# NAA: C3830, D5/4/1240

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Publications, Reports, Patent - Radiophysics Papers for Publication - Book on Radio Astronomy in Nelson's Series by AJ Higgs - Tentative Title "Radio Astronomy"

COMMONWEALTH OF AUSTRALIA

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

PUBLICATIONS, REPORTS, PATENTS, ETC.

RADIOPHYSICS PAPERS FOR PUBLICATION

Book on Radio Astronomy in Nelson's Series, by A.J. Higgs

(Tentative Title: "RADIO ASTRONOMY")

DRAFT TYPESCRIPT + OUTLINE OF CONTENTS (CHAPTERS I - XIV)

CORRESPONDENCE:— 19 September 1968 - JULY 1980

Returned for W.F. Sullivan
10/5/86

File: D5/4/1240

NOTE FOR FILE

BOOK ON RADIO ASTRONOMY FOR PUBLICATION BY THOMAS NELSON (AUSTRALIA) LTD IN THEIR N.A.P. SERIES (NELSON AUSTRALIA PAPERBACKS)

TITLE: "Radio Astronomy" (tentative). RPP NO. 1240.

AUTHOR: A.J. Higgs

BACKGROUND:

Following discussions between Arthur Higgs and José Turner (Field Editor, Thomas Nelson (Australia) Ltd., Sydney) in September 1968, Nelsons wrote to Chief of Division on 19 September 1968 inviting RP to write a book on Radio Astronomy for publication in their NAP series. The Chief agreed that Arthur Higgs would do this.

The following extract from a letter to Nelsons from Arthur Higgs (dated 16 October 1968) indicates the type of book he envisaged:

> *"My overall objective, however, would be to produce an interesting but authoritative account of Radio Astronomy at a semi-popular level which would be thoroughly up-to-date and different from other texts on this subject, in that it would draw largely on Australian material for illustrative purposes and record the significant contributions which Australia has made toward the development of this new and exciting field. This has not yet been adequately done."*

The material prepared by Arthur Higgs consists of an "Outline of Contents" and typed drafts of Chapters 1 to 12 and 14. (Note: The chapter headings in the "Outline of Contents" do not always correspond with those in typed chapters, as the "Outline" was prepared at an early date (16 October 1968) in order to give Nelsons some idea of the scope and plan of the book.)

Some time after Mr. Higgs left the Division (probably in 1971), I understand that Nelsons decided not to proceed with publication. There is no correspondence about this decision on file, but it is possible Arthur Higgs may have it.

S. Atkinson
1/7/80

cc H.C. Minnett
Marie Wickery

S. ATKINSON
File

RPP 1240

TITLE: To be selected; tentatively "Radio Astronomy".

## OUTLINE OF CONTENTS

CHAPTER 1 - BIRTH OF RADIO ASTRONOMY

Definition and description of radio astronomy - relation to optical astronomy - current optical picture of the Universe - discovery of radio waves from the Milky Way (Jansky 1932) - work of Reber - discovery of solar and cosmic radio waves during World War II - historic observations of solar radio waves at Dover Heights, Sydney 1947 - location of "radio stars" at Dover Heights, first identifications with optical objects - contemporary work overseas - realisation of the possibilities of radio astronomy - beginnings of continuing research programmes in Australia and overseas.

CHAPTER 2 - ORIGIN OF COSMIC RADIO WAVES

Outline of the various natural processes which produce radio waves - how they are propagated and penetrate the earth's atmosphere - frequency range of interest - variation with frequency - polarization - effect of magnetic field - the "new look" they provide on physical conditions at their origin, and in intervening space.

CHAPTER 3 - INSTRUMENTS AND METHODS OF RADIO ASTRONOMY

Evolution of the radio Telescope - performance and relative advantages and disadvantages of various types - some of the major world installations - parametric and maser amplifiers as high performance receivers - techniques for precise location of radio sources - occultations by the moon - long base line interferometry - interference - international frequency allocations for radio astronomy - searching for line emission.

CHAPTER 4 - NATURE AND DISTRIBUTION OF RADIO SOURCES

Surveying the skies - catalogues of radio sources - identification with optical objects - characteristicsand distribution of typical galactic and extra-galactic sources - emissionfrom interstellar molecules - peculiar sources (quasars; pulsars).

CHAPTER 5 - THE SUN AND THE SOLAR SYSTEM

CHAPTER 6 - STORMS IN THE SOLAR CORONA

CHAPTER 7 - EXPLODING STARS

CHAPTER 8 - THE HYDROGEN LINE AND THE SHAPE OF THE GALAXY

CHAPTER 9 - THE HYDROXYL RADICLE AND PROTOSTARS

CHAPTER 10 - COSMIC MAGNETIC FIELDS

CHAPTER 11 - QUASI-STELLAR OBJECTS (QUASARS)

CHAPTER 12 - PULSED RADIO SOURCES (PULSARS)

CHAPTER 13 - IS THE UNIVERSE EXPANDING?

CHAPTER 14 - RADAR ASTRONOMY (ADDED LATER)

Glossary - Appendices (?) - Index - Further Reading.

Thomas Nelson (Australia) Ltd
597 LITTLE COLLINS STREET MELBOURNE 3000 ☎ 61 2152
ALSO AT 403 GEORGE STREET, SYDNEY 2000 ☎ 29 3639
CABLE ADDRESS: THONELSON MELBOURNE

11 October 1968

A.J. Higgs, Esq.,
C.S.I.R.O.,
Division of Radiophysics,
P.O. Box 76,
EPPING, N.S.W. 2121.

Dear Mr. Higgs,

Following our discussion yesterday I shall look forward to receiving an outline of your proposed text on Radio Astronomy.

I am enclosing copies of two of the more recently published Nelson Australasian Paperbacks - one from the geography series and one from the history series. As I told you, the series will be extended into economics next year. The books are intended mainly for the general public, but we hope that they may also be used as supplementary reading in sixth forms, and by students at university who are not engaged in that particular field of study.

Best wishes.

Yours sincerely,

Jose Turner.

Jose Turner,
Field Editor, Sydney.

23rd September 1968

Miss Jose Turner,
Field Editor, Sydney,
Thomas Nelson (Australia) Ltd.,
403 George Street,
SYDNEY, N.S.W. 2000.

Dear Miss Turner,

Following our discussion last week, I find that Mr. Arthur Higgs, my Assistant Chief, would be quite interested in writing a text on Radio Astronomy, provided he were not under pressure to meet an early date line. He would do this as principal author, drawing on the work of the Laboratory and of course on other sources for his material.

Perhaps you would care to get in touch with him direct and discuss the details.

Yours sincerely,

(E.G. Bowen)
CHIEF OF THE DIVISION

Dr. Bowen
Mr. Higgs
Mr. Seddon