TEACHING ASTRONOMY
IN SCHOOLS
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BY

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PREFACE

The origin of this little book can probably be traced to a talk that I gave at a meeting of the British Astronomical Association on my efforts to teach some astronomy in a school. Following this I got into correspondence with a number of other teachers and prepared an article entitled ‘Astronomy for Schools’ for School Science Review.* This was published in 1949, and since then I have had a number of opportunities of lecturing to teachers on this subject, and discussing its problems with them. In the light of these discussions and with the lapse of time the article required amplification; here it is, and I hope that fellow-teachers will find it useful.

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5 May 1955

E. A. B.

PREFACE TO SECOND EDITION

In the interests of economy very few changes have been made in chapters I–IV, though some addenda to them will be found on page xii. Chapter V has been reset to incorporate many changes, both by addition and withdrawal, in the teaching aids available. There are also substitutions and additions in the Bibliography.

December 1961

E. A. B.

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Teaching astronomy in the past; the case against teaching it.

ADDENDA

I WHY, WHEN, AND HOW?
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III IN THE OPEN AIR
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ABBREVIATIONS

The following abbreviations are used:

B.A.A.  British Astronomical Association
I.A.A.M.  Incorporated Association of Assistant Masters
R.A.S.  Royal Astronomical Society
S.M.A.  Science Masters Association
_Sch. Sci. Rev._  _School Science Review_
_Whitaker_  _Whitaker’s Almanack_

NOTE

The bold superscript letters in the text indicate references to the Addenda on p. xii
INTRODUCTION

Astronomy is certainly one of the oldest of sciences, and in this country its teaching at university level seems to have been recognized for a long time, for there has been an Oxford professorship since 1619. What has happened to it at school level? Little science was taught at all until the middle of the last century, and the appointment of J. M. Wilson (afterwards Headmaster of Clifton) as a science master at Rugby probably marks the beginning of science teaching in the sense that we use the expression today.* Rugby’s first laboratory came in 1860 and its observatory a few years later. Of the latter the Devonshire Commission of 1875 reported that it ‘is now playing an important part in the science education of the school’. The same report refers to telescopes at Eton, Rossall and Clifton. Of early textbooks there was one by Lockyer in 1868, and another by R. S. Ball in 1877.† Quoting from the Editor’s Preface to the latter: ‘... it is very generally acknowledged by those who are practically engaged in Education... that there is still a want of Books adapted for school purposes upon several important branches of Science’. And in the Author’s Preface: ‘The present volume is intended for those pupils of the higher classes in schools, who, having some elementary knowledge of mathematics, desire to gain some information about Astronomy.’ This certainly suggests that astronomy had a place in modern teaching, and yet by the turn of the century it had virtually disappeared.

† Sir R. S. Ball, *Astronomy* (Longmans Green, 1877).
Possibly this was a stage in the development of teaching methods. Laboratories became available, and the natural consequence was to use them; H. E. Armstrong was a powerful figure in the teaching world in the nineties, and he favoured the heuristic method for which chemistry lends itself so well. Thus chemistry held the field (for boys), supported by physics and with the rest nowhere.

There are, and probably always have been, schoolmasters (and no doubt schoolmistresses too) who are also enthusiastic astronomers, and have not failed, by hook or by crook, to pass some knowledge on to their pupils. Most of them ploughed lonely furrows; they did not make their work known and they received scant recognition. An exception was E. O. Tancock, who taught astronomy at Giggleswick and in 1913 published his lessons as a book* which remained the standard school text for years. While unknown teachers were keeping the subject alive it received official recognition from another quarter.† In a parliamentary report published in 1917, three recommendations are made: that in Preparatory Schools, at age about 12, ‘physiography’ should be taught and should include ‘simpler astronomical phenomena, which in the hands of a good teacher may be made an excellent training in reasoning and observation’;* that outlines of cosmical physics be taken with the non-science sixth; and that there should be short courses in astronomy for teachers. After the first world war the General Science idea began to bear fruit; the monopoly of chemistry and physics, already supplemented by some biology, was shaken and other branches of science, including astronomy, were considered by syllabus makers. The General Science Sub-Committee of the Science Masters Association included

† *Natural Science in Education* (H.M.S.O., 1917).

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astronomy in their second report issued in 1938, and some examining bodies included it as an option in the ‘twin-credit’ General Science papers of the School Certificate—a practice that survives in the present General Certificate of Education.

Objections can be made to the introduction of astronomy into the school course, and the reader must decide on their validity. The curriculum is already too crowded—with the lapse of time the child’s plate has become loaded with less and less of more and more. Has not the time come when for every new subject added an old one must be taken away, and what can we afford to take away? If the aim of science teaching is to give that attitude of mind called the scientific method, does it matter what sections of the subject are used for the purpose? Surely we should choose something that is convenient to teach, something in which the process of experiment-observation-inference can be most easily applied; astronomy is not such a subject. If the aim is to stuff the child with ‘useful’ facts, then astronomy is not ‘useful’ to most citizens—he is unlikely to make money out of it or even to earn his living, for professional astronomers are few. If the aim is just to get as many passes as possible in the General Certificate, then why waste time on something that provides only two questions, optional at that, in a very wide examination paper. Astronomy must surely be an expensive subject, and most schools are short of money. Another objection that I have heard more than once, from outside the teaching profession, from amateurs who love astronomy and say that it is ‘much too precious to spoil by associating it with school’! Presumably readers of this book are already converted or they would not be reading it, but nevertheless the question of ‘why teach astronomy’ must now be considered.
ADDENDA

a Page x: Preparatory Schools. Many I.A.P.S. schools have recently adopted the loan service of scientific books and equipment operated by the Esso Petroleum Company. One of these termly ‘units’ is on astronomy.

b Page 10: the syllabus. Astronautics is a science in its own right and is far from being a hundred per cent astronomy, but some reference to it must be made with any present-day class. The minimum syllabus should therefore include an elementary description of the astronomical achievements of space research, and artificial satellites should be added to Extension 5. Radio astronomy calls for mention in Extensions 1 and 4.

c Page 23: star maps. The Science Museum postcards Nos. 372–375 will be found useful for distribution to pupils, the first two before Christmas and the other two after it. (Address on page 54.)

d Page 38: simple telescopes. A simple telescope of the kind described, giving a magnification of 25–30, is now available commercially from Charles Frank Ltd, Saltmarket, Glasgow. The lenses can be purchased separately.

e Page 46: reflecting telescopes. An inexpensive ‘kit’ for making a wooden 4-inch reflector can be obtained from Ottway & Co., Orion Works, Ealing, London, W. 13. Much care is needed in its assembly and if the pupils are doing it there must be a skilled handicap master in the background. A kit for a standard type of 6 inch is made by Stanley & Co., New Eltham, London, S.E. 9, and a number of manufacturers will supply finished components for telescope builders.