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RPL management- Frustrations with the new *Australian Journal of Scientific Research (AJSR),* 1948-1950

In the post-war era the newly minted radio astronomers struggled with isolation as pointed out by Sullivan (2009, *Cosmic Noise: A History of Early Radio Astronomy.* Cambridge University Press, Cambridge, UK. page 143):

> The early RP years are rife with examples of things that would have gone differently if RPL had not been located 10,000 miles from its sister institutions, but instead 100 or even 1000 km … The RPL staff (and Australian science in general) were constantly bedevilled by their inability to have frequent contact with colleagues from other institutions, the long interval learning about research conducted elsewhere, the delays (sometimes inordinate) in publishing Australian results in the prestigious British journals, and the lack of Australian readership of Australian journals … [Overseas trips were taken by Bowen (1946), Bracewell (1946-1949), Pawsey (1947-1948), Bolton (1950) and Kerr (1950-1951).] What emerges is that such trips served four primary purposes: (1) intelligence (in the military and political sense of the term), (2) education [for example Bracewell received a PhD from Cambridge], (3) publicity and (4) establishment of personal contacts.

As Sullivan pointed out, in the post-war years, the CSIR and university groups were frustrated by the lack of Australian scientific journals. The consensus was that an Australian journal would contribute to the post-war attempts to be better connected with world-wide colleagues and to show "a further sign of the growing independence of Australian science from British hegemony".

However, the radio astronomers were frustrated with delays experienced in launching the journal which was to have four editions per year starting March 1948; then in the subsequent year, issues in June, September and December. The journal was in existence for five years with Series A consisting of "Physical Science" and Series B, "Biological Science". Dr N.S. Noble, an agricultural scientist, was the editor. Papers on a variety of topics appeared in Series A, chemistry, physics (cosmic rays, condensed matter, radio astronomy, cloud physics), meteorology and engineering. Members of the board were, among others, Leslie H. Martin, professor of physics at the University of Melbourne, Prof Sir Macfarlane Burnett, Nobel Prize for Physiology or Medicine 1960, from the Walter and Eliza Hall Institute of Medical Research. Pawsey was a member of the editorial board from 1959-1961.

In 1953, the journal split into a number of journals in a number of diverse disciplines; the radio astronomers then published in the *Australian Journal of Physics*, 1953 to 2001.

The CSIR Division of Radiophysics got off to a slow start in the new journal in 1948, publishing only two of the 38 published papers in the inaugural year 1948: John Bolton and Gordon Stanley in March 1948, "Observations of the Variable Source of Cosmic Radio Frequency Radiation in the Constellation of Cygnus" (vol 1 page 58), and Frank Kerr in December 1948, "Radio Superrefraction in the Coastal Regions of Australia" (vol 1, page 443). The success rate increased rapidly in 1949 with the publication of 14 papers from RPL, including a publication on rainmaking endeavours by E.J. Smith, "Experiments in Seeding Cumuliform Cloud Layers with Dry Ice" in March 1949 (vol 2, page 78), and a theory paper by Kevin Westfold in June 1949, "The Wave Equations for Electromagnetic Radiation in an Ionized Medium in a Magnetic Field" (vol 2, page 169). In 1949 there were nine publications on radio astronomy topics. During the last three years of the existence of the *Australian Journal of Scientific Research,* the number of radio astronomy papers ranged from 8 to 13. The totals for the five year period were 44 from the Division of Radiophysics: including 33 radio astronomy, six cloud physics, three theoretical and two atmospheric science articles. A major challenge for the Australians during this period was the problem of overseas subscriptions; for example Jodrell Bank did not have a subscription to the Australian CSIR-CSIRO journal until 1950.[1]

In the course of 1948, Radiophysics began a series of conflicts with the newly established *Australian Journal of Scientific Research* (AJSR) concerning three significant publications summarising the early radio astronomy research. These papers were the Pawsey "survey" paper (called by Pawsey an "integrating paper", "Solar Radio-Frequency Radiation", published only in 1950), the "radio thermal corona" ("Solar Radio-Frequency Radiation of Thermal Origin", 1949) by Pawsey and Yabsley and the "instrumental paper" ("The Measurement of Solar Radio-Frequency Radiation", 1948) by Pawsey and McCready. In the end, only one of the publications was accepted by *AJSR*. The fate of these publications illustrates some of the problems of the RPL scientists experienced in publicising their research in the post-war era.

Before leaving Australia in 1947, Pawsey had completed the first draft of a major "survey" or review paper on early solar noise research. This paper was an extensive review of existing solar radio research. Other post-war solar noise research from the UK, USA, Canada, France, USSR, Germany and Sweden was included in the article. In addition, substantial unpublished RPL solar data from Payne-Scott (two figures) and Bolton[2] (four figures) were included.

[1] Sullivan (2009). Before 1950, Jodrell Bank staff could only find copies of Australian journals in London.
[2]Bolton had carried out detailed studies of circular polarisation of Type I bursts ("enhanced radiation") at Dover Heights in a project that had begun as a collaboration with D.F. Martyn.

The tribulations of the writing, internal refereeing and publication of this paper have been described by Goss and McGee (2009, appendix E, page 286)[3]. Here we summarise some of the highlights of this fascinating and (for Pawsey) frustrating experience. This saga shows some aspects of the attempts of the RPL radio astronomers to find their place in the world-wide astronomy community. In addition, aspects of the evolution of the lengthy, complex and frequently contradictory internal refereeing process were revealed. As we have seen, the slow growth of a mature and experienced scientific process at RPL impacted the evolution of publications in the post-war years as the radiophysicists evolved from electrical engineers and physicists to astronomers.

Pawsey began writing the survey in June-July 1947.[4] During the 13 month trip, numerous drafts and updates were written, including the major revisions that became the "Washington draft" of 9 December 1947 and the "April draft" sent from London to Bowen the following year (1948). As Pawsey left Australia in late September 1947, the intention was to submit the survey solar paper to the new *AJSR* in 1948. Pawsey expressed his doubts to Bowen (28 September 1947) about the formation of the new journal, especially about the international circulation since "the new journal [will be] unknown" throughout the scientific world. On 9 October 1947, Bowen wrote Pawsey (at the Australian Consulate in San Francisco) that

> … the question of CSIR publications is still in the melting pot. The latest decision is not to publish the technical [engineering] journal or even the Series B [biology journal] for some time, to attempt a Series A [physical science] and encourage the use of the present Journal (*Australian Journal of Science*, 1938-1970) and Bulletin series. In other words we are back, more or less where we started two years ago [1945, the beginning of discussions of the formation of Australian journals.] I have had a serious talk with White about the whole thing, told him how in some cases we have held up publication

[3] Sullivan has written on his archived copy of the paper "Excerpts from RP file re trials and tribulations of this paper (+ others) during October 1947 to April 1950. "

[4] Already on 15 October 1947 (during Pawsey's trip to the US from Sydney), Bowen wrote an enthusiastic letter about these papers to Fred White, Executive Officer of CSIR. In particular he described the "survey" paper in detail: "Too much solar noise work has been published in bits and pieces and Pawsey's survey fills a much needed gap in the literature. Besides covering the subject in a comprehensive fashion it contains a fair amount of original material. The quality is first-rate … when [the final copy is] prepared I will submit [the manuscript] to the [CSIR] Executive for their approval to publish. He suggested that this paper and the "instrumental" paper could appear together, possibly as Papers I and II."

in anticipation of CSIR doing something and how this is seriously prejudicing the chances of our young men[5]. He agrees that we have made a mistake in expecting too much and that we should now publish each paper in the journal most appropriate to it at the time it is written … [T]here is no point in our holding papers for the CSIR journals." Bowen anticipated that most of the papers would be sent to overseas [mostly British] journals.

On 17 November 1947,Bowen wrote Pawsey at the Australian Embassy in Washington, D.C. (ASRLO, Australian Scientific Research Liaison Office), an update with an upbeat assessment : "[T]hings now look a little brighter and the [CSRI] Executive is pressing us to put your own and McCready's paper (instrumental) [Papers I and II] in the Series A, and possibly Bolton's [Cygnus A] as well … Noble is now anxious to receive manuscripts for the CSIR journal [for 1948] ... so I would be glad if you could send your finally corrected copy as soon as possible." This was the impetus to quickly complete the "Washington draft" of 9 December 1947. Bowen elaborated on 24 November with good news again about the *AJSR*, both Series. The first issue of Physical Sciences was expected in March 1948, with submission by 30 December 1947. Now Bowen anticipated that the Pawsey "survey" and Kerr's superrefraction paper would appear in issue 1 in March 1948 while the "instrumental" paper (paper II) would appear in issue 2 in June 1948, along with the third major paper, the Pawsey and Yabsley paper on the "radio thermal corona". Their expectations would not be fulfilled, only the Bolton and Stanley paper on Cygnus appeared in issue one and the thermal paper would only appear over a year later in the issue of June 1949 (submitted on 17 January 1949).

An examination of the trials of the three Pawsey papers provides insight into the controversies, conflicts and the evolution of CSIR policy in this era.

On 24 November 1947, Bowen continued, providing details about the evaluation of the survey paper. Harry Minnett had been the internal referee, suggesting a number of changes. After these changes were made the amended text could be submitted to the journal in January 1948. This was not to occur. In a handwritten letter[6] from McCready on 18 November 1947, McCready reported that the internal referees for the survey paper were quite critical. Most significantly, Fred White, Executive Officer of CSIR and a well-recognised ionospheric physicist, was rumoured to be quite critical. As we will see this fear was justified.[7]

[5] Of course, Ruby Payne-Scott was working at CSIR in 1947.

[6] The "backchannel" connection to Pawsey from RPL.

[7] Bowen concluded the 24 November 1947 letter with praise: "I would like to conclude by saying that having been closely in touch with the solar and cosmic noise work since your departure, I am more than ever impressed by the excellent work which is being done and the spirit running through the Group. It is obvious that you have brought them along wonderfully well and the influence is a lasting one. The way

On 9 December 1947, Pawsey posted the revised manuscript to Bowen with the expectation that the paper would be immediately submitted to the *AJSR*. McCready's premonition came true on 18 February 1948. Bowen wrote Pawsey with a "piece of bad news [about the survey paper] … I was a little worried over it when you sent it back … and therefore asked White for an independent opinion.[8] He was … more critical than I was and I think it is only fair to send a copy of his comments to you." (These were included in the 18 February 1948 letter, but are not present in the archive copy.) Bowen asked for a complete rewrite with little justification (e.g. "early parts need considerable clarification" and the manuscript contained "too much conjecture in the latter part of the paper". Bowen pointed out that two other experts, David Martyn and John Jaeger, were less critical than White, but both suggested that a number of clarifications were required. (Again no details were provided.) Bowen asked "What was to be done?" Three possibilities existed: (1) Pawsey could have another shot at re-writing the text, (2) he might obtain a co-author to assist with the re-write or (3) he might wait until he returned home later in 1948 for the completion of major modifications. Also the problem remained with the fate of the "instrumental paper", paper II. Bowen asked McCready to finish this manuscript and then submit immediately to *AJSR;* this did occur within a few weeks.

On 9 March 1948, Pawsey replied to this new criticism. He was "naturally a little unhappy about [the criticism]", but in general he agreed that the paper needed additional work. In order to ensure a successful re-write, Pawsey suggested that Bowen join the paper as a co-author! Pawsey was quite displeased with White's criticism of the electromagnetic theory. Pawsey admitted that White is "an expert in this field"… but the paper was targeting a "non-ionosphere" audience, written in a "non-mathematical and easily readable form, together with a reference to a full treatment". On 31 March 1948, Bowen replied with a conciliatory tone: "I agree entirely that it is most desirable to press on … and not wait until your return … I am not as sure now of my previous suggestion about a co-author for the Survey paper. Obviously you are the person to write it and I guess that a final version isn't far off." Bowen was not interested.

The "April draft" was posted by Pawsey on 1 May 1948 from London to Sydney. Pawsey pointed out that he disagreed on a number of critical points of the magneto-ionic theory, "… so that in regard to the 'pass' and 'stop' ranges of propagation I do not think that the remark that this is well known is justified." On 24 May 1948, Bowen wrote that the manuscript "now seems to be in excellent shape" and "[the paper] should now be pushed ahead for publication as fast as

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in which everyone is right on top of his [again Ruby Payne-Scott was ignored] job and continuing to do excellent work after your departure is a great tribute to your leadership."

[8] The implied time line is inconsistent with the McCready warning well before the "Washington draft" was sent back to Sydney. Bowen had received the "Washington draft" towards the end of December 1947.

possible … I still think that the *AJSR* is the best place, if only to ensure its appearance at an early date". [9]

On 8 June 1948, Pawsey wrote Bowen that he had shown the "April draft" (his term) to Ratcliffe, who liked the paper and had suggested a few minor modifications. Like Bowen, Pawsey still thought the *AJSR* was the best choice for publication. [10]

Then on 21 June 1948, in a letter from Bowen to Pawsey, bad news again arrived. The instrumental paper had been rejected by the Editorial Board of the *AJSR*.[11] "This, they say, has been done not on quality but because of a ruling of the Board against accepting papers wholly concerned with techniques." Bowen was ready to give up and submit the paper to the *Proceedings of the Physical Society* (UK); in fact, the paper was never submitted to a journal. Bowen "did feel strongly about ... the decision" and pointed out that this meant papers on, for example, the cloud chamber or synchrotron could never be published in the *AJSR*. "I have therefore made a vigorous protest and expect to see some amusing results."[12] Unfortunately, the rejected paper was only issued as an internal report as RPR 74 (found by Goss in the Australian Telescope National Facility archive) "The Measurement of Solar Radio-Frequency Radiation", dated January 1948. Since there are references to papers from April and September 1948, the earliest date likely refers to an earlier draft of the report.

On 30 June 1948, Bowen announced to Pawsey that he, Arthur Higgs and McCready were all pleased with the survey paper (after some minor changes) and were looking forward to getting the paper in the December 1948 issue of AJSR. By this point, issue number 1 from March 1948 had already appeared.

On 9 July 1948 the modified "April draft" was sent to Sydney by Pawsey. On 27 July 1948, Pawsey expressed his fear to Bowen that the *AJSR* would next reject the survey paper. Pawsey was certain that the paper could be published in the UK; he would need to organise this possibility before he was to leave for Sydney in late September.

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[9] The comments of Bolton and Payne-Scott on the survey paper were sent on 4 March and 21 June 1948, respectively, with special attention to clarifications on their unpublished data from Sydney.

[10] On 5 June 1948, Pawsey complained to McCready about the huge delays affecting the "instrumental" manuscript: "The trouble that we are up against is that when a paper hangs about for so long, that one's ideas tend to change in the meantime. However, in this case we are aiming at a fairly unpretentious paper and I think we should go ahead with a minimum of alteration …"

[11] This decision meant that the coupling of the "survey" and "instrumental" papers would not be feasible.

[12] There is evidence that the editorial board of the *AJSR* was not consistent. In September 1951, the *AJSR* published an article (Vol 4, page 432) by Muirhead and Lichtblau, "A Circuit for the Operation of a Synchrotron in Conjunction with a Wilson Cloud Chamber", clearly a technical publication.

On 30 July 1948, there was additional news. In a surprising turn of events, Bowen announced "I can't say that I am happy about the paper. Like a lot of others we have had recently, either it isn't very good or I have read it too many times in a rough form. The second of these is certainly true …" Bowen then suggested that the only way to find out about the quality was to send it to a journal and await the referee's comments. On 9 August 1948, Bowen wrote again to Pawsey, agreeing that they give up on *AJSR*.

> The Executive and the Editorial Board of the new journal have said several times that they will not accept survey papers, and our excuse in submitting yours was going to be that, in addition to being a worthwhile review of the subject, it contained a large amount of original matter. I feel sure, however, that there would be an argument which, at best, would delay publication still further. Our experience with the "instrumental" paper by McCready and yourself shows that they are inclined to argue, irrespective of the merits of the paper.

On 9 August 1948, Pawsey responded to Bowen's recent 30 July letter ("not happy about the paper"). Naturally he was confused by Bowen's flip-flop assessments. "I had hoped to get a lead from outside people but the two who have read it, yourself [Bowen] and Ratcliffe, are in disagreement. You are critical, Ratcliffe praised it. The only thing I can see do to is to try it on the referees after incorporating the modifications you have each raised." (At this time Pawsey had not received the 9 August 1948 letter of Bowen.) Pawsey worried still about the possible "review" paper classification which he considered to be a "dangerously close" category that might well lead to rejection by the *AJSR.* Thus both Pawsey and Bowen had essentially given up on submitting the "survey" paper to *AJSR*.

On 20 August 1948, Bowen sent Pawsey the final typed version from Sydney. Bowen had asked the Executive of CSIR for permission to publish the paper in a UK journal, still undetermined. Pawsey was to proceed with the submission as he saw fit. On 9 September 1948, Pawsey indicated that Ratcliffe had suggested publication in the *Proceedings Institute Electrical Engineers (London),* "which has [a] new policy of publishing integrating [review] articles in fields of scientific radio."[13] Pawsey then submitted the paper on 17 September 1948, six days before he departed the UK by ship to Australia.

The "survey" paper was to have a long road to final publication, almost two years away in either August or September 1950. The paper was received on 20 September 1948 and then resubmitted after referee comments on 3 February 1949. The paper was "read" before the

[13] Pawsey had also looked at the possibility of publishing in the *Reports on Progress in Physics*, an idea rejected since he was told that this journal was "booked up" until 1950. This choice was ironic given the inordinate delays in the actual publication in the *Proc IEE (London).*

Radio Section of the Institute of Electrical Engineers by J. Stanley Hey on 7 December 1949, with detailed published questions from Martin Ryle and four other participants. The reply was written in a collaborative manner by both Hey and Pawsey (see Goss and McGee, 2009 for a description of this cooperative endeavour, Appendix E, p. 286)). In NRAO ONLINE 20, we discuss the major scientific conclusions of the Pawsey 1950 survey publication "Solar Radio-Frequency Radiation".

Summary:

The survey or integrating solar noise publication was a frustrating experience for Pawsey and the RPL administration. With the retrospective vision of seven decades, the following points are apparent:

(1) The paper was written too soon after the post-war explosive growth of solar radio astronomy began.
(2) The field was evolving rapidly, with numerous discoveries and insights occurring while the publication was being written.
(3) The paper was "over-refereed, with numerous disagreements among the 'experts'".
(4) Pawsey was not in Sydney during the key period of 13 months in 1947-1948. All communications were carried by mail; the turn-around time for post was, however, surprisingly swift.
(5) RPL tried to use a newly founded journal in Australia. The journal had not established clear-cut policies. Confusing and contradictory advice was received from the CSIR about these policies.
(6) The new journal utilised inexperienced referees in Australia.[14]

[14] Goss experienced some legacies of this refereeing system in 1967. The process often led to major improvements, but the delays could be inordinate due to the use of multiple internal referees. In a few exceptional cases, there were suggestions that the complex process might hinder originality.