NRAO ONLINE 6

Martyn's Trip to the UK in 1939- Secrets of Radar

> "Australia's official cooperation, together with that of the other Dominions", David Martyn recorded, "was invited by Britain in February 1939."[1]

The dramatic summons to London delivered to the Australian government in late February 1939 is a well-known story. This trip set in motion the realisation of the Australian Government of their need to develop RDF [Range and Direction Finding]. Time was of the essence since Martyn's return was only a month before WWII began in Europe and two years and four months before Pearl Harbour on 7 December 1941.

In 1938, the security situation in Europe deteriorated rapidly. In September 1938, a conference (now associated with "appeasement") was organised in Munich. The British Prime Minister Chamberlain and his French counterpart, Daladier, met with the Axis leaders, Mussolini and Hitler, to discuss the Sudetenland Crisis in Czechoslovakia. The "peace for our time" conference led to the dismemberment of Czechoslovakia, 15 March 1939. During this later period, the British authorities made a major decision to reveal the secrets of RDF to their Dominions, New Zealand, Canada and Australia.

On 25 February 1939, a secret cable was sent from the UK to Australia. Acting High Commissioner J.S. Duncan[2] of Australia in London wrote to Rt Hon A.J. Lyons[3] (Australian PM):[4]

> See my telegram to the Treasurer of January 19th, subject Piddington. Conversations have been carried on from time to time with the Air Ministry on the subject of secret research. They culminated today in the disclosure to the High Commissioners of new development in defence applicable particularly to air but also probably capable of development for other services. High Commissioners have been informed that if their

[1] Evans (1972, RRB, p. 283), quote from Martyn's article in 1945 on "Radar" written for the Australian "Blue Book". See Additional Note 1 for the complete text concerning the events of 1939.

[2] Duncan was acting on behalf of S.M. Bruce, High Commissioner of Australia from 1933-1945. Bruce was a former Prime Minister of Australia (1923-1929).

[3] Lyons was to die in office barely a month later, 7 April 1939. He was succeeded by Earle Page for a few weeks and then on 26 April 1939 by Robert Menzies, serving until 29 August 1941. After a short interval during which Fadden was Prime Minister, John Curtin (1885-1945) became Prime Minister on 7 October 1941, remaining for most of the remainder of the war (Leader of Australian Labor Party- died 6 July 1945)).

[4] This and following quote from Evans, 1970.

> Governments send the best qualified physicist to England all information will be placed at his disposal for secret report to Dominion Governments. Utmost secrecy essential and choice of greatest discretion important. Am satisfied that the new development which is the product of the best scientific brains here is of great significance and that the Commonwealth should be fully advised in relation to it. If you decide to send [a] man, the idea is to attach to him either air or military liaison officer or both in order to obtain knowledge of service operation as well as scientific application of the new development. Period of stay would probably be three or four months. Utmost secrecy imposed hence the absence of fuller information here. Air Ministry attaches such importance to it that they ask that details be not communicated by letter. Other High Commissioners communicating similarly to their governments [New Zealand, South Africa and Canada].

With no explicit mention of RDF, the British invited (for the first time) the Australians to play a role in the development of this new defensive weapon. Fortunately, the Australians were already aware of many of the details, having been informed by Martyn and Piddington of the potential use of RDF. (see NRAO ONLINE 5)

Within two days, Casey (CSIR Minister) sent a copy of the cable to Rivett (CSIR CEO) asking if Madsen would be available to go to the UK.

> I am enclosing a most secret telegram [from London] connected with the enquires we have been making lately re the **employment of Piddington on certain work** [our emphasis- clearly RDF research]. You will notice that they suggest sending the "best qualified physicist" to England. You might let me know what you think. I suppose it would not be possible for Madsen to go? I'll be here in Sydney in Cabinet all tomorrow…

Rivett telegrammed immediately to Casey with the message that he had not consulted anyone (even Madsen!) but would instead suggest David F. Martyn of the CSIR Radio Research Board[5]. He suggested that Casey interview Martyn in person, a decision which was to have major consequences for the future of RDF research in Australia. On 28 February 1939, Casey met Martyn at Sydney University (by chance, Madsen was with Martyn when Casey arrived) and later in the day telegraphed to Rivett that Martyn was the obvious choice; Casey had also discussed this choice with the Prime Minister Lyons as well as Menzies and Page.

[5] In retrospect, Martyn was a strange choice. Schedvin (1987)has expressed doubt about the 33 year-old scientist's qualifications as would have been viewed in 1939: "[Martyn] had spent most of his time in research science working alone or with a small number of collaborators; the more complex human and political dimension of defence science were quite outside his experience."

On 14 March 1939, Martyn left by flying boat to the UK, a long air journey lasting 10 days (arrival 24 March). Martyn stayed in the UK for only two months, until 25 May. The return trip (see below) was via ship, through the Panama Canal to New Zealand with arrival in Sydney on 7 August 1939.

Schedvin (1987) has described the uncertainties in both the UK and Australia of this decision to involve the Dominions[6]:

> Presumably the British Air Ministry calculated the risk of the information falling into the wrong hands against the advantage of encouraging development of the new techniques by a member of the Imperial family strategically located east of Suez. The British authorities did not know that the international character of the ionospheric work over the previous decade had led quite independently to radar work in Germany and Italy as well as in the United States and Canada. It is unlikely that there existed any clear notion of how an Australian radar centre might contribute to the defence of the Empire, but in the weeks [preceding the] Munich debacle [of 15 March 1939], with war seemingly inevitable, the decision was taken to encourage Australian research and development in the event of an emergency, and as a possible production centre for the defence of Singapore and Malaya. Clearly, the contacts established before the war [with Martyn and Piddington] were crucial to this decision.
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> The handful of [Australian] Cabinet ministers who were consulted had little or no idea of the nature of radar, nor how it might be used in the defence of Australia. Nevertheless, they had no hesitation in accepting the invitation. On John Madsen's [sic, in fact David Rivett's] strong recommendation, David Martyn was selected to receive the secret information. He was easily the outstanding research scientist in the field. Understandably, the PMG's Department felt that an electrical engineer should also be sent, but in the event Martyn went alone--an indication of the importance attached to secrecy, and that the emphasis was still on research.
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> Martyn spent [two] months in the United Kingdom … With other Dominion representatives he visited the chain air warning system along the east coast of England, and inspected new systems that were being developed, such as the compact air-to-surface vessel (ASV) equipment for installation in aircraft for sea reconnaissance,

[6] The Schedvin text is in the main published text.

equipment for measuring the distance and the angles of azimuth and altitude of an aircraft from an anti-aircraft gun position (GL or gunlaying), and a lighter and portable form of air warning (MB or mobile air warning). In his inspection of research establishments, he was impressed by the rapidity of development[7]. Martyn conveyed his excitement to Madsen[8]:

> Firstly, you may take my considered and emphatic view that this subject is a revolution in Defence matters, and in no application is anything approaching finality even in sight. Every model constructed is obsolete in a few months. It also bristles with scientific problems.

Additional details of this important visit have been supplied by Evans (RAB, 1970, p. 10). Martyn ordered large quantities of radar equipment and also prototypes for further development in Australia. For example, on 26 April 1939 (the day Robert Menzies became the new Prime Minister), Duncan sent a long cable (Evans, RAB, Annexure 4) describing a number of radar sets (each set was called an "equipment" in WWII) that would be ordered for "training purposes and for tests as to their suitability under Australian conditions". The Australians hoped to be allowed to manufacture some of the RDF equipment, but "some reluctance has been shown [by the British] in view of the extreme secrecy here but I am hopeful that the necessary approval will be given in relation to Australia although it will probably be withheld in the case of certain other Dominions." The price of the RDF equipment was to be £163,000 with the expectation that an additional £200,000 would be required in the next months.[9] In addition, 2000 blueprints of various "equipments" were to be sent to Australia along with training manuals. The expected delivery date of these items was to be September or October 1939—a date never fulfilled due to the beginning of the war on 1 September 1939, as Germany invaded Poland. (By September 1940, two CHL- Chain Home Low sets working at 200 MHz- transmitters had arrived in Australia with one receiver; MB, Mobile Base, sets arrived later.)

[7] Watson-Watt (Watson-Watt, R. (1957). "Three steps to victory." Odhams Press) has mentioned meeting Martyn during his visit to the UK in 1939; he knew Martyn from late 1929 on his visit to the UK RRB (Slough) as he moved from Glasgow to the CSIR in Melbourne.

[8] Schedvin also remarked on the tone of Martyn's letters. Martyn was clearly anxious to "justify his benefactor's faith" in his protégé. This adoration would dissipate in early 1941.

[9] Later the Australians (31 May 1939) were to contrast their aspirations with those of the Canadians. Their North American colleagues in Canada expected to order RDF equipment costing £800,000 with an additional £80,000 to be spent on research and development.

On 2 May 1939, an "Aide-Memoire"[10] was exchanged between the Australian High Commission in London with the UK Secretary of State for Air, the First Lord of the Admiralty and the Secretary of State for War with a detailed list of the 18 radar sets ordered by the Australian. On 31 May 1939 (just after Martyn left by ship for Australia), Air Marshall Newall (UK) replied, agreeing to the collaboration between the RAF and the RAAF on radar matters.

Evans:

> [Starting the end of March, Martyn] visited research establishments of government departments working on RDF and also factories of firms manufacturing RDF equipment. In collaboration with Naval, Military and Air Liaison Officers he visited coastal defence stations, studied Service applications of the new techniques, and had conferences with senior personnel on the tactical impact of RDF.

Martyn had discussions on the part which Australia might play in radar development programmes:

> He immediately adopted the stance that Australia should not merely play a passive role in the radar development programme and copying it for local distribution, but rather that the trained and experienced Australian RRB personnel should accept the more positive task of undertaking a research and development programme, which dovetailed into the UK work, and at the same time catered for the special conditions essential for military operations in the South West Pacific.

As Martyn departed from the UK for Australia on 25 May 1939, he helped the High Commissioner Stanley Bruce write a report which was sent back to the Australian Prime Minister, Robert Menzies, from 31 May 1939. "Notes of RDF and Application to Australian Defence" was a comprehensive summary of the various types of RDF equipments, starting with Chain Home (CH):

> This has been designed for the purpose of obtaining early warning of aerial attack on Great Britain … Each station requires the provision steel towers 350 feet high and an operating personnel of about 14 in peacetime and 40 in war … [W]hile obviously invaluable for the defence of Great Britain, there is no reason to believe that protective measures on this scale are necessary for Australia.

The other types of RDF (MB, "mobile base" CH), ASV ("aircraft-surface vessel"), GL (gun laying for anti-aircraft gunnery), CD (coast defence, for enemy shipping; it was the case that this latter

[10] Three additional documents were located in 2009 at the CSIRO Division of Radiophysics in Marsfield, Sydney by John Brooks: Air Marshall Newall to Duncan (31 May 1939), telegram from Bruce to Menzies (a brief summary of Martyn's visit, 31 May 1939) and the Aide-Memoire of 2 May 1939.

type of RDF was not well developed and would become the main project in Australia in 1940 and 1941) and SA (surface vessel to aircraft) for shipboard anti-aircraft weapons.

David Martyn's activities since 24 March 1939 were described in some detail, including the 19 RDF equipments which were ordered.

> It is not suggested that this quantity of equipment would be adequate to fill Australia's ultimate Defence equipments. It is believed, however, that at the present state of development this quantity of equipment can play a valuable part in the defence of [Australia], without committing us to great expenditure on types of equipment which may soon become obsolete … [The RDF sets can be tested] under Australian conditions and will facilitate training of personnel.

The ASV sets were to be delivered within a few months. As we shall see below, the attempts to duplicate the ASV RDF in Australia were not successful.

The report continued:

> Dr Martyn has indicated that Australia's knowledge of RDF could not be considered complete with the obtaining of complete sets of plans, manufacturing blueprints, training documents etc. After considerable negotiation, it appears likely that the privilege of securing these documents will be extended to Australia. It is at present proposed that the items in question, numbering some thousands, shall be transported to Australia via Panama [to avoid the dangerous trip via the Suez Canal or via Cape Town] under the protective custody of the Captain of RMS Rangitata [NZ Shipping Company] under the supervision of Dr Martyn, with the provision for jettisoning in emergency.[11]

The Australians would not be allowed to manufacture these equipments due to reasons of secrecy; manufacture in Australia would only be possible after research and development in Australia could be carried out.

The report ended with a prescient view of the future or RDF:

> It is accepted that the present development of RDF already marks a revolutionary advance in the science of warfare. It is also clear that its future possibilities, both in

[11] In the Majorie Barnard interview (See Additional Note 1), Martyn was graphic in his description of the plans in case of enemy attack: "Documents were packed in six canvas bags weighted with leaden bars and perforated so that in case of enemy attack they could be thrown overboard—the perforations would ensure that papers were destroyed by sea water and the lead would carry them to the bottom."

> warfare and in civil applications are of great importance … It would appear to be a wise procedure for Australia to undertake research and development on RDF immediately.

There had been discussions that the Air Ministry would possibly train Australian and New Zealand physicists in RDF techniques. But,

> it should be pointed out that scientists are already available in Australia who have the necessary knowledge to commence such work immediately. The independent development of RDF technique by [Australian] Radio Research Board [personnel] a year ago is sufficient evidence for this ... [This is clearly a reference to Piddington's success in both the UK and Australia.]

Since RDF research would likely have major impacts on defence, civil aviation and even meteorology, Martyn pointed out that research in the field should not be confined to the wartime period. Likely the authorities back in Australia had also been involved in the preparation of this document, based on the suggestion that a panel be considered to advise the Australian government on future actions. Not surprising the names suggested would be those who would guide the Radiophysics Advisory Board later in 1939: Sir Harry Brown (Director of Postal Services), Prof J.P. Madsen (Chair of the RRB) and Sir A.C.D. Rivett (CEO of CSIR). The report ended by pointing out a major defect of the planning in mid-1939, the lack of involvement of the users of the RDF equipment, the military.

> Finally, it is desirable to point out that provision will soon have to be made in Australia for the training of the operating personnel of RDF equipment. Owing to the complexity of the apparatus, it is important to realise that a high standard of intelligence and training will be necessary. The question of training of possible instructors will be given consideration by the respective Service Authorities in Australia.

Martyn did not point out that questions and potential problems in 1939 were the fact that the military authorities in Australia had little or no experience in the use of this new weapon. As we will see, this defect was to play a major role in questions of gaining acceptance of radar in Australia as the Pacific War developed in 1942; both strategic and tactical issues were to be raised as WWII evolved.

Martyn's long journey from the UK to Australia began on 25 May 1939, arriving in New Zealand via the Panama Canal on 27 July. He visited New Zealand colleagues for a week, departing for Sydney on 3 August with arrival on 7 August. The arrival was only three weeks before the start of WWII on 1 September 1939.

Additional Note 1. Martyn's Summary of his trip of 1939 to the UK, Marjorie Barnard interview 26 October 1946 (from the original unedited transcript in the Barnard collection, from the Mitchell Library, Sydney)

> All data [of the British military regarding RDF] was released to him without reservation. Asked at a private luncheon by Watson-Watt, immediately on arrival, if he had any idea what was to be told him, Dr Martyn explained how he had pierced the secret [during his successful visit in 1936]—to the consternation of the audience. The visit was of crucial importance for how Australia's role in radar research and production was to be determined and through that determination the course of the war in the Pacific [after Dec 1941] may well have been changed. There were two schools of thought [in the UK in 1939]: (1) The Dominions should not carry on any original research in radar but should only accept equipment and techniques from the UK. Sir Cyril Newall [Chief of the Air Staff in 1939] had this point of view due to secrecy considerations. (2) Research and development should be pushed ahead independently in Australia. If war broke out (then imminent) there would in any eventuality be an independent centre from which the work could continue. Martyn held this latter view very strongly and had the support of the Australian High Commissioner. Since the Pacific war was to differ in nature and requirements from the struggle in Europe this was an important factor.