetica* in 1622, one of the earliest societies of its kind, it survived for only two years. The reason of this failure was that Junge was suspected, though quite unjustly, of being a Rosicrucian, a member of the secret society of that time devoted to astrology. It was not surprising, however, that the progressive views of Junge, which included his advocacy of teaching in the vernacular, and of a greater use of experiment, brought him into disrepute with the Church. As a result of this misfortune, and the threat of an accusation of heresy, he removed to Hamburg, where he passed the last thirty years of his life as rector of the High School, and where he died on September 23, 1657.

Junge's opinions won the approval of Leibniz, who placed him on a level with Galileo, Kepler and Descartes, while Goethe said that if the methods of Junge had been followed sooner, the advance of human knowledge might have been hastened by a century. Unappreciated in his life-time, his service to science remained obscure. Like his contemporary, William Harvey, he lost many of his manuscripts in a fire, and the suspicion with which he was surrounded prevented the publication of those that remained. Unlike Harvey, Junge did not live to see the result of his labours. His disciples and followers recognized their merit, however, and among his works, printed during the century following his death, are "De plantis Doxoscopiae physicae minores" (1662), "Isagoge phytoscopia" (1678), "Logica Hamburgensis" (1681), "Geometria empirica" (1688), and "Opuscula physica botanica" (1747).

Most of these books have become very rare, but during the succeeding years his memory has been

kept alive by his admirers, and especially by those in Hamburg. On the 300th birthday of Junge in 1887, Dr. Konrad Friedlander reported that "in terms of the will of Joachim Jungius, about 500 scholarships had been awarded, for the furtherance of scientific work, and that the list of scholars included many distinguished persons". In 1928, Prof. Meyer-Abich, of the University of Hamburg, founded the "Jungius Kommission", with the view of investigating the unpublished manuscripts, and in the following year a commemorative volume was printed, entitled "Beiträge zur Jungius-Forschung". Eventually, in 1947, a "Joachim Jungius Gesellschaft" was inaugurated in Hamburg, with the wider object of "promoting research in all branches of science, and extending the scope of scientific work".

The year 1957, the tercentenary of his death, marked a further revival of interest. Dr. J. H. S. Green paid a graceful tribute to the memory of Junge in an article in *Nature* (180, 570; 1957), and when the Joachim Jungius Gesellschaft met at Hamburg on October 31, 1957, under the presidency of Prof. Kurt Heyns, his first duty was to award a Joachim Jungius Prize and Medal to its first recipient, Prof. Rudolf Meyer, of Zurich, who has long been an ardent student of the works of Junge, and had recently edited a new edition of "Logica Hamburgensis". Prof. Meyer then delivered an address on "Joachim Jungius and the Philosophy of his Time", which, following the introductory remarks of the president, is printed, with other noteworthy papers by various authorities, in the little volume commemorating the occasion, which bears the title "Die Entfaltung der Wissenschaft" (The Development of Science)\*, and which may be read with pleasure and profit by every scientist, whatever be his special branch.

Prof. Kurt Vogel deals with "Mathematics in the Early Years of the Seventeenth Century". Prof. R. Hooykaas, of Amsterdam, in a paper on the knowledge of elements and atoms at that time, shows how Junge championed the atomic theory, and opposed the older philosophy, alleging that in spite of chemical changes, atoms retained their individuality. This paper concludes with the significant remark that "one free man can do more for science than a whole crowd of *Konformisten*". The important place of Junge in the history of botany is clearly revealed by Prof. Walther Mevius, who tells us that Junge's contribution to that science was probably his greatest achievement. He was indeed one of the founders of scientific botany, and to him we owe the terminology which was perfected later by Ray and Linnæus. Junge was the first to classify plants according to the varieties of their component parts. Many modern terms are of his coinage, and, as Charles Singer stated in his "Short

\* Die Entfaltung der Wissenschaft: Zum Gedenken an Joachim Jungius (1587-1657). (Vorträge gehalten auf der Tagung der Joachim Jungius-Gesellschaft der Wissenschaften, Hamburg, am 31. Oktober/1. November 1957 aus Anlass der 300. Wiederkehr des Todestages von Joachim Jungius.) Pp. 160. (Glückstadt: Kommissions-Verlag J. J. Augustin, 1958.)

History of Biology", Junge "had a real insight for classification, grouping plants according to the formation of their flowers, and naming the groups Compositae, Labiatae and Leguminosae", names which still remain. The paper which follows, on "Experiment in the Medicine of the Seventeenth Century", gives an interesting account of this important epoch in medical history, and is contributed by Prof. J. Steudel, of Bonn. It is illustrated by eleven figures, showing some experiments of Harvey, de Graaf, Boyle, Mayow and others. Prof. W. Flitner, of Hamburg, describes the logic and philosophy of the period, and his colleague, Prof. D. K. Deitrich Schmidt, discusses the changing outlook of theology in the days of Junge.

The scope of this excellent collection of monographs is extended even more widely by a thoughtful and suggestive study by Prof. Karl Bauch, Freiburg,

of the new approach to art, adopted by Raphael, Rubens and other artists in the opening years of the century under review. Twelve illustrations in this paper are of much interest. Finally, an appropriate background to the whole scene is provided by Prof. Otto Brunner in an essay on "Hamburg's Historical Position during the Lifetime of Joachim Jungius". This article, also appropriately illustrated, should prove valuable as a reference to the contemporary topography of the city. Too often, in writing of the history of science, this essential basis of social history is omitted. The Joachim Jungius Society is to be warmly congratulated on the publication of this timely and attractive little volume, which not only pays a fitting tribute to the work of a forgotten genius but also builds upon that work an edifice well worthy of so sound a foundation.

DOUGLAS GUTHRIE

## EDUCATION IN THE AGE OF SCIENCE

IN a recent issue of *Daedalus* (88, No. 1; 1959), ten distinguished American correspondents examine different aspects of American education and their place in a rapidly evolving scientific and technological age. The articles are grouped in five pairs, each pair representing two different points of view regarding the same aspect of education. The problem of Prof. Sidney Hook and George N. Shuster is that of the general nature and ends of education. Prof. Hook holds that the ends are threefold: to produce skills, knowledge and loyalties. On all three aspects there is a difference of opinion. If 'skills' mean the ability to think, speak and write effectively, education must clearly aim at such skills; but do they include skills of everyday living? Here there are rigorists and latitudinarians. Regarding knowledge and loyalties, the differences go deeper. Prof. Hook is a secularist who believes that the only knowledge worthy of the name is that which is accredited by scientific method, and that even moral judgments are subject to empirical tests. Shuster believes that theology is the queen of the sciences, and that the most sure and important knowledge has another kind of certification altogether.

In the papers of the second group, Prof. Douglas Bush states the case for the humanities in education, and Prof. Ernest Nagel the case for the sciences. Both advocates recognize that both disciplines are essential but they differ about two points. Prof. Bush, concerned about the 'sophisticated vulgarity' of newspapers, best-sellers, radio, advertising and music, thinks that much of this is a by-product of science, partly through its technical applications, partly through the exaltation of science in the popular mind. Science has made 'mass civilization' possible, and 'the religion of commonness' that has resulted has been creeping out from news-stands and films into the schools and universities. Science provides the means by which a commercial civilization may exploit the mind more expertly, but no corresponding resistances against the shoddiness of mass values; nor does it do anything to prevent the 'spiritual impoverishment of the expert' himself.

Prof. Nagel, admitting the part of science in helping to produce mass culture, replies that it is unjust to make science responsible for men's misuses of it, and argues that our mass culture, for all its

defects, represents a high-water mark in democratic education. He then makes a claim for science that provides a second bone of contention, believing that scientific method, taken broadly as the method by which propositions are validated, is the sole and sufficient means of establishing any kind of knowledge. The judgments of value passed by a humanist upon poetry or music may be merely expressions of his feeling; but if they say more than that, if they offer themselves as true, there is only one way of establishing them, and that is the approved way of science. Bush, Shuster and others do not agree. They hold that the poet, the religious man, and the critic have insights that such a method is inadequate to appraise. Here, as elsewhere, it becomes clear how difficult it is to talk about education without entering into philosophy.

The chief issue of the third group is raised by Prof. Arthur Bestor's contention that American schools are trying to do too much. If all three ends—skills, loyalties and intellectual discipline—are important, can a school sensibly try to achieve all of them? Perhaps a residential school can, since it has full control of the pupil's time. A day school cannot; if, with a few hours a day at its disposal, it tries to take over the functions once performed by home, church and work, as well as to discipline the young mind, it will do all of them badly. Prof. Bestor's proposal for American schools is clear-cut: let them realize that they are over-extending themselves and close their ranks, so that they can perform their own function well—that function being distinctively intellectual. To maintain their standards in the face of local pressures, they should set up State-wide systems of examination, which would free the able students from the educational 'lock step' and would test actual achievement rather than accumulations of credits and hours.

Prof. Bestor's views are challenged at several points by Prof. John L. Childs, who argues that the sensitivity of American schools to the social needs of their pupils is an advantage, not a weakness, and that the schools are not to be improved by a return to the narrow intellectualism of the French and other systems.

The issue raised by the two papers in the fourth group is: What can the schools do to prepare their