



DAVID RIVETT:

FIGHTER FOR AUSTRALIAN SCIENCE

ROHAN RIVETT

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OTHER WORKS OF
ROHAN RIVETT

Behind Bamboo. 1946

Three Cricket Booklets. 1948-52

The Community and the Migrant. 1957

Australian Citizen: Herbert Brookes 1867-1963. 1966

Australia (The Oxford Modern World Series). 1968

Writing About Australia. 1970

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David Rivett as painted by Max Meldrum. This portrait hangs at the Commonwealth Scientific and Industrial Research Organisation's headquarters in Canberra.

ROHAN RIVETT

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FIGHTER FOR AUSTRALIAN SCIENCE

RIVETT

First published 1972

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**Printed in Australia at
The Dominion Press, North Blackburn, Victoria**

**Registered in Australia for transmission
by post as a book**

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Foreword

By Baron Casey of Berwick and of
the City of Westminster
K.G., P.C., G.C.M.G., C.H., D.S.O., M.C., M.A., F.A.A.

The framework and content of David Rivett's life, unusual though it was, can be briefly stated as it was dominated by some simple and most unusual principles.

He and I met frequently in the early 1930's and discussed what we were both aiming to do in our respective fields.

He was a man of the most rigid integrity and way of life. He devoted his life wholeheartedly, selflessly, and without reserve to what he regarded as the interests of the promotion of scientific research in Australia. So far as a human being can control his own life, he allowed nothing to impinge on this, not even his own personal and immediate interests. When he died I remember saying to myself that the expression 'too good to be true' might well have been said of him. His dislike of publicity quickly became known to all who had opportunity for contact with him.

I had unusual opportunities for contact with Rivett in the early years of his scientific work for the Australian Government. His avoidance of personal publicity was understandable, but his intense distaste for even legitimate public appreciation of the work of his organisation was, I found, difficult to understand.

Rivett's work with C.S.I.R. commenced in circumstances of peculiar difficulty. The State Governments had major reservations and suspicions in their attitudes to the new Commonwealth agency. The Federal Government was uncertain about its responsibilities in the field of scientific research.

Julius as Chairman and Rivett as Chief Executive Officer each made important contributions to the building of an institution of a new and unique character, and with a most ambitious range of research interests which have been described as taking place

in a political and social climate that was on the whole at that time rather indifferent to scientific research.

Although Rivett can hardly be said to have been enamoured of politicians, I found him most co-operative and pleasant to work with. He was direct and forthcoming in his views. He attracted the attention and support of the best scientific minds. He was personally possessed of an attractive and most original mind. I quickly became aware of his antipathy to publicity and kept myself carefully on my side of this fence.

Rivett provided inspiring guidance during the formative years. He gave enthusiastic support to the scientists appointed to the new research units. He encouraged the establishment of first rate scientific programmes to back up applied research on industrial problems. He encouraged those who personally needed encouragement. He supported research activities in the scientific schools of Australian universities, most of which had previously been at a low ebb. He arranged for C.S.I.R. units to work closely with university departments, often setting up C.S.I.R. work within a university campus. He and those he influenced created an atmosphere in which research for the benefit of the community could flourish, and the Council of which he was chief executive could inspire the confidence of the public.

It is much to Rivett's credit that, before the outbreak of the Second World War, important problems of the agricultural and pastoral industries (the primary industries) were solved as a result of C.S.I.R. research—that during that war major contributions were made to the Australian war effort. I remember with some surprise that the demand for research came principally from the primary industries in the early years of the work of C.S.I.R., rather than from the secondary—but that at the conclusion of the war period a structure had been established for C.S.I.R. that permitted a vigorous expansion, which broadened the scope of research activities to assist industry, both primary and secondary.

In the immediate post war years, following the death of Julius, Rivett became Chairman of the Council. He retired at the time of its reorganisation as C.S.I.R.O. in 1949, a body still perme-

ated by the spirit of dedication that Rivett did so much to create in its predecessor.

Australia owes a great deal to Sir David Rivett, and this biography, by his son, is to be welcomed. Too many of Australia's sons who have made substantial contributions to one or other of our major activities and achievements are allowed to pass from the scene without adequate record.

Edrington
Berwick
1972

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Acknowledgments

When a writer has been engaged for more than six years on a book, his obligations to others tend to outweigh anything achieved. This is no place for excuses about my tardiness in completing this work beyond the plea that, like others before—and no doubt others to come—I was partly sabotaged by the thirty year rule which still governs release from Commonwealth Archives. The red tape regulating release of even the most unimportant and trivial memoranda on long-dead subjects and forgotten issues that still dogs any researcher in Canberra is something that no reasonable government in the world should tolerate. A breath of the fresh-air American outlook in the Minister handling the administration of Archives in Canberra could do much for future Australian biographers and historians. At present we are the laughing stock of all who try to use our records and this is not the fault of the employees but of the absurd and often lunatic restrictions which tie them down.

A major debt for help lies to old colleagues of my father. No one could have been more helpful than Sir Ian Wark, Dr. J. R. Vickery, Dr. E. G. Bowen, Sir Samuel Wadham, Dr. Lloyd Rees, Dr. Lionel Bull, Mr. Lawrence Coombes, Professor E. J. Hartung, Lady Bassett, Sir Mark Oliphant and Dr. James Prescott.

Former members of the C.S.I.R or present members of today's C.S.I.R.O. at every level have been unvaryingly kind, patient and positively co-operative. I cannot name all those who have assisted but a strong personal debt is due to Mr. Wally Evans, Mr. John Graham, Mr. E. J. Drake, Mrs. Nora Roberts (Sir George Julius' secretary), Miss Bronwen Thomas, Miss Agnes Slattery and Miss Hilda Todd.

Unhappily some of the men who did so much as David Rivett's Divisional Chiefs and colleagues to create C.S.I.R. of

1926-49 and who helped in compiling this story have died since. As the text will in some instances show a debt is due to Sir John Madsen, Sir Harry Brown, Dr. B. T. Dickson, Dr. A. J. Nicholson, Mr. H. P. Breen and Mr. Francis Ratcliffe.

Without Delme Forbes the project would never have got off the ground. Delme took infinite time and trouble in assisting my mother to find old letters, photos and documents. All the basic research work about C.S.I.R. was done by her and by Margaret Jennings who laid aside her own Archives of Australia series to delve and edit.

No one else except the author is responsible for the shortcomings of this book. Delays were largely due to the problems arising from a determination to seek objectivity at all costs.

In the final stages a special word of gratitude is due to Lord Casey for his patience and helpful foreword, to my old master and long-time friend, Arthur Phillips who is, surely, one of the most perceptive editors of Australian writing, and to Miss Ellinor Archer who so generously insisted on compiling the index.

Nan, who has helped with almost everything written for the past 25 years, has never needed more patience than since we decided, in 1965, to tackle this particularly tough assignment on the basis that no favorable comment of any kind was permissible in a biography of a close relative unless someone else made the remark or wrote the statement.

R.R.

CHAPTER ONE

The Attack

September 30 - October 6, 1948

In Canberra, by the spring of 1948, the Opposition Liberal and Country parties were at last scenting electoral victory. Seven years in the political wilderness, the longest period that Labor had ever held office in Australia, had made many men on the Opposition benches prepared to do or say almost anything that might discomfort the men who had been ruling Australia since September 1941.

Attacks on Communists and attempts to associate sections of the Labor Party with communism or with weakness towards Communist agitation had been part of the stock-in-trade of the Australian right, as of conservative parties everywhere, ever since Lenin's Bolshevik regime had consolidated its hold in Moscow. In 1948, after years with the Soviet Union as an ally, the Cold War had revealed to all the great gulf that still separated the USSR from her British and American allies. Spy revelations followed by the rape of Czechoslovakia, the death of Jan Masaryck and the Berlin airlift crisis had brought anti-Soviet feeling and Communist phobia to a new pitch in all the democracies. The Opposition hoped to use this to embarrass the Chifley Labor Ministry in the House of Representatives. Chifley had still a few months to go before proving to the nation on the coalfield that he was prepared to be very tough with Communists who attacked the vital interests of Australia.

A series of attacks on the Council for Scientific and Industrial Research—henceforth referred to as C.S.I.R.—under the by-line of a British scientist had appeared in a Sydney weekly. A security officer in England during the war he accused the C.S.I.R. of being loose on security and of allowing people who were or might be members of the Communist party to work on projects which had a security content.

Various worrying reports came to the attention of the scientists leading the C.S.I.R. during 1948. In May 1948, Professor Marcus Oliphant wrote from England to Rivett:

I find a growing atmosphere of mistrust of Australian security which is likely to prevent any participation by Australia in atomic energy or similar undertakings for some time to come. There is gross misrepresentation of your own views which, it is claimed, have so demoralized C.S.I.R. staff that Liaison Officers in Washington and London have become grossly careless of security papers in their possession. I have found myself very glad to have a copy of your 'policy' speech at Canberra to use as ammunition against the prevalent idea that Australia cannot be trusted with any information not already made public. I was told by one critic that 'No Australian, from the P.M. down, can be trusted not to be careless or worse, and I include you (M.L.O.) in that statement!'

Since the May case no scientist is above suspicion, especially if he protests in any way about the spread of secrecy in science, but the Civil Service trade union has halted dismissals of Communist 'sympathisers and fellow-travellers'. There is worry over C.S.I.R. personnel at Harwell, particularly in the event that they return to Australia as officers of C.S.I.R.

Would it not be wise to transfer all secret work and all contacts with secrecy from C.S.I.R. to the Supply Department and force them to set up a scientific organisation of their own. They could revel in red stamps and stultify work to their heart's content and C.S.I.R. could be free.

Canada and South Africa are sufficiently free from contamination!

Rivett and his colleagues accumulated ample evidence that someone was trying to create an atmosphere of suspicion about the absence of security in C.S.I.R. But they knew that no work of any possible secret or defence significance was being handled by C.S.I.R. in 1948. Although warned of the trouble being fomented they did not react rapidly because they had a good conscience and knew it was simply not possible for C.S.I.R. personnel to obtain information of value to Communists or any other potential enemy because no work of secret significance was still being carried on in any branch of C.S.I.R. Therefore the events of September 30 and subsequent days in Canberra pro-

foundly shocked the scientific community of Australia—particularly those in C.S.I.R.

David Rivett's attackers on 30 September 1948 and in subsequent sittings in the Commonwealth's House of Representatives were Arthur Fadden, 53, member for Darling Downs, leader of the Country Party and once, for six weeks, Prime Minister; Archie Cameron, 53, member for Barker, former minister and onetime Country party leader; E. J. Harrison, 56, member for Wentworth, former minister and acting leader of the Liberal party; and J. P. Abbott, 57, member for New England, former minister, also Country party.

The members of the Government who defended the C.S.I.R. and its chairman, Rivett, were the Minister for the Council (henceforth referred to as C.S.I.R.) and Minister for Defence, Mr. J. J. Dedman, 52, member for Corio, Labor; Mr. E. J. Holloway, 72, member for Melbourne Ports and Minister for Labor and National Service; and Mr. J. B. Chifley, 63, member for Macquarie and Prime Minister of Australia. The extracts from all speeches are quoted from *Hansard*.

At 3.21 p.m. that day Harrison, in the absence of his leader R. G. Menzies, resumed the debate on the Commonwealth Budget for 1948-49. He called attention to the estimates for the Council for Scientific and Industrial Research, a rapidly expanding organisation which then employed about 2,500 scientists and other workers. Harrison pointed out that the estimates were increased by £350,000 of which £31,500 was earmarked for investigation of nuclear energy. He then said:

'Quite recently a controversy arose in this country over reports that the U.S.A. was reluctant to pass on to Australia information on atomic research for fear it would leak out to Russia through Australian communists. The inference was that the United States was not sure that the C.S.I.R. could be relied upon to observe secrecy. The minister in charge of the C.S.I.R., Mr. Dedman, rightly defended the Council. Although the Minister said there was no basis for the reports, no less a person than the chairman of the C.S.I.R., Sir David Rivett, was subsequently reported as having said that military science should be dealt with

in special laboratories under the control of the military authorities. He added that secrecy and integrity in science could not flourish together and that those who preached secrecy for security were false guides. These are interesting observations by a gentleman who knew quite well that the instrumentality which he controls had co-operated closely and successfully with the defence authorities during the war. Significantly, Sir David's opinions are supported by communists who are themselves participating in scientific investigation.'

Harrison then instanced a senior lecturer at Sydney University who was chairman of the science committee of the Communist party. He also had advocated free interchange of ideas. Australian scientists involved in a guided missile project in Central Australia had been sent to Britain's atomic research establishment at Harwell and more visits had been arranged. He added: 'The Minister's assurances that the C.S.I.R. has nothing to do with secret defence projects is so much eyewash. . . .'

The Minister for Defence and for the C.S.I.R., Mr. John Dedman, replied that he denied most emphatically a number of the statements made. An article had appeared in a Sydney newspaper to the effect that the government of U.S.A. was withholding from Australia all information regarding atomic energy. There was no truth in the allegation yet Harrison had made a similar assertion. The truth was that under an Act of Congress the government of the U.S. was not permitted to pass on to any country information about atomic energy. Interchanges with Opposition members followed and Dedman concluded with:

' . . . I want to make clear that during the whole of the war period the C.S.I.R. was engaged in most highly secret work. There was never one leakage then and there has never been one since.'

HARRISON: Because we were fighting as an ally of Russia. We had no fellow travellers then.

DEDMAN: These attacks . . . on individuals, including Sir David Rivett, have nothing to them. . . . Rivett is not alone in expressing the view that, in order to advance in the field of

knowledge generally, science must be completely free. That opinion is shared by a great many scientists throughout the world . . . because of certain allegations made in the U.S.A. 40 per cent of the scientists engaged in a particular project there have resigned their positions. They say they will not carry on under conditions which leave them open to be continually sniped at merely because they uphold what they believe to be their right to be completely free to publish the results of the experiments they undertake.

HARRISON: Does the Minister agree with that?

DEDMAN: I am sorry to have to say that I agree with Sir David Rivett, science will progress more speedily only if there is a complete interchange of information . . . in certain circumstances such as those which prevail today it is absolutely essential that some scientific experiments and research work should be kept absolutely secret. When Sir David Rivett made his statement he was merely repeating what a great many other scientists had said the world over. . . . Rivett suggested that if defence scientific research projects were undertaken in Australia they should be undertaken not by C.S.I.R. but by a special defence scientific research section established in the Department of Defence or some other appropriate department. As I said not long ago the council was not now engaged in any work of a secret character.

The Minister went on to quote the chairman of the Tennessee Valley authority in the U.S., the atomic scientist, David Lilienthal:

‘ . . . The notion that our atomic energy leadership depends upon a “secret formula” locked in a vault is nothing less than a gigantic hoax upon the people of this country. Our leadership depends upon developing new knowledge and the new applications of that knowledge.’

Dedman then said that Harrison ‘almost went so far as to say that Sir David Rivett was capable of doing what the Communists had done.’

HARRISON: Do not put words into my mouth. The Minister should stick to the facts.

DEDMAN: . . . He said the statements made by Sir David Rivett were similar to statements made by Communist leaders. What inference could be drawn from such a statement?

HARRISON: What nonsense!

DEDMAN: Everyone who knows Sir David Rivett is certain that he is a man of the highest integrity. If the C.S.I.R. has any defence secrets they are safe with Sir David Rivett.

HARRISON: Yes, I agree with that.

There followed a discussion of other personalities employed by C.S.I.R. with alleged Communist affiliations.

Fadden then arose and, after attacking the minister for alleged untruths, said:

'I shall quote a confidential statement. I challenge the Prime Minister (Mr. Chifley) and the Minister for Defence to deny that the Prime Minister told the British Cabinet on the 8th of July at a meeting held at No. 10 Downing street at 10.30 a.m.—that he understood the U.S. authorities were reluctant to communicate to Australia certain secret information about the progress of research in developments on atomic energy. This reluctance might be due to a belief that C.S.I.R. was not fully under the control of the Australian government. It was true the head of the Council had stated his view that the council should not concern itself with secret work. To remove any impediment about the free exchange of information between the U.S.A., U.K. and Australia, he was prepared to make necessary adjustment in the constitution of scientific organisations serving the Australian government in this matter. . . .'

Fadden went on to challenge the Minister to deny that at a meeting of the heads of the C.S.I.R., including Rivett, on 6 July 1947, the Minister had told them that some U.K. departments were not sure C.S.I.R. should be trusted with certain documents. This militated against the U.K. in obtaining information from the U.S.

There followed further clashes between Fadden and Dedman centring on the Minister's credibility. Then Abbott of the Country party produced a booklet entitled *Science and Responsibility*.

ABBOTT: . . . It is an address delivered at . . . the commencement ceremony of the Canberra University College . . . sent

to me by Sir David Rivett after I had asked certain questions in this Chamber. . . . The great danger of the attitude Sir David Rivett adopts is that in teaching young scientists there is no reason for secrecy about scientific matters, he could turn many of them, who are perhaps tainted by Communism, into potential Dr. Nunn Mays. (Dr. Nunn May had been sentenced at the Old Bailey in London in 1946 to 10 years' penal servitude for communicating information about atomic research to Soviet agents.)

The attack was then taken up for the Opposition by another ex-minister.

CAMERON: . . . Had I been a member of the government when certain statements were made last year I should have thought the proper thing to do with Sir David Rivett would be to relieve him of his duty. He should be reminded of the old adage: 'He who pays the piper calls the tune.' . . . the sooner he leaves the government service the better. He should either . . . conform to the policy of the government which pays him or get out and continue his research at his own expense.

When the debate resumed that night about four hours later, E. J. Holloway, the Minister for Labor and National Service and member for Melbourne Ports replied for the government.

HOLLOWAY: Everyone is aware of the remarkable job done by C.S.I.R. during the recent war . . . it is now doing a magnificent job helping our primary and secondary industries. . . .

He said Rivett was attacked for deploring the tendency not to treat scientific research as being international in character. He had heard eminent scientists declare that investigations of the commercial potential of atomic power had been in progress for the past 20 or 30 years. He then paid tribute to Sir David Rivett's character and services and added:

'While Sir David Rivett is in charge of C.S.I.R. I am certain the Australian people will be confident that there will be no leakage of atomic secrets . . . when the acting leader of the Liberal party and the leader of the Country party resort to the tactics of a guttersnipe it is bad for the honor of this Parliament.'

When the Prime Minister returned to the House that evening (he had been absent during the previous debate) he rose and

explained his discussion in Britain. He said there never was any agreement of the U.S. and Britain to disclose to each other results of research or experiments in atomic energy. Then he spoke of Rivett.

CHIFLEY: . . . Charges have been made against the Chairman of C.S.I.R. . . . Such accusations are a poor reward for the hard work and integrity of a man who has rendered great service to the country in the world of scientific research. He may have the idea, as many other scientists do, that research should be open to the world and that there should not be any secrets. . . . I spoke with leading scientists in Great Britain who are engaged on highly secret defence work. The statements made about Sir David Rivett had been brought to their notice and they expressed, without qualification, their complete confidence in him and in the work he was doing for Australia. . . . Those opinions were expressed by men who knew Sir David Rivett not only by reputation but who knew him personally. . . . The economic and political views of the chairman of the council, Sir David Rivett, would not coincide with mine . . . but I should be doing him a great injustice if I did not point out that no servant of the Commonwealth is held in higher esteem or more trusted than he is. Furthermore . . . no one . . . is more conscious of his country's interests. . . . People making false statements about the security of Australia . . . could very easily do more harm in the eyes of the nations with whom it is associated than the Russians themselves. . . .

ABBOTT: That is pretty low.

HARRISON: The Prime Minister is descending to the level of the debate.

Chifley concluded that evening's debate on the estimates by saying that members of Parliament should never have made the statements made that day.

Next morning, after the papers in all states had reported the debate with front page headlines, the House resumed and Cameron took up the estimates debate by a fresh attack on Rivett, quoting the remarks of a South Australian politician. Then:

CAMERON: We cannot have a government-sponsored institution whose chairman lets himself go every now and again as Sir

David Rivett did in 1947 . . . the thing (he) must get into his scientific mind—and if he has any mind other than scientific so much the better—is that he is a paid servant of the Commonwealth. . . . Rivett and his co-scientists are not a government on their own, they are not a law unto themselves. While they may be particularly capable and distinguished men—and I hope they are—they are citizens of the Commonwealth of Australia who render service . . . for certain known emoluments.

ABBOTT: And their duty ought to be to their country!

Most of the rest of that day's debate was concerned with party attack and counter-attack. When the debate resumed five days later, Abbott quoted from Rivett's Canberra paper published under the title *Science and Responsibility*. Abbott repeated the key phrase: 'They who preach secrecy are false guides. That way lies war.' Rivett had said the secrets of the atomic bomb were only a set of engineering procedures. He had dismissed it lightly in that way when other nations were certain to develop it in a few years. Abbott then said:

'Both the Minister and Sir David Rivett are living in a world of unreality. They have a happy kind of faith in the honesty of a man in whose honesty we cannot trust. Since the conclusion of the Second World War we have learned from bitter experience. . . . I claim that the address given by Sir David Rivett was a most dangerous one. In a period almost of war, he preached wickedly and wrongly the most dangerous doctrines to our young scientists. Nevertheless the Minister has defended it.'

The parliamentary participants in this personal attack on David Rivett were excused by one friend on the grounds that they were making considerable political mileage out of the charge that the government was insufficiently concerned about Australian security. Yet while the Chifley government may have been in the sniper's sights the man in front of the target was certainly David Rivett. Parliamentary privilege enabled the quartet to smear a man forbidden to answer back. Consciously or unconsciously (and with their experience unconsciously is unbelievable) they reflected directly on the loyalty, patriotism and judgement of Rivett.

The politically sophisticated can say that, after being seven years in opposition, any party is likely to play it rough to help bring down any ministry. They can argue that the C.S.I.R. chairman was buying into politics by his statements at Canberra University. It can be said that, in the spy-mania and nuclear hush-hush of 1948, many people genuinely believed that scientists could 'give' the Russians power to destroy their country.

In the memoirs of Sir Arthur Fadden entitled *They Called Me Artie*,* the politician's obsession with party advantage without other thought shows in his fascinatingly revealing account of the episode:

'In October 1948 I figured in a somewhat dramatic incident relating to Communist activity. Prior to this time there were indications that both the British and United States governments had been reluctant to divulge full information on defence developments because the Australian government was inclined to discount the security risk involved in its attitude towards Communists and fellow travellers in public departments and authorities.

'While charges of this nature were being made by the Opposition, a document came into my hands which, if genuine as I believed it to be, confirmed that the United States was in fact unwilling to impart certain defence secrets on these grounds. I quoted the document in the Budget debate. . . .'

Fadden goes on to tell of his successful brush with security officers sent to investigate how he got the document which must have revealed both details of the British Cabinet meeting with Chifley in July 1948 and the C.S.I.R. executive meeting with Dedman in 1947. Senior scientists and the top Defence people, including Sir Frederick Shedden, had no doubt who was responsible for the leak to Fadden. Only one man outside the government could have been informed about both meetings. But he was able to occupy a post of responsibility for some years before his defects of character and many rows led to a humiliating resignation.

Fadden's description of his Parliamentary group at the time suggests the frame of mind that caused them to bespatter any-

* *They Called Me Artie*. Jacaranda. pp. 97-99.

one caught in their crossfire against the government's Front Bench.

' . . . I was leader of the guerilla band we called the Country Party. . . . We were able to concentrate, in high spirits, on returning some of the criticism bestowed on us by Labor opponents in the early years of the war. We did this usually without rancour but keenly, like kelpies marshalling the flock. I pride myself we missed few opportunities and drove in many of the wedges which finally brought the Government down.'

Surely this is fair political warfare against one's parliamentary opponents equipped with the same defences and privileges. It is a matter of each citizen's personal opinion if the same tactics are legitimate when they involve besmirching the good name and character of a public officer who has no similar parliamentary privilege to protect him and is effectively gagged by his position and obligations to his authority from any form of self-defence.

This does not imply that David Rivett was a lamb for slaughter. He had been in public life for twenty years. He knew, as Oppenheimer, Lilienthal, Lattimore, Conant and other scientists and educationists in the United States knew, that their statements of faith and belief in the integrity of science were likely to provoke political thunder. It came especially from witch-hunting politicians in the Senator McCarthy mould, seeking publicity and every political advantage by provoking the current apprehension about leakages to the Soviet Union. He took the risk as the great scientists abroad took it, but like them was probably unprepared to find critics indulging, behind the barriers of privilege, in sniping that smelt of character assassination. Two reporters in the U.S.A. won the New York Newspaper Guild's Award for 1951 with a series of articles exposing McCarthyism under the title 'Smear Inc.'

Harold Holt was to write some weeks later to David Rivett saying that it was a pity both he and 'Bob Menzies' had been absent from the House because they would certainly have 'kept the boys in line'. Would they? Menzies kept his dislike of the tactics to private utterances. Holt was not then deputy leader of the Liberals and it is unlikely that any of the four would have listened to him.

Scientists are not political animals. Nor are they usually very worldly. Many things done and said in Parliament go by them unobserved or without a hint of comment. Therefore it was astounding that, in the hours and days following the attack, a multitude of scientists in universities, private industry or various laboratories inside and outside C.S.I.R. wired, wrote or phoned their feelings about the attack. More than a hundred letters and notes survive but the telephone callers were probably more numerous.

Some of the most informed are still unprintable today. But a dozen taken at random may throw light on the man attacked and on where he stood among his peers:

The distinguished Cambridge research physicist, Professor Hugh Webster, who had joined the University of Queensland wrote:

The recent controversy in Parliament regarding C.S.I.R. and secrecy has annoyed and disturbed me profoundly. I am disgusted that politicians have had the presumption to criticise you, and I should like to assure you that men of science in Queensland are solidly supporting you.

I have felt very inclined to state publicly what I know to be a fact viz, that during the war the only leakages of information that caused the English authorities any concern (as far as Australia was concerned) occurred from politicians and not from the C.S.I.R. or the public service. . . . I do hope that the trouble will not cause you to carry out your threat of resignation. It is vital, if Australian science is not to be set back 20 years, that you should carry on, at least until the future of C.S.I.R. is assured.

Dr. Edmund Cornish, later head of C.S.I.R.'s Division of Mathematical Science in South Australia, wrote:

One fumes and boils to think that the one person of the calibre necessary to epitomise the true spirit of science should be subjected to such treatment. With cheap and shabby things like that occurring daily around us it makes me feel the more thankful that I chose to follow science. . . . I've tried to go all the way with you but no one could possibly have felt as he who possesses the real insight of the spirit of the game and built the organisation into its erstwhile form. . . .

Canberra entomologist, G. A. H. Nelson, wrote:

My appreciation and thanks for the courageous stand you have taken in the last 18 months on the separation of military research from wider and more fundamental research. I deeply regret . . . that you as leader of very many of us should be subjected to public criticism, merely it seems, for a momentary election advantage. It seems, if today's Press report is correct, that you won your point after all the furore in the House.

To the man attacked with no open and total withdrawal of the charges, claims for a 'win' were particularly hollow.

Dr. George Briggs, chief of the National Standards Laboratory wrote:

I want to tell you how much I detest the completely unjustified attacks made on you last week in Canberra by certain members of Parliament. The reason . . . is . . . just political expediency . . . but nevertheless is despicable.

Dr. Norman Esserman, chief of the Metrology Division at the National Standards laboratory, wrote:

The shocking performance in the House last night . . . thoroughly disgusted us all. . . . We hope some forceful action can be taken to bring home to them a sense of the honesty and integrity so completely a part of you but entirely lacking in them so not at all understood.

Professor Peter MacCallum, chairman of the executive of the Australian National Research Council, wrote of 'the unanimous indignation of your scientific colleagues at the scandalous outburst at Canberra.'

Thirty-four scientists of the Department of Electrotechnology signed a joint letter condemning 'unfair accusations' and assuring unanimous support. They added:

It is not a matter of opinion but of fact that scientific research flourishes in an atmosphere of complete freedom and is vitally dependent upon the free interchange and criticism of ideas. . . .

One hundred and two research and professional colleagues at Dr. Ian Wark's Division of Chemical Industry sent to Press and Prime Minister the following:

The irresponsible attacks recently made in Federal Parliament on Sir David Rivett and the C.S.I.R. call for strong condemnation. The majority of scientific workers share his views. . . . Such an attitude is essential to the healthy development of science and its application in the interests of our country. . . . We the undersigned . . . express our wholehearted support for and confidence in Sir David Rivett.

Dr. W. J. Dakin, the wartime Director of Camouflage, wrote: 'I should like to assure you that all here are simply furious with the remarks made by Opposition members. . . .'

Dr. Howard Worner of Broken Hill Pty. Ltd., wrote: ' . . . C.S.I.R. is doing more than ever in its history to advance the well-being of our country.'

Dr. E. G. Bowen, chief of radiophysics and already, at 37, internationally famous, wrote: 'Everyone I have spoken to . . . is aghast at the statements being made. Need I say that we are wholeheartedly behind you and the viewpoint you have taken. . . .'

Professor Joseph Wood wrote: ' . . . The anger amongst my colleagues here today would have done your heart good. We all realise that you have carried the torch for all of us. . . .'

Sydney engineer, Alex Gibson, wired succinctly: 'FOR GOD'S SAKE, DAVID, DON'T GIVE UP.'

Yet scientists—and these were all scientists or closely linked with science—carry few hundreds of votes and politicians in their mid-fifties have pretty thick skins. What they are afraid of is not 'boffins' or 'laboratory wonders' but the Press. In this case, with the whole Australian Press backing the Opposition to oust the Chifley government, the attackers of Rivett and C.S.I.R. must have felt very confident that they were safe from rebuke in the media. However, while some papers criticised the Labor ministry as usual and deplored the absence of candour, the published comments about the attacks on David Rivett and his organisation must have come as a shock to those who had regarded the press as a political ally.

CHAPTER TWO

Carving The Path

1885 - 1906

To understand the conviction which David Rivett brought to his battle for the integrity of the scientist at the end of the 1940's, something of his family background and, especially perhaps, of his father is essential.

Albert Rivett bore no resemblance to the popular idea of a Protestant minister in the last decades of Queen Victoria's reign. He was of good, questioning, rebel stock—Huguenot Rivetts migrated from the French Inquisition two hundred years earlier.

Studying theology at Harley House, in London, he worked in the East End slums. Then, at 24, he volunteered for overseas service, sailing for Australia in the *Hesperus* in August 1879. In Melbourne he met and married Elizabeth Cherbury whose parents founded the Homes of Hope for children and the Pilgrims Rests for 'aged, destitute gentlewomen', in those days before old age pensions were thought of.

In 1881, the young migrant from Norfolk and his bride made their home at Port Esperance (now Dover) in the extreme south of Tasmania, serving a group of small Congregational churches. This was raw pioneering. The first settlers felled and grubbed out the massive eucalypts, and prepared the soil for the famous apple orchards of the future. Here, Eleanor Harriett (Nell), then Albert Cherbury David (Bert to the family, later David) arrived. There were to be nine Rivett children, of whom the seven who survived early childhood, each lived beyond seventy.

No one could have imagined that in 1949 Australia's most popular weekly would devote its entire front page and much of page two to their achievements under the headings THANK GOD FOR THESE AUSTRALIANS and 'Hats off to the Rivetts!'

The young mother left an indelible impression. When forty years later, her daughter, Nell, revisited the area, she was told:

'The stories of your parents and what they did here belong to the fairyland of our childhood.'

Then in 1887, the family crossed Bass Strait and Albert Rivett began 47 years of fighting for recognition of the rights of the humblest and poorest.

Called successively to Yarrawonga, Beechworth and Albury in the Murray Valley, he published—from 1890 onwards—a 'Journal of Applied Christianity' called 'The Murray Independent'. This later became 'The Federal Independent'. It was this organ, maintained for almost half a century, that backed his sermons to goad the Establishment.

Eleanor (Nell), eldest of the family gives this picture of the years at Yarrawonga (1887-96):

Our house, lined weatherboard, verandahed, with corrugated iron roofing, was of the kind then common in country towns. A stretch of parkland, called the grove, lay between us and the River Murray. We children loved the grove. What fun it was to fish for yabbies with bent pins for hooks on cotton lines in a creek flowing—when it did flow—into the River! We delighted in the sight of an occasional paddle-steamer, and came to know the ways of the swagmen who unrolled their 'blueys' inside a hollow tree or pitched a tent to live on the good money earned in the shearing season. When cash ran out they tramped on from township to township seeking work. . . .

When not on pony the children took endless bush rambles. The rifle butts nearby held a hint of danger but over the Murray's bridge, at Mulwala, grapes and other tempting fruit were for sale. However they had to be eaten on the spot. Customs duty was levied if they were brought back into Victoria.

At home a green-fingered father had them helping in the vegetable garden where, in special frames and boxes, tomatoes, celery and asparagus flourished. Above and around them were peaches, apricots, plums and all the berries. Albert Rivett's flowers—especially his dahlias and chrysanthemums—always took prizes.

Among the pets was a huge bullfrog which lived in a fresh-water barrel while from another barrel behind the house on the lawn strawberry plants trailed and fruited in profusion. An off-

season picture shows five youngsters, including David, aged nine, perched atop the barrel with their Dad's label:

IN V.R. POUND
FOR SALE
YOUNG STOCK
by order—BAILIFF

Warmhearted hospitality was offered by many neighbouring farms to 'the people's preacher'. After church he was lavishly dined and milk, cream and cheese arrived at their house in abundance from fond parishioners. Nell remarks that one farmer's wife made a practice of bringing in, on the same day, a joint of fresh meat for her own Roman Catholic priest—and one for father Rivett as well.

Sandy blight and typhoid were the scourges of bush towns like Beechworth and David was the worst sufferer. The kindly French doctor would take no fee. He said everything depended on the nursing. A doctor could do little but Mother Rivett was a most competent nurse. When the parson sought to protect the health of others he clashed with the town's wealthy. Nell says:

One of our earliest experiences of our father's concern for people, his insistence upon justice rather than municipal red tape, led to what was characterised as the Bark Hut controversy. Typhoid had broken out in a family living in a shanty outside the town. Instead of enabling them to use all the measures then known and usually prescribed for disinfecting the dwelling the authorities ordered the hut to be burnt down together with all clothing. This aroused our father's anger and his exposure of the cruel and discriminatory measures taken probably prevented the repetition of like measures—but not without considerable ill-will at the time.

Like any other bush boy in the nineties, David rode a pony and a bicycle almost as soon as he could walk. Because the family never had money to buy things, he learned early to make household equipment—stools, tables, kitchen things—with hammer, saw, plane and screwdriver. Most of the toys and dolls of his sisters were made by him or his father, then dressed or decorated by his mother. With creek tributaries of the Murray all around, David and the other youngsters soon acquired the

rudiments of fishing for the family pot. The shooting of birds and the odd rabbit came later in the vacations of his Melbourne schooling.

He began school at Yarrawonga when he was six, then continued at Beechworth, in the heart of the Ned Kelly country in the Australian Alps. Despite typhoid which reduced his attendance in the last half of his twelfth year to only fourteen days, he became dux of the school in taking his Merit certificate. A sheet of an exercise book, carefully kept by his mother, lists every prize her eldest son gained. The list included competitions, country exams of various kinds with prizes of '10/6—books' to Wesley College's most-coveted awards, the Powell and Draper Scholarships, and his matriculation and University exhibitions. They number 71.

The main teacher was no one individual. David, his brothers and sisters derived a questioning, examining approach from their father. Blind conformism was unthinkable. Amid the Victorian hypocrisies, pretences and myths cultivated for the convenience of the propertied, each youngster came to look at the human values involved. If a neighbour were in trouble, if a family were hit by illness, fire or loss, it was taken for granted that Albert Rivett would be on the scene. His youngsters absorbed—almost as naturally as they breathed—his philosophy. His elder son acquired the drive to seek scholarships because it helped the family and because it was the sole way to qualify for further training. Envy of the horses, carriages, furnishings or journeyings of the affluent did not enter their Dad's philosophy. The children had no concept of it. They were happy and strenuous kids. They had no time to be otherwise. They lived mainly on fresh fruit and vegetables, all home-grown. The splendid constitutions of all seven must have stemmed in part from the total absence of luxury and of synthetic and manufactured food-stuffs.

Sixty years later, one senior Beechworth citizen recalled that his family constantly commented:

'You never see one Rivett—parent or child—sitting idle. If the girls weren't cleaning, sewing, making scones or helping mother or father, they were bent over their school homework or solving some

competition. When the boys weren't bringing in wood, running messages, doing odd jobs, they were reading or working at their studies. The skylarking was strictly within the family circle, not in the streets or public places. Yet the atmosphere was always rather jolly. Teasing and family jokes bubbled over every day. You had a tremendous sense of their oneness. They were three times as numerous and it seemed to me ten times as strong as my heroes—The Three Musketeers—because, although all highly individualist, you knew the "one for all and all for one" thing was stronger in that house than anywhere you found yourself—then or later. They would have roared with mockery if you'd suggested this, because they were always teasing each other. But the drive and ebullience in each of them made that little cottage always seem a place of brilliant light and cheeriness. If the mother did all the worrying for the nine of them, she kept it out of sight. I suppose Mrs. Rivett was the cement and the driving force but her husband's infectious gaiety and contempt for acquisitiveness made nonsense of lack. No powerful group could hurt them really. The Rivetts had too many who loved and admired their father and came to see the quality in his kiddies.'

Nell has described the setting in which she and David came to adolescence:

Perhaps the most formative years of our childhood were spent in Beechworth among the rugged hills of North Eastern Victoria. Its streets were lined with magnificent oaks and elms, and in every direction were vistas of loveliness. Rambles and sometimes scrambles through the bush and over the rocks were our delight, and many were the tales we heard of the days of the gold-rush when Ned Kelly and his gang plotted their daring but discriminating raids beneath a roaring waterfall where we often picnicked. Tales too we heard of lucky fossickers who out of sheer bravado had lit their pipes with ten-pound notes, or shod their horses with gold. . . .

It was during one of our holiday seasons that the first bush-fire tore up through the resinous wattle eucalypt and pine-clad hills and threatened our town. Dad, Bert and young Ted with all the men and boys for long hours fought back the flames lest they cross the ravine and consume the town. Women and girls at home kept baths and all receptacles full of water and anxiously, in terrific heat, watched the shingle roofs lest sparks set them ablaze.

Beechworth towards the turn of the century was still one of the most thriving rural communities. You were not long left in doubt that the carriage trade—attending the Anglican or, occasionally, Presbyterian churches—had all the pretensions and portentous asininity of their contemporaries among the social limelighters of Sydney and Melbourne.

Beechworth State School's records and the reports of teachers underline the abilities of the young Rivetts. But they had no need of high intelligence to realise that most of the wealthy of Beechworth regarded their Dad with undisguised suspicion and, often, open dislike. 'Damned subversive' and 'radical preacher' were among the milder epithets applied by the entrenched wealth of the town. In his pulpit each Sunday and in his indestructible monthly paper he dared repeatedly to challenge the shibboleths of laissez-faire and the greed of the Establishment in the nineties.

At various times, following Albert Rivett's statements about victimisation of strikers, exploitation of children or of widows, inadequacy of social services, or, above all, about the jingoism preached in defence of Cecil Rhodes and the Boer war in South Africa, outraged men of substance in and around the town tried to force the parson out of their community. At one stage almost a quarter of his congregation—the wealthy and those dependent on their favours—abandoned him and went elsewhere for their Sabbath sustenance. Albert Rivett laughed, shrugged and continued to ask the same searching questions and expose the same shams of logic and fake Christianity.

For years the 'carriage trade' withdrew their patronage from his church and their offerings from his collection. They sought to influence the timorous section of the townspeople against the iconoclast Albert Rivett. They were doomed to disappointment. The Ovens and Murray Register of 12 August 1903, carried a lengthy account of the mass farewell Beechworth accorded to Albert Rivett when after seven and a half years he was transferred to a larger church at Albury. He spoke of his debt to his deacons, 'steadfast and true', who had backed him although they often disagreed with him. Yet they had been under pressures which put their loyalty to the severest of tests.

In reply, Councillor I. R. Warner summed up Rivett thus:

He was a truth speaker and made himself unpopular as a consequence of his uncompromising attitude to what he believed to be great evils. . . . Any man who spoke his mind would be to some extent unpopular.

The seven children could not fail to bear the mark of this type of courage. In later years Ted and Chris in their battle against the obscurantism and narrowness of the Medical Association, like David in his fight against the politicians, carried on the lessons preached in the little monthly paper that was to go on for forty years. The family's lifelong detestation of cant, humbug and pretence stemmed directly from a man who practised in every hour the things he wrote in his paper and spoke from his pulpit. It was not perhaps surprising that, on the old firebrand's death in 1934, a paper,* which had habitually black-balled all his utterances and writings, described him as 'the most magnificent rebel parson of his age.'

By the standards of an affluent country community the nine members of the household lived a hand's breadth from extreme frugality. On an income of £150-180 a year, feeding and clothing seven growing youngsters must have demanded a loaves and fishes miracle. Their mother was one of the women of mixed English and German origin who pioneered in so many of Australia's bush communities in the last century.

She once admitted to her future daughter-in-law that when they did come to Melbourne her shopping was confined to jumble sales, bargain sales, material purchased at fetes and odd lots. As a minister's wife she took it for granted that she spend nothing on her own adornment beyond the sober suit or single dress that must serve for years on all public occasions. But the children, given this example, escaped any sense of deprivation. They competed—often successfully—for every prize offered by the advertisers of the day.

In 1899 David sought the one scholarship that offered a chance to tackle secondary education and gain access to a university. Against entries throughout the state, he topped the list.

* The Sydney Morning Herald.

He was to do this in each major examination in which he entered for the next ten years. The scholarship took him to Wesley College in Melbourne's St. Kilda Road and on 26 December 1899, the Headmaster of Wesley wrote to David's father: 'His papers are the best I have ever corrected for the Scholarship Examination.' He lived with relatives at Clifton Hill, bicycling daily the eight miles to and from the north end of Hoddle street to his school at the south end of Punt Road.

David loved games, running, cycling. Within four years he was to win the allcomers' bicycle race at Melbourne University. But his sport at Wesley was sharply restricted by the demands of study. Most of his contemporaries at the private schools of those days came from families to whom school fees represented an insignificant percentage of the family income. For the odd scholarship boy (especially with five other youngsters pressing on to demand secondary and tertiary education) winning one of the few scholarships available was the sole means of continuing towards a professional career. David won every scholarship or prize available to him at Wesley College between his arrival at 14 and his final Leaving Honours examination just before he turned 17. As he once admitted later: 'It was either come top or drop out. There wasn't really any choice.' Already Eleanor, his elder sister, was brilliantly winning her way through the Modern Languages course, first in the class lists at Melbourne University.

David was seriously ill with fever during the long vacation at the end of 1901 and his return to school was delayed. A letter explaining his absence was answered on 6 February 1902, by Mr. M. P. Hansen, later to become Victoria's Director of Education, but then senior science master at Wesley College.

Wesley College,
13 February 1902.

Dear Sir,

I venture to write to urge you to carefully consider the advisability of sending Albert up for a course in Science and Mathematics at the University rather than in Medicine. You are fortunate in having a son of whose ability men of experience and capable of judging . . . think very highly. He is not an ordinary

clever boy but in my opinion he is endowed with quite exceptional ability and it behoves you, sir, to give him an opportunity of turning it to the highest and best account.

Furthermore a Science course at our University is less expensive and more richly endowed with Exhibitions and Scholarships than that of Medicine, and he has thus a better chance of paying his way in a Science course. In addition he will be under Professors in Science of far higher standing than the Professors and Lecturers in the Medical Course. . . .

Hansen went on to outline specific science and research awards his pupil might win and to sketch the possibility of a Cambridge scholarship with ultimate possibilities of a Fellowship and 'a professorship in some good university'.

With an extraordinary perceptiveness about one who had just turned 16, Hansen added that while not wanting to decry the nobility of medicine 'I feel sure that a life devoted to the pursuit of pure knowledge would be a happier, better and more useful one, even if perhaps not quite so lucrative.'

David was fortunate. In M. P. Hansen, in D. O. Masson and E. H. Sugden, now about to enter his life, he encountered in rapid succession three men whose personal influence has rarely been equalled in the history of Victorian education.

Then senior master to the famous L. A. Adamson at Wesley, Hansen, at the end of his career, was to write:

Looking back over half a century of teaching and examining, at school and at university, perhaps the most brilliant of all students I was privileged to teach or to watch was A. C. D. Rivett. His papers written at tremendous speed—he often handed in fifty or sixty sheets of foolscap inside three hours—have not in my experience been approached.

Hansen had imparted to his star pupil the enthusiasm he himself brought to the laboratory. Dux of Wesley, Rivett's Senior Government Scholarship (first in the state) brought him in March 1903 to Melbourne University's chemistry school and to the man who was probably the most influential teacher, friend and advisor of his lifetime—David Orme Masson.

Scholarship entry to Queen's College, then youngest and smallest of Melbourne's university resident colleges, meant that

he was his own man at last. He was now 17. Relatives, with fundamentalist religious views and observances which seemed to his logical mind to lack consistency, reason and proportion, could be left in peace—and could leave him at peace. Friends and associates were henceforth of his own choosing—in the laboratory, between lectures, in the College commonroom and in the rowing sheds on the Yarra where he took much of the exercise he always craved.

Dr. Leonard Mitchell of Toorak, one of the survivors of Rivett's contemporaries in Sugden's Queen's, recalls:

Chapel was compulsory (either night or morning) for the first three years. There were about 50 students . . . Dr. Sugden knew each man personally. Under John Webster Dunhill bible classes started in College, several being held in David's room. These used to meet before breakfast and discussion was free and vigorous. . . . All studies had open fireplaces and the wood was brought to all floors by 'Old Frank'. Housemaids kept the rooms tidy, made beds and waited on table in Hall.

The students put in the first chip bath heaters about 1906—otherwise showers were cold—there was no hot water in the place.

Many of those close to David in his university years at Melbourne and Oxford were rowing men. But in these years at Queen's he formed lifelong friendships with three men—E. O. G. 'Inky' Shann, most beloved and unhappy of brilliant academics; R. C. Mills, subsequently Director of the Commonwealth Office of Education; and P. R. Le Couteur, perhaps the most outstandingly successful of all cricketers in the annual Oxford-Cambridge match, later headmaster of Sydney's Newington College.

A yet more striking figure in those four very happy years at Queen's was the Master—Edward Holdsworth Sugden. For 40 years, for Queen's men throughout the world, there was no question of thinking of Queen's without its founder and driving force. No man, except David Masson, his professor of chemistry, played a more significant role in David Rivett's development.

A contemporary has left this picture of Sugden at Queen's:

A merry gentleman, full of the joy of life, capable of infecting others with his own enthusiasms, wise as a counsellor and ever tolerant . . . the Master was an ideal leader for the generations of men who went through his hands at Queen's . . . he knew when to leave people alone and when to enter deeply and closely into their lives. He could be a companion in a study, whether his own or that of any of his men in Queen's . . . a love of music and a joy in literature radiated from him and so through him became the possession of others . . . his greatest work was and continues to be shown in the lives of the men to whom he meant so much during and after their undergraduate days. . . .

David summed up his own reflections on the Master's impact, in Queen's College Chapel on 28 July 1935, after the Master's death:

We people at Queen's have never been a very large group: rather fortunately so, I think, for personal bonds are possible in a small community that are quite impossible amongst great numbers. . . .

Always the Master diffused happiness and good fellowship, two main characteristics of a University society of young men.

He would attend every match on the oval in which his teams were playing, wearing always in wet or cold weather a familiar and friendly old mackintosh which seemed to us to be an integral part of that picturesque figure. And, when the match was over and lost, he could still smile; for he had much practice at that in the earlier years. . . . To recall all this is to feel again a very pleasant warmth.

Then he came to the thing about Sugden that mattered to him most during those four years at Queen's (1903-07):

Perhaps what appealed most of all to us in College with him was the Master's willingness at any time to discuss any or all of the many debatable questions which none so thoroughly enjoy traversing, or shall I say exploring and exploiting, as do young and ardent undergraduates. They may tackle big and fascinating problems of life at times in crude and awkward fashion but if any characteristics in young men deserve the description 'divine',

I would give it to the curiosity and scepticism which University students as a class bring to the examination of the major questions and the current beliefs of their times. These are the most precious possessions of the student race and the most worthy of cultivation. Sometimes they are delicate plants, easily killed: sometimes they are rank and run wild: but all the progress of the world depends upon their development.

Edward Sugden knew that well . . . he could be sympathetic with any man whom he knew to be struggling fairly and squarely with problems of life . . . to him as to every man of character, the manner of approach and the attitude of mind were of greater significance than the final attainment or judgement. . . .

The main responsibility of University teachers I believe to be the cultivation of the disciplined open mind and the keen, plucky, searching spirit in their students. . . . Our first Master was one of them. . . . Intolerance is only too common among us and if it has ever shewn itself in Queen's men, neither the precept nor the example of the first Master can be held responsible. . . .

College morale was very high. In Exhibitions and first class honours each year Queen's men gained places out of all proportion to College numbers. David, as major scholar for three years, played his part in these academic triumphs. In his first year he took exhibitions and first class honours in Natural Philosophy, Chemistry and Biology. In his second year, finally abandoning medicine for science at Masson's urging, he took first class honours and the exhibitions in Natural Philosophy and Chemistry. In his third and final year (1905), he graduated with first class honours in the School of Chemistry and was awarded the Dixon Final Honour Scholarship and the Kernot Research Scholarship in Chemistry. Contemporaries emphasise that he was unassuming, popular with fellow students. He entered with zest into College and University activities. Teachers commented on 'an early intellectual maturity overlaid by a disarming, boyish enthusiasm.'

In 1906, while doing post-graduate work with Masson and seeking to supplement his income with some part-time teaching at Wesley, David set himself to study Arabic with a view to the Mollison scholarship which carried a handsome prize of

£60. He liked it, did very well and was regarded by fellow students as a certainty to take the award.

When he sat down for the examination, he recognised the unseen text as almost an exact replica of one his tutor had set him a few days earlier. Feeling that this could not have been a coincidence, he handed in a blank sheet of paper and allowed the much-needed prize to go to someone else.

At the end of 1906 he joined applicants for the 1907 Victorian Rhodes Scholarship. At the personal interview he apologised for being 'a bit short in sports' making the point that his chances of a possible university career had depended entirely on his own scholarship earnings so that he had not been able to devote time to games at school. He had played tennis and represented the school in the Victorian Schools' Mile Walk. At Queen's he had played pennant tennis, reached the singles semi-final, played in the football team, rowed in a number of Melbourne University Boat Club races and won the University one mile bicycle race. Years later an infant son's favourite plaything was a battered mug inscribed: M.U.R.C. TRIAL EIGHTS 1906. A. C. D. RIVETT STROKE.

This certainly failed to compare with the records of some of the magnificent athletes who sought the Rhodes that year. Yet his participation in College and University clubs, committees and meetings, indicated he was no mere academic.

On 7th March, 1907, his mother received the following wire :

MRS RIVETT YOUNG STREET ALBURY
HAVE WON THE RHODES SCHOLARSHIP
BERT RIVETT QUEENS.

CHAPTER THREE

Australian at Edwardian Oxford

1907 - 1912

David Rivett and Stella Deakin met over a chemical solution in the senior laboratory of Melbourne's Chemistry school some months before David graduated. A shy, slender, fair girl six months younger than David, Stella was the second daughter of Alfred and Pattie Deakin. She had been a successful student at Melbourne Church of England Girls' Grammar School but owed most to the encouragement of her father, who was to be three times Prime Minister of Australia, and, even more to his sister, Catherine Sarah Deakin, for many years a senior teacher at the Presbyterian Ladies' College.

In 1905, Stella and her close friend, Winifred Nance, were the only two girls in the senior chemistry laboratory among all the science, engineering and medical students taking part II chemistry. Winifred, the daughter of a Queen's tutor, was responsible for their meeting. Stella played the female lead in two Queen's plays. As Stella progressed through her science course—eventually qualifying for a master's degree—encounters in the laboratory were frequent. The mutual attraction was immediate. Stella shared David's enthusiasm for science and dedication to hard work. Miss Jean Finlay, matron of Queen's, who was to be the lifelong friend of both, played the fairy god-mother in promoting their meetings. Over the next 40 years it was to be a help to David that Stella had had a scientific training and background of chemical study, first in Melbourne then in London and Germany.

By the time David boarded the R.M.S. *Himalaya* in August, 1907, both had made up their minds. They were at pains to insist on each other's total liberty, yet, in the absence of any bond, implied or accepted, neither ever seriously considered another partner. They had to wait six years between meeting

and marriage and for much of that time were half the globe apart. A massive correspondence—gradually becoming the important part of the daily life of each of them—permitted more mutual exploration of mind and outlook than proximity might have produced. Already, before 1907 ended, the Prime Minister, eyes twinkling, was heard to remark: ‘Has the boy nothing else to do but write to Australian girls?’

Stella Deakin’s encouragement and affection brought forth thinking and reactions long bottled-up in the straitjacket of his secondary and tertiary studies. Books were a ceaseless source of discussion through letters despite the five or six week delay imposed by sea carriage. David spelt out his approach to the correspondence in his first letter from the Bight:

. . . I hate quotations but here is one you have given me in James: ‘. . . conversation does flourish and society is refreshing and neither dull on the one hand nor exhausting in its effort on the other whenever people forget their scruples and let their tongues wag automatically and irresponsibly as they will.’ . . . Well, my pen if not my tongue, will probably often wag in a highly irresponsible manner. It may be far too irresponsible sometimes but if you find it so—will you tell me? I cannot think of anything more disastrous to a dialogue such as ours is to be than for one to write something which is afterwards regretted and then never to know whether it has or has not caused some unintentional pain to the one who receives it. The candid way that one’s laboratory work treats one, may seem very hard sometimes, but I guess it is just that hardness which makes one love it. So we shall be experiments to one another and if the course of the curve does not go as we should expect and wish, we can do the same thing as would be done in the laboratory—ask the reason why.

Exhilaration bordering on ecstasy comes with the sudden opening of new horizons. Oxford-bound on the R.M.S. *Himalaya* David launched on a lifelong love affair with the feel of a ship at sea:

. . . We are having a simply glorious trip of it. The old ship is up and down all the time. Princes Court clink* is not in it for

* a Melbourne gaol.

sensations. Here in the Bight we are pitching rather than rolling—and there are yarns about that part of the Bridge was swept away last night . . . but I am getting very sceptical about ship yarns: ‘Roughest trip of my life’, ‘first time sick for thirty years’, etc., etc., etc. . . . when often repeated make one dubious of ship talk. . . . Have not been sick at all so far and am quite certain that I will not be now. Did not expect to be when I came on board tho’ I did expect to fight—and got a walkover instead. ‘Rivett’s usual luck’ I suppose. . . . I cannot decide which of the two I most sympathise with—the ship or the sea. The fight is glorious. . . .

I cannot help wondering if there is not a great deal to be ashamed of in my delight at being here—free as anyone can be and quite alone—able to do what I like and think what I like without anyone being hurt by it. . . .

I wish it would be rougher. Once in the examination, Chem part I, I felt just as if I did not care what the paper was like—the Prof. could do his very worst and set the hardest paper possible and I would be able to beat it. That is how I feel about the sea now. The rougher it is the more I will feel in sympathy with it. . . .

That seven weeks’ voyage to Britain gave the chance to read widely in philosophy and among novelists for whom hitherto he had had little or no leisure. Almost every thinking young man or woman was involved in the current challenge from the Huxleys, Shaws, Wellses and many others to the Establishment’s Victorian acceptance of Christianity. His own break-away from what had been rammed at him in so many lifeless church services—never his father’s—prompted him to quote:

Faith is not dead—the priest and creed may pass
 For thought has leavened the whole unthinking mass
 And man looks now to find the God within;
 We shall talk more of love and less of sin
 In this new era; we are drawing near
 Unatlassed boundaries of a larger sphere.
 With awe I wait till Science leads us on
 Into the full effulgence of its own.

Here was his religion—science.

News of the death of a friend caused him to write: 'What do you think of death? Whenever I get news like this it makes me feel more than ever keen to get into work. There will always be the sting associated with death—in spite of the mummery of the church service—until we get to the understanding of what it is and what is its exact relation to life. It may be really the end but who can say one thing or the other at present? One thing I feel certain of and that is that we can only ever get to understand it and all the other mysteries of the Universe by the patient investigation of the problems that lie immediately to hand. I hate to think of those lines:

Whatever thou hast been tis something better not to be.*

'They seem so full of funk and yet the idea is very very common among men of all types. The very intricacy of the mysteries that make them wish to escape the thinking about them should really be the very greatest possible incentive to want to live and work in order to understand them—just as a big unknown problem in chemistry always makes one want to tackle it at once and the greater the problem the greater the desire.'

His own religious philosophy was already evident: The laboratory and the lessons it taught had made an impact exceeding his detestation of the hypocrisy of much 'churchianity'. A conversation with a scientist-turned-missionary, one night in the Bay of Bengal, brought this report to Stella:

He very soon agreed with me that it was impossible to bring reason to the beliefs which he held regarding a personal God, etc. Having done science, he knew what he was talking about . . . he simply said that *intuition* was his basis for beliefs. . . . Life was not worth living to him without his personal God even though he had no grounds for believing in such an existence except the grounds of intuition. And the same thing held with regard to the future life. According to him, anyone in my position would have

* *The Message of Man*. Stanley Coit. (Macmillan, 1905). A much loved, thumbed, underscored little calf-bound volume carrying his own notes and additions. Their perusal suggests why, as an agnostic, he set himself ideals and standards which constantly amazed even those who saw most of him.

nothing to make life worth the living. I could almost have laughed at the idea and I wondered how a man could have done a course of Science work without finding—not enough to last him for one life only—but for many. . . .

In the last week of August 1907, in Calcutta, David joined Eleanor, who was teaching there for the London Missionary Society, on a joyous journey through the great northern cities of India. A new world, with problems unique, opened before him:

. . . India has fascinated me tremendously. One begins to see things there in a way that never even suggested itself in the atmosphere of a University. . . . If ever a country needed great men at the head of it India is surely that country and what grave burden rests on the English people who while holding its wealth must at the same time hold the responsibility for its development in every direction. . . . I had sufficient sense of the fitness of things never to attempt to describe the Taj but I often attempted other things and always felt the depressing sense of failure after it. But perhaps India would baffle most people. I think I learned more and got more to think about in those ten days than in any ten weeks or perhaps months of my life. . . .

Eleanor maintains that his lifelong interest in India—and in the needs of Indian scientists—stemmed directly from that journey. India's problems influenced permanently his approach to the world, but then, within weeks of leaving India, came the challenge and stimulus of Oxford.

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Oxford . . . to an Australian in the last years of the Leisure Age . . . those final, comfortable days before the Armageddons. . . . Oxford was a mist that beguiled and enflamed . . . a mist that sometimes beckoned with magic and ancient mysteries and more often throttled you with an omnipresent sense of smothering cottonwool . . . a jovial place and also a chilling, aloof place that could be as unfriendly to outsiders as the gaunt Plantagenet and Tudor towers and grey walls . . . the thriving, commercial

*Corn and the arrogant, timeless *High, supremely indifferent to the red buses and bicycles milling below. . . .

Oxford 1908 was happy running with the team or crew before breakfast—twice round the Parks with a quick shower at the end . . . leisurely paddles and sharp bursts of gut-busting pressure as the eight leaped down the straight on the Isis. . . . Oxford was a heady torchlight procession before a great meeting at that Hall in the High . . . or a play that went to the core of new iconoclasms threatening to overthrow the world that old Queen Victoria had left. . . .

Oxford was like sunrise on an open hillside after shackled years in the turn-of-the-century bush churches with their timeless sermons and endless repetitions . . . Oxford was freedom to walk out and see a vulgar show and stroll back and give your name to the porter for a morning fine—not that the show didn't bore you and even reproach one as a sheer waste of time but that the liberty, the sheer inconsequence, was glorious after all those whispers of the small bushtown . . . freedom even from the pressures of the big city school on the solitary scholarship boy from the bush. . . .

Oxford was . . . the chaps along the dark oak refectory tables . . . the other crewmen in the eight . . . the tutor drawing on his pipe with that quizzical half smile . . . the eager faces in the heat of commonroom debate. . . .

To a boy from overseas, Oxford was lonely and also over-companionable . . . very assured gentlemen, although younger, calling to 'advise' your seeking membership of this Club or that Society, this dining group, this mad whim of yesteryear . . . this near defunct association kept alive only by a past that went back to Anne—or much earlier yet. . . .

Oxford colleges were not Melbourne colleges . . . no longer the best man for the job . . . Oxford top appointments in sport or societies went to WHOM WHO KNEW . . . the Australian makes a good speech but—you want a President with some idea of how to entertain. . . .

Yet these were minor things—Lincoln had perhaps less of them than other Colleges—and it had the Fleming and the

* The Cornmarket and The High are the main Oxford streets.

Alhembic where the talk was good and free and you made odd allies and foes as people threw about their versions of Darwin and Shaw, of Ibsen and Newman, of Chesterton and this socialist firebrand H. G. Wells . . . you could believe in anything and nothing and still hold respect providing you argued fairly—especially if you were witty with it. . . .

David rather liked one aspect:

In Australia, they toss a fresher out of bed or have him out at 2 a.m. and make a fool of him before the assembled College and then make a friend of him. Here they leave him entirely alone at night—never attempt to make him feel the fool he may be—and also never on any account make a friend of him. . . .

I must say I rather like the English reserve. . . . With most of them there is nothing in the least offensive in the way they keep themselves away from freshers. . . . On the whole I think the Lincoln fellows are a really decent lot . . . the yarns one hears of the snobbishness, etc., of the Oxford man to his juniors are for the most part utter rot.

However, at the beginning of his second year, he was to encounter several hilarious samples of the thinking of the times, including a story he loved to tell against himself:

I'm going into the other house tomorrow where I booked rooms some time back and went round tonight to see if they were ready. Knowing the street but not the house I enquired of a small boy which place it was. He led me on a little and then showed me the back gate of the house I wanted—Lyndhurst Villa. I thanked him and added that I supposed this was the gate to go in at—pointing to the front gate. 'Oh! No,' he said, 'No, not that one, that's for the gentry!' How's that after a year of Oxford culture? I tried to comfort my injured dignity by reflecting that it was a rather dark night and even small boys are not always infallible.

But when, a few weeks later, the usual Guy Fawkes festivities led to police action, the full flavour of Edwardian reaction among the blue-blooded came forth:

. . . A few fellows were taken in hand by the police and put in the lock-up for a while. This is not the normal thing at all—as only the Proctors are supposed to deal with the undergrads and only the Vice-chancellor's court can, for most offences at any rate, try them. . . . Next day appeared a letter in *The Times*

from the titled parson member of the Cecil family (I forget his name) complaining of this unprecedented departure on the part of the Vice, and maintaining that it was most shocking that 'clumsy lower class policemen' should be allowed to handle 'high spirited young gentlemen' who were merely 'indulging in an outburst of youthful vigor'. Young men were sent to Oxford in order to come in contact with educated intellects both when punishments were concerned as well as in the more normal matters. The writer therefore protested against the innovation.

Of course for the most part there was great amusement over the letter, especially as one of Cecil's sons had been locked up . . . and coming from a clergyman gave rather suggestive side light on the question of why he came to be in a profession that regards all men as brothers. . . . One incautious don of Hertford, who suggested that not only ordinary policemen but ordinary birching might be a good thing for the 'young gentlemen' had all his windows smashed.

Rowing sheeted home to him the ingrained acceptance of these weird values among the English working class—particularly as to money:

One of the greatest oarsmen that Oxford had ever had (rowed in the winning Olympic Eight) was coaching a varsity crew on the river and he happened to be spoken of by someone on our barge when Old Ned, the Lincoln bargeman of about 30 or 40 years' standing, joined in with the most utter contempt in his tone: "E made all 'is money 'imself, 'e did. Guy Nickells ain't no gen'lman, NO!" . . .

His friends at Oxford were largely Australians—Phil Le Couteur, Mervyn Higgins, Gerry Portus and others. Virtually all Melbourne contemporaries who came to England between 1907 and 1910 made their way to his rooms at Lincoln, none more welcome than old Queen's men like R. C. Mills, Leonard Mitchell and 'Inky' Shann. Another friend was a German, A. W. Von Blumenthal, who read philosophy at Lincoln. Friendship among college mates had been something of a late discovery, beginning with Fen (Fen Woodburn):

Am afraid the art of making friends (I don't mean in the ordinary meaning) was not possessed by me during those first good many years of my 22, or, if possessed, was prevented from being

exercised by indolence or over-particularness, or a weak and silly preference for my own counsel due to ignorance of what friendship meant to one. I hardly know whether it is the custom for schoolboys ever to get to know one another beyond the limits of same school or same class acquaintance but certainly I never succeeded in doing so at Wesley. Nor for several years at Queen's—till Fen came into College at the beginning of 1906 and I got eyes opened that had previously been closed. Since then my education has proceeded apace. More things than Prof. Masson lectured on were learned in the chem. lab. and I know of no greater influence in a fellow's life than that which you, Stella, have brought into mine.

His own resentment of the traditional attitude (still prevalent in Edwardian Oxford) in relegating women to a secondary place in the scheme of things leaps from his writing, just as, later, women's performance in war industry was to make him an early champion of equal pay and privileges. At the end of 1907 he was writing:

You so often see a woman who is so much a mere echo of her husband's personality that her existence means nothing to anyone—I mean nothing fresh or inspiring. I think marriage which results so is one of the most wretched failures that can be conceived. It is simply the union of two to kill one. If you put Alpha to represent the personality of a woman, say, and Beta that of the man . . . the union should be greater than Alpha and greater than Beta and ALSO greater than Alpha plus Beta. . . .

But more often than not it seems to me that the one personality, generally the woman's, is sunk into the man's and when a woman gets married she just ceases to live out her own life altogether and the loss to the world may often be irreparable. . . .

A splendid miscellany addressed David and his fellows in those last years of a world that was about to vanish—David Lloyd George, Lord Milner, Theodore Roosevelt, Rudyard Kipling, Ramsay Macdonald, France's Dr. Raymond, Robert Hart of Peking, Asquith, Curzon and others. Among them, in June 1908, was the founder of atomic science, the great Rutherford:

Rutherford was quite good. His 'ows' and his 'ers' were numerous and pronounced—but he put his subject very clearly. He seems a fairly young fellow—35 to 40—moderately bald (like all

great geniuses)* and of unimposing appearance. He brought several experiments with him—all of which were thoroughly successful. . . .

During David's first year a number of secretaries urged him to join their societies, clubs or groups. Apart from the Boat Club, he joined the Alhembic, the Colonial Club and appeared occasionally at the Union and at the debating club. But the one which really mattered to him was Lincoln's senior society—the Fleming. This group chiefly discussed current writers and their ideas but it served mainly as a catalyst for graduate and undergraduate to analyse their philosophy of life and the world around them. At the end of his year, the Fleming dinner caused him to write:

Tonight was the dinner of the Fleming Society and rarely have I enjoyed a function so much. . . . Only tonight did I fully realise what sort of fellows there are in it—and then only to realise at the same time that some of the best are about to go down and no longer to be associated with us. It was a merry dinner but there was an amount of feeling in it that one seldom finds even in a less reserved crowd than one of English fellows. One poor beggar after being the centre of all the wit and joviality, absolutely broke down just after making the most brilliantly ridiculous speech from the top of the little tower over the guest chamber just in front of the kitchen. I am glad there's a Society like it in Lincoln—for I think I will get to know some *men* there next year, and I must confess that this year has been rather lonely in that respect . . . yet I have also found a lot in Oxford life that made it worth coming for, even though on the particular side where my life work lies, it has not much to offer. . . . However I often think of some words you once gave me just before I left—when you wished me success, 'Though it might not be the success the world hears of.' Well I am pretty certain that the latter will not come to me here. . . . I can never tell you how much your letters have meant . . . they are the best antidote to the blues that I know of. What reason I have for ever getting the blues is more than I can say—but that they come pretty frequently is a fact of experience. . . .

He had been at Oxford thirteen months when the Fleming men reciprocated:

* David was going bald very rapidly by 1907.

Have just received the official nomination (tantamount to certain election) for Treasurer of the Fleming. In accordance with the tradition of the ages, this means promotion to Secretary in the summer term and President in this term next year. I am exceedingly pleased about it as outside of the Boat Club there is no position in the College I esteem more. The office of president is a pretty heavy one, involving the opening of every debate with a speech of about 10 minutes, but its educational value is correspondingly great and I look forward very much to it next year. In the meantime the appropriate offices are to be passed through.

Of the joys of his first year, none surpassed his delight in skating and in the transformation that a black frost or hoar frost wrought on the Oxford countryside. On 5th January 1908, just before his second term began, the miracle came:

On Friday the flooded meadows were everywhere converted into skating rinks—the Cherwell was frozen over—and there was no longer any doubt about the capacity of the weather gods to provide Christmas weather as it used to be ‘when Xmas was Xmas in England’ . . . I won’t say much about my first trials at skating . . . learning to skate is neither a graceful, dignified nor entirely painless operation. However what with daily and strenuous efforts—even tumbles can be reduced in number and this afternoon I was almost satisfied with my capacity to go where I wished, and not where the law of gravity tended to send me. . . . I couldn’t help thinking . . . a crack skater has been known, I believe, to cover a mile in 3 minutes and I suppose all but the absolute mugs could do say a mile in 8 minutes, say twice the pace of a quick walk. Well now if that were the normal rate of progress of people the traffic of the streets would be much faster . . . people would therefore think and act more quickly . . . this would be shown not only in the dodging of traffic but in its influence in every other department of life. . . .

Last night we had a very hard white frost. . . . Never before, I think, have I seen anything more exquisitely beautiful than the trees in Addison’s Walk—or the other walk along the frozen Cher. Right to the smallest twig there was on every branch the most beautiful deposit of white ice crystals. They were of the long needle variety and in nearly every case projected for 2 or 3 cms from the wood—in some cases probably more. There was a delicacy about the fluffy deposits that was almost perfect, and the beauty was not only in the fine crystalline appearances at close

hand, but even more in the whole aspect, the total appearance of the tree—or group of trees. Like the Taj Mahal, exquisite as an architectural whole.

David did not attend a great many lectures in chemistry or in science generally at Oxford. Most of his three years were spent in research at the bench. For four and a half years at Melbourne Masson and fellow students had been there for discussion, advice and stimulus. The loneliness of the researcher, accentuated at Lincoln by the fact that he was usually physically alone in the laboratory for many hours each week, day and night, inevitably led to violent contrasts in mood. Despite all the stimulus which Oxford life offered, David sometimes had grave doubts about the wisdom of what he was doing there.

His tutor from first to last was Nevil Vincent Sidgwick, then 34—small, quiet, unforthcoming. A Rugby boy, Sidgwick had taken a first in Natural Philosophy in 1895 and in Greats in 1897. On a Dixon scholarship to Germany he had worked with Ostwald in Leipzig and with Von Pechmann in Tübingen. He did not inspire students as an investigator, although he had an orderly mind, a prodigious memory and an acute intellect with exceptional powers of perseverance. He read their essays casually and uncritically but with stray illuminating comments.

Marston, in his Royal Society Memoir* captured Sidgwick, David and a very famous fellow-pupil:

Sidgwick . . . concerned with the lack of cohesion of chemical knowledge, had already embarked upon the immense task of inductive scholarship necessary to transform Inorganic Chemistry from a mass of disconnected facts into an ordered system of relations, which culminated over forty years later (1950) in his monumental text, *Chemical Elements and their Compounds*. He outlined a course of experimental work, took his young pupil to Magdalen's Daubeny Laboratory, allotted him a bench, and then made off to his own rooms.

The bench was shared with an auburn-haired youth, Henry Tizard of Magdalen. Propinquity under the wing of Sidgwick bred an enduring friendship between the two young men who were to become in their respective homelands outstanding figures of official science—both first class minds, endowed with temperaments as different as war and peace. They saw little of their tutor: his

*A. C. D. Rivett.

occasional brief visits to the laboratory, and, once a week in his rooms, an hour or so of talk about chemistry and other things—mostly the latter led them to consider chemistry as an aspect of physics, to view it as a whole and place it within the matrix of other knowledge. His teaching engendered a profound respect which, in the course of time, grew to mutual affection. . . .

Tizard later told the story of Sidgwick handing him Mellon's *Chemical Studies in Dynamics* with the casual comment: 'It's too mathematical for me. I wish you'd take it away and see how many mistakes you can find in it.'

David's long vigils in the laboratory, and the recurrent periods when all his personal research seemed a great bore dogged by what he regarded as his own incompetence was finally to be put to the test when he sat for Schools (Oxford final exams) in the summer of 1909. He felt deeply that he owed it to the Rhodes conception and to those who had selected him to do well. By his standards only the rarity of a first class honour would fill the bill. But at times he doubted his own abilities. Even his handwriting worried him and also Sidgwick:

By the way—you would have laughed to hear him just before I left. . . . He pointed out with the characteristic lying of Oxford courtesy (!) that my writing was really quite a good hand—but didn't I think that it could be made much clearer . . . when I get a 4th class—I shall have the excuse that the examiners gave the decision on handwriting and not on chemistry!

When things went amiss in the laboratory, David was savage in his self condemnation:

I have also been in the laboratory every day and am about as far forward now as then. It has seemed absolutely impossible to do anything at all. One instance will suffice. Today I finished an estimation in the dye stuff I am supposed to be preparing. Between two results there was a difference of over 8 per cent!! I think it is time chemistry was given up and something else tried at which I might make a better fist. . . .

The final weeks were a torment mitigated only by the successes of the Lincoln boat which he stroked in the May eights a mere fortnight before the exams. An hour or two after the last paper was handed in he wrote to Stella:

Can't say how I did—only know that the strain of 6 hours between 9.30 a.m. and 5 p.m. at full tension makes a fellow feel mighty dull and limp and I'm just that at present. The old right hand is calling out too about conditions to which it has been a stranger for three years and even more than the hand are the second finger and thumb performing . . . I wrote full belt all the way but whether the quality was any good or not I can't say. . . .

The days of waiting before results were posted lengthened into a fortnight. The last minutes were described to Stella who was studying in Germany:

Of course I went down to the schools to see if list up. Expected at 5 p.m. Many people gather. In my vast experience knew it would be at least half an hour late. Looked at Test Match scores. Then looked at AUSTRALASIAN and read about boat races. . . . All the time tried hard to convince myself that I was completely cool and veteran-like and not a bit concerned about any list. By 5.30 p.m. to school—waited five minutes—just gave list casual glance. How that crowd rushed. Strolled away and busted up 2/2d. just for something to do. Shocking extravagance. . . . Bad if I had not got through after all that reading and grounding in Melbourne. . . .

The wording of the telegram which reached her ahead of this letter always remained in her memory. Jubilation didn't change David. His wire read: GIVEN FIRST.

Through the 32 months he was up at Oxford, rowing for the College gave him satisfaction and delight. Lincoln had been in the rowing dumps for some time, well down in the second division (there were about 33 crews, eleven to a division). The June before his arrival had been a particularly humiliating period for Lincoln men. The tendency to pick crew on friendship or social status rather than relative merit persisted.

However, in 1908, the rot was stopped and the Boat Club president asked David to stroke the Lincoln crew in 1909. They made their first bump in a memorable race that May. Teamwork, training and David's enthusiasm kept them at it and before his Oxford life ended in May 1910 he had stroked the crew to four or more bumps and into the First Division for the first time in some 30 years.

The results are of small importance compared to the strength and fitness that early morning running and daily afternoon rowing gave him. At Lincoln in the key role of stroke of the Eight he was able at last to give to a sport—of first significance at Oxford—the same dedication and enthusiasm he brought to the laboratory.

A letter to Stella in Berlin, written on 26 May—the sixth and last day of the May eights—indicated the extent of his involvement:

Well it was a race to be remembered. Weather again very bad, blowing in squalls—as we started quite a fair squall was in progress—but no rain. We got off fairly well though rather slowly for my liking. Continued the method of making the crew burst for 10 strokes at intervals along the course. House II (Charterhouse) gained on us a good deal and I began to feel bit anxious. We had a bad bit in the gut—in this weather it is very bad there. At one time just before it I thought we were in for some more crabs but the danger passed. After the gut we have a straight stretch along the Green Bank (how I wish you knew it, dearest) as far as the Barges. We got going nicely there. All the time we seem to have been going up on Oriel. Got one pistol some way before the Gut (meaning we were one length away) and two just about the Gut (half length) while at the end of the Greener, we got the three which meant a quarter length away. A little bit farther on we got still closer and the cox got his whistle going. This is the signal for shooting for the boat in front. . . . I've never known a boat leap like ours did then. It was just beautiful. It seemed that we left Charterhouse standing—they were suddenly three times as far away as when the whistle went. In about 12 strokes we had Oriel—simply crashed right on top of them. It wasn't a fancy bump. It was a desperate one and there was no doubt about it. Just opposite our barge too—how's that for stage judgement!

Perhaps one of the tests of how much the overseas student makes of Oxford lies in the way he employs his vacations—a total of 28 weeks a year.

David divided his first vacations between Britain and acquiring a first-hand working knowledge of German, first in Hamburg, then at the Tilly Institute, Berlin.

In February 1909, after nearly two years of planning, Stella, accompanied by her aunt Catherine, had crossed to Britain. A

few weeks later David accompanied the pair to Berlin where Stella studied chemistry while he prepared for his final exams and the memorable May Eights.

In August the couple, now officially engaged, but still escorted by 'Auntie K', had two wonderful weeks on the English Lakes based at Waterhead on Lake Windermere. Then David returned to his digs in St. John Street—shared with Gerry Portus. He saw Stella, who was working with Perth's Professor Norman Wilsmore in London, almost every weekend. They explored London and much of south England together until Stella and her aunt returned to Australia in June 1910.

Rowing and skating apart, nothing gave him more satisfaction out of doors in Britain than his service with the King's Colonials, a newly formed cavalry unit. With that characteristic military bent for preparing for a war already enshrouded in history rather than for meeting the opponent and conditions of the day most of the training seemed based on the idea that war with the Kaiser (the only foreseeable foe at that period) would be a re-enactment of the horseback skirmishes among the kopjes with the Boers.

In his second camp David was promoted to Lance-Sergeant and had a troop of his own. His letters from the camp catch the new life:

Had a glorious day today. Spent the morning with a scouting force of squadron D (known internally b.t.w.* as the Dashing D's) looking for an enemy that we didn't find—and this afternoon the latest development in scouting fever had a long innings on a neighbouring road. One gets quite expert after a while in measuring widths, lengths, inclines, etc., with no more instruments than one's eyes, limbs and horse. . . . It's rather a change after the laboratory grinding at Oxford. I'm wondering sometimes if I'm the same chap as was seeing black through all things chemical some 5 or 6 weeks back. . . . Got back all my old keenness for a horse that possessed me in my juvenile days when my Shetland (at Beechworth) created my Heaven on earth . . . b.t.w. we must make immediate enquiries when we get away about hiring horses or ponies. . . . I feel that it will surely be greatly to your advantage to have a dumb companion to assist you through your impending

* b.t.w.—by the way.

boredom. Inspection of tents and saddles and rifles at 12.30. Allow me to tell you, Miss Deakin, that the lines of Troop No. 1 C. Squadron were a treat to see. Tidy and spick and span as lines could be: Impartial opinion! I've been squadron orderly sergeant today. . . .

As Lance Sergeant I get corporal's pay of 7/6 a day and as Sergeants proper only get 8/2 that is certainly not so much to growl at after all . . . 7/6 a day is 52/6 a week is it not? I feel like a financial colossus earning money at so high a rate. Was almost going to say it was first earning I have done—but I forgot last camp and also Wesley.

Did I ever tell you that Adamson* gave me £4 a week there for the first temporary month for 5 mornings of 3 hours each—and then £3 for it as a permanency. Asked me if I thought it would be enough! Never having done anything of the kind before I had made up my mind that 30/- was the most I could expect. . . .

Finished the shooting course on Friday . . . only made one hit out of seven. Didn't get the right height. Managed to retrieve myself by 24 out of 28 at 500 yards which was somewhere near the top score for our troop. . . .

Friday night ended pretty noisily. Before dinner all the sergeants in our and the Tab's lines were given strong evidence of their trooper's love for them—by being tossed up in blankets. . . . After dinner came a long concert—of usual camp style—which lasted till nearly midnight. Best part of it was a speech by Colonel Lawrence, our O.C., wherein, besides the usual flattery he spoke very straight and reasonably about the future of our Regiment. . . . He told us by the way of the affiliation recently brought about between ourselves and various colonial regiments in Australia—the 6 Regiments of Light Horse. I was exceedingly glad to hear of it. . . .

Saturday was cleaning out day—packing up—striking tents—getting horses entrained, etc. Quite an easy day—contrary to my expectations. We were ready to depart long before time. Most of our fellows went to Oxford but some went through to London—I among them. . . . Had quite a good evening with supper afterwards at the Comedy restaurant. The Palace is rather a respectable Gaiety type of place and the attraction at present is Maud Allan—a dancing girl who possesses the two features which the English public requires in its stage heroines, viz., wonderful gracefulness

* Wesley College headmaster 1902-32.

and very few clothes. Her dancing really is marvellous—quite of a different type from the ordinary stage fling, as different in fact as E.B.'s* poetry from Rudyard Kipling's Barrack Room Ballads (!) and I have never before seen states of the mind so beautifully portrayed through motion as this girl succeeded in doing it. She has a most remarkable suppleness of limb and uses it in an extraordinarily fascinating way. The Dance Salome was one of the three 'pieces' she went through and a most weird thing it was. The girl has been given the head of John the Baptist and her feelings alternate between supreme delight and the most abject terror at her possession. Of course no word is spoken all the time but you are in no doubt whatever as to what is passing through her mind. . . .

On Friday 14th we had a splendid day. No drill of the regular type but a field day against the Surrey Mounted Infantry who were camped nearby. . . . The troop I was with—after an exciting and exceedingly large quantity of galloping, scouting, and doing everything but shoot at the enemy was captured by a body of the enemy who galloped over us—but it turned out ultimately that we were not captured after all. This particular batch of the enemy had been simply annihilated by rifle fire when coming up the road towards us and therefore were glad when they got to us! The great difficulty is to retain sufficient sportive instinct to at once acknowledge your death, especially when the umpires do not happen to be in your neighbourhood. . . .

The first half of 1910 was all Stella's. A letter from David Masson gave new hope to the lovers. It contained an estimate that Masson's associate—B. D. Steele—would have a good chance of gaining the new chair of chemistry being established by the University of Queensland. Should that come about Masson wanted Rivett to come to Melbourne as his senior lecturer and, if all went well, his eventual successor. The salary of £400 a year represented more than the going rate for similar jobs for well-qualified young science graduates in Britain and Europe, so they both saw it as their best hope of marriage and of being able to set up a home.

At the beginning of July 1910—after 16 months in Britain and Europe—the two Deakins sailed for home on the *Miltiades*

* E.B.—Elizabeth Browning.

leaving a bereft and temporarily inconsolable young scientist behind. Fortunately, David's visit to Edinburgh chemist, Dr. Walker, produced an extraordinary opportunity. Walker had good contacts with Professor Arrhenius of the Nobel Institute and understood that Arrhenius was welcoming some outstanding young scientists to new laboratories which had just been established in Stockholm. At Walker's instance, David wrote diffidently to Arrhenius to ask if there might be any possibility of being allowed to join his team from July onwards. He received a warm and charming invitation and, a day or two after Stella's departure, he himself took boat to Copenhagen where Arrhenius was temporarily visiting.

At the Nobel

Of all the scientists of international reputation in the quarter of a century between Queen Victoria's Jubilee and the World War, Arrhenius of Stockholm was one of the greatest. For forty years after the first meeting of the young Australian with the giant Swede, David kept a sketch of the Nobel maestro in a frame above his study mantelpiece. Here is his first impression of Arrhenius:

Liked him greatly at once. He is distinctly large—worth a good deal more than a mere knighthood. Face highly colored, I should hardly call it in the least bloated. Very pleasant, good natured, red look about it, with the arteries easily visible in the cheeks. Liked the look of him much better than his photo suggested. . . .

He asked me about my work—and got a lot of it launched at him. Took me down to the lab and got Madsen's assistant to show

me round the chem. part . . . later Arrhenius proposed we should go for a walk. He speaks quite good English and is very easy to follow. In fact he is really delightful to listen to as he puts things in an original way that is most clear and charming. Thus, osmotic pressure was 'the tendency to molecules to get away.' . . . The problem he wants to get onto is this. . . .

And then follow four pages of chemical problems.

So for the next six months David settled down in Stockholm with this master scientist and a group of very bright young researchers. He advertised for and secured lodgings with a German family with whom he generally talked for an hour or two during and after the evening meal each night practising his German. At 8.50 each morning he arrived by train at the Nobel Laboratory. All day he worked at his experiments in a congenial, expert atmosphere, returning home at 6.30.

For the Swedes, as for the Danes in Copenhagen, he at once conceived a strong liking. Within a month he was toying with the idea of seeking a more permanent post in Stockholm and perhaps of inducing Stella to join him there. These inclinations were rather shattered when he found the depth of Swedish scientific salaries. Even the great Arrhenius was then receiving little more than would be paid to a senior lecturer or associate professor in the chemical school in Melbourne. But David's enthusiasm for his work and for the uninterrupted research blazes through his Stockholm letters. At heart he was pure scientist. He simply wanted to find out things. Endless experiments and repetitions caused no sense of impatience while he had a conviction that somewhere along the path the sum of human knowledge in a particular field might be advanced.

The international flavour of the Institute was good. At Oxford there had been the English—no close friends—his Australian colleagues from the years in Melbourne, and two Germans. But here, with Finn, German, Dane, Swede, Italian and Russian, he could pursue research without any regard to national divisions.

Arrhenius was a natural leader. He inspired each of the younger men. He was so human without affectation or conceit despite his enormous reputation. His own eagerness for results seized on David's intense enthusiasm and fired further response.

The sudden cutting off of the close contact with Stella was an additional spur to work.

In his Rivett memoir for the records of the Royal Society, Dr. Hedley Marston gives this picture of Arrhenius and the Nobel at that period:

. . . His Dissociation Theory . . . had long since become a prime mover of chemical thought; he was now one of the great figures of physical chemistry, and was treated, in his own country, as an oracle of science. Two years previously (1908) he had settled into the fine residence attached to the new laboratory of the Nobel Institute of Physical Chemistry, built for him by the Royal Swedish Academy, close to Stockholm. He accepted David Rivett there as a guest worker.

The young Australian, fresh from Oxford, was immediately captivated by Arrhenius's intellectual vitality. Life in the *Experimentalfaltet*, was warm and intimate. There, involved allusion gave place to an implicit openness befitting a scientific institute; critical outlook was keen and unrelenting; looseness of thought was dealt with summarily in terms that left no place for covert understatement. Arrhenius, at all times intensely human and never inclined to equivocate, peppered his remarks with incisive personal criticism. Unforgettable *mots justes*, such as ' . . . 'N—was there (Leipsig) at the time, still young and honest' . . . in which there were implications he had no intention of disguising, flowed freely to highlight his teaching and orientate the thoughts of his young associates.

In the privileged atmosphere of the Institute, Rivett 'received inspiration from above'. The silence of the laboratory was punctuated from time to time by queries and words of encouragement which came reverberating down the stairway from the attic where Arrhenius spent the greater part of each day recumbent on a creaky couch, thinking. Long hours of exacting experimental observations, driven by Arrhenius's ever keen avidity for more and more grist for the mill of physico-chemical theory, were rewarded by his eager interest and personal affection. Whilst measuring innumerable conductivities and freezing points of aqueous solutions containing mixtures of salts, testing current theory in light of the findings, and fitting the anomalies into a pattern of wider understanding, Rivett's interest in equilibria within heterogeneous systems took shape. . . .

David made do in Stockholm with an ageing sports coat, a pair of bags, a brown suit (that had to be jettisoned before he left from sheer overwearing) and a green suit which did yeoman service on all social occasions—except a couple of big nights when his dinner suit was called for.

His room reflected the traditions of dedicated, impecunious scholarship:

Inventory is as follows—1 bed, 1 table with cupboard under it and 1 thermometer (celsius). That is not mentioning the paint on the wall, nor the apparatus of the Central Heizung, nor yet the four gas taps which Frau Arr. remarks will be very convenient when I am pessimistic . . . the table is very nearly a quarter of the whole room's area . . . my clothes and other belongings are in the cupboards and drawers. . . . I have forgotten the most important item of all—my chair. Specially lent to me by Frau Arr. There's scarcely room for it between table and bed. It is one of the sort that you spin round and it rises. It was used by Arr. until some time ago. . . . So now I sit in the seat of the Mighty feeling extraordinarily impressed of course but sometimes extraordinarily uncomfortable, for, when there are cupboards under your table, you can only stretch out your legs by opening one of the cupboard doors and putting those members on the clothes therein. . . .

His meals came first from the German family with whom he boarded for some weeks . . . then, when he moved into the little room beside his laboratory, from the laboratory caretaker's wife. When he ate in Stockholm it was usually at an automat but every week or two there was perhaps one gayer outing at a cafe with the typical Swedish smorgasbord, the varied fish, the heavy pastry and always the insistence he should drink beer or schnapps.

Perhaps it was the almost universal fleshiness of the middle-aged Stockholm males that inspired his lifelong detestation of personal fat. He ate heartily but the passion for exercise to offset any possible additions of weight remained with him.

Went out for nearly two hours . . . running most of the way . . . saw only six people . . . excellent 'ekker' . . . felt much better. . . .

A prodigious lone walker—not because he shunned society but because the krone must be husbanded at all costs and social fellowship meant the high costs of cafe visits—Sundays saw him walking for six or seven hours on end with a short break for an economic mittagessen while he explored Stockholm in every direction for twenty miles around Nobel Institute.

In Stockholm there was also fun. Very gay outings with the international group of young researchers were enlivened by the presence of Arrhenius, his young second wife and her very attractive sister. The cafes of Stockholm on the equable summer evenings and a flow of banter in several languages gave David, during this last summer in Europe, freedom and carefree enjoyment. He never was so free before—with exams always hanging over him—or later, as marriage, mounting responsibilities and a family came in succession. It had been a long way from the first Beechworth scholarship of 1899 to Stockholm in 1910. All the way the imperative had been categoric and brutal—‘Beat them all or drop out.’ Now for a few months there was no examiner, no pressure beyond his own driving enthusiasm for untrammelled research.

His letters were the outpouring of a man in love. Loneliness and longing accompanied him on his many rambles around Stockholm despite the warmth of the Arrhenius family. But the visible evidence of productive laboratory research delighted him. This was the ultimate test. But for the desire to earn enough to marry, he would probably have stayed on with Arrhenius for years—perhaps indefinitely.

Had there been a Rockefeller, or Carnegie, Foundation in those days of 1910, chemist contemporaries believe he would have made research his work for life. To him the central figure in the eternal battle of science towards new horizons was the man at the bench. This Stockholm half-year gave him the bench man’s tests in undiluted form. He never escaped from the conviction that this was the most satisfying, fulfilling and—for himself—the best form of daily work.

David’s own letters say nothing of the regard Arrhenius developed for his Australian researcher. Yet the facts speak for themselves. Arrhenius was constantly sought by scientific bodies

all over the globe as guest speaker. He had made arrangements for an extensive absence in the U.S.A. from the beginning of 1911. Before October was over, disregarding seniorities and long association with some of the other scientists, Arrhenius proposed that David should take over as acting director of the Nobel Institute during his absence.

However, the Melbourne lectureship had now finally been confirmed. David would begin work at his old University in March 1911 and he and Stella hoped to be married during the year. Not without keen regrets, he had to tell Arrhenius it was impossible. The trust and respect implicit in the offer—coming from this source—was perhaps the greatest accolade his scientific abilities had received. For he deeply admired Arrhenius:

He has the mind that revels in the big subject and his great power is in drawing accurate conclusions from poor or insufficient data. All his great work has been established on a poor experimental basis. In none of his papers has he done very accurate work and of course all his cosmogonic and astronomic calculations are based on approx. results—yet he seems to be able to pick out the essence of a set of figures at once and to know exactly what should be rejected as experimental errors and what should be assessed at a high value. The ordinary man could not do such things. . . .

Basically David liked the Swedes, their good natured detachment, their vigour, their candour. The ladies of Stockholm enchanted him—his Australian experience did not offer so many who combined such good looks with charm, wit and knowledge. His almost Trappist absorption with his experiments challenged many of them—especially a young relative of Arrhenius who helped Frau Arrhenius with the young Sven. Another, Froh Hannan, was a delightful companion:

We walked all the way back to Schellekatan. She is really a fine woman—I'll tell you more of her later. She's getting on for old enough to be my mother or at least an aunt—so it's quite safe.

But seriously, she is I think one of the sweetest and finest women I have got to know on this side. Don't know if I'm getting

very soft nowadays—but I felt horribly cut up at saying goodbye to her—just as I did today with the Prof and Fru and Sven Erik. . . .

Soon after Christmas, with only a short stop in London and at Oxford, he was on the way home. Few journeys in his life seemed slower than that laborious voyage in the first weeks of 1911. At times, he must have reflected again, as he had done for weeks in Stockholm while discussing the option at long range with Stella, whether his long-term development as a scientist might not be better served by remaining at the Nobel with Arrhenius with Stella joining and marrying him there. The great barrier was that there was no income on which to assume the responsibilities of marriage.

He had made up his mind about his partner more than four years before. He had never changed it for a moment. Now, after so much waiting and separation, they could be together in an environment they knew and where prospects for a wedding within the year were good. As it was, both would be in their twenty-sixth year before they could marry. It was not really a counter-proposition to give up what they had so devoutly hoped for as the outcome of his eight years at Melbourne and Oxford. David certainly did not know at the time that going back to Melbourne probably cast the die against a lifetime of research. Henceforth, successive calls were to demonstrate his abilities as an organiser, administrator, and leader of a team. For nearly all the 40 years of good work which remained, he was actually to enjoy only half a dozen at the bench.

Had there been funds for young scientists in the Sweden of 1910, the history of science in Australia and, possibly in Sweden might have been a different story.

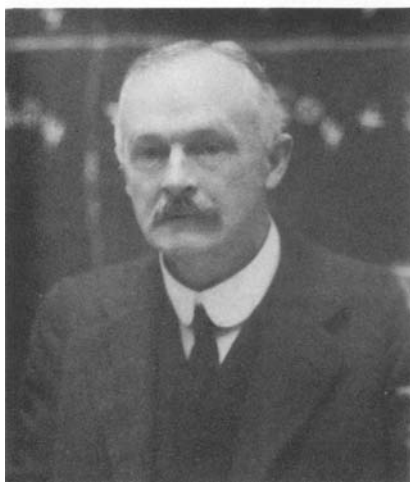
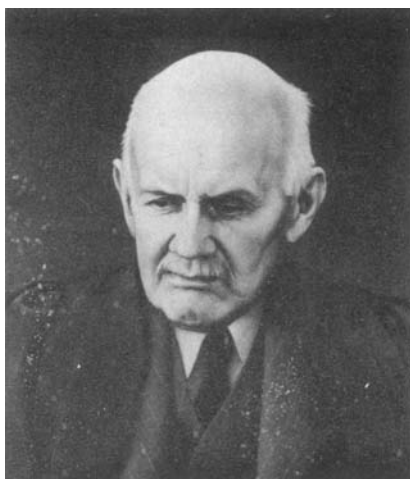
As it was, David and Stella were reunited in Melbourne in February 1911. A few days later he took her to Sydney where Albert Rivett and the family were living at Long Nose Point. On return to Melbourne he began lecturing and experimenting in the Melbourne University chemistry laboratory alongside his old master, David Orme Masson, and the most brilliant of the latest crop of Masson graduates, Ernest Hartung. For some



The Rivett Family Group (about 1903);
from left: Albert Rivett, Elsie, Nell, Mary
(in front), Mrs. Rivett, David, Olive, Ted,
Christine.

Typical house-party at the Herbert Brookes home at
Macedon. Mrs. Brookes, the hostess, is fourth from
the left with David and Stella and sons to the right
of the octogenarian Professor Lucas in the centre.





THE MASTERS

Top left: Arrhenius of the Nobel, Stockholm.

Top right: Sidgwick of Lincoln College, Oxford.

Centre left: Sir Charles Martin of the Lister Institute and C.S.I.R.

Centre right: Sir David Masson, Professor of Chemistry, University of Melbourne.

Bottom left: David at the start of his university studies.

THE PUPIL

months David lived with Stella's aunt Catherine (Auntie K.) at Adams Street, perhaps half a mile from the Deakin home in Walsh Street and commuted between Parkville and South Yarra.

In November 1911, he and Stella were married by the Reverend Dr. Charles Strong at the Australian Church. They spent their first few days at Point Lonsdale and then rented a small house in Airlie Street, South Yarra. But already, forces were at work that were to take him away from the experimenting and lecturing at the university laboratory he loved.

CHAPTER FOUR

1912 to 1925

Congresses, Wartime Hospitals, Munitions-Making and Professorship

Living at Airlie street the young couple struggled to save every penny. Frugality carried often to the point of self-deprivation was the keynote while David was working on the tests and diagrams that were later to make his chief scientific work 'The Phase Rule', one of the most sought-after and widely read studies among fellow scientists in Britain, the United States and Europe. Stella believed that personal independence and liberty to do one's chosen work in preference to more lucrative posts hinged on building a bank account. Alfred Deakin helped to get them a block in Walsh street and they saved in the hope of building there. However, before they had been married a year, David's University work and personal research were interrupted.

Back in 1910 the British Association for the Advancement of Science had accepted an invitation to meet in Australia in August 1914. The Federal and State governments agreed to meet all the expenses of bringing to Australia 150 of the world's leading scientists. Nothing approaching the organisation necessary had been attempted in Australia before. Prime Minister Fisher chaired the Federal Council of 1912 which appointed Orme Masson as chairman of the executive for the conference and David Rivett as organising secretary. The other members of the council were Dr. John McFarland, Professor Baldwin Spencer, Dr. Carty Salmon, Mr. Alfred Deakin, Dr. James Barrett, Dr. Henry Chapman and Mr. Malcolm Shepherd.

This task brought David's research work to a halt. For several months in 1913 he travelled with Stella through Britain meeting the leaders in each major branch of science and helping to draw up details of a program of discussion and visiting. Then he came back to Australia and in a long series of bone-shaking journeys began an exhaustive exercise in organisation.

The Australia of 1914, without any hotel of quality outside the cities, with no air transport and roads of such underdevelopment that rail travel everywhere was virtually essential, presented exceptional problems. It was harder as the guests were men and women accustomed to the rapid transport, short distances, first-class hotels and sophisticated travel arrangements of 1914 Britain and Europe. Planning for the stay of parties of 20 and 30 in small bush hotels or in billets in the best of neighbouring houses had to be investigated to the last bed, sheet, towel and pillowslip. Simultaneously he was seeking to identify the mines, agricultural projects, irrigation works, factories, laboratories and research centres that might interest the scientists from abroad.

The survey in Britain enabled David to link each Australian centre with his knowledge of the special interests of the leaders who had been invited from each field of science.

At the beginning of 1914 the *Illustrated London News* reported:

The meeting of the British Association for the Advancement of Science which is to take place in Australia next August has involved many people in much work for the last two or three years. Not the least devoted of these is Dr. Rivett, the Australian Organising Secretary. His position is one of much responsibility, as he is the connecting link between the several committees which are at work in Australia and the authorities for the Association in London. As such he has been hard at work in England in 1913 and will now be busy in Australia.

However no one could have foreseen that in the very week of the arrival in Melbourne of the main British Association contingent, Europe, for the first time in 44 years, would be plunged into total war.

That the conference survived the dislocations and proceeded with quite extraordinary smoothness through August and September to a happy conclusion spoke volumes for the patience, enthusiasm and tolerance of Australian hosts and overseas guests alike. In spite of all the problems, some ludicrous, some ironic, the actual meetings were happy and stimulating. The British official report passed this verdict:

For 15 months, David Rivett devoted himself entirely to the duties of his office, and it is recognised by all concerned that the success of the Meeting was largely due to him.

Three months after the conference ended, W. A. Herdman, one of the chiefs of the British Association, wrote from London to the Indian Institute of Science at Bangalore advocating that Dr. A. C. D. Rivett of the University of Melbourne be appointed principal of the institute. Herdman, a professor of the University of Liverpool, wrote this judgement a few days after Rivett's 29th birthday:

Of all the many young university men—scientific and otherwise—I have had to do with in various capacities there is not one I would prefer before Dr. Rivett for such a post as the organising and executive head of a scientific institution.

Herdman then spoke of having had exceptional opportunity for judging Rivett's qualifications while being 'in constant touch' during the two years of planning and arranging the B.A.A.S. meeting:

He had a task of no ordinary nature, dealing as he did with a large body of scientific men (of all kinds and ages and several nationalities) on the one hand, and on the other with numerous local committees and administrators in Australia from the highest officials of the Commonwealth downwards.

In all his work Dr. Rivett was enthusiastic and indefatigable and showed a remarkable combination of the necessary firmness with perfect tact and geniality. . . .

David was given no chance to rest when the international scientists were finally stowed aboard their various ships to run the hazards provided by the U-Boats on their homeward voyages. Suddenly he was a name as an organiser. First he was testing means of protection against gas warfare, then the authorities called him to the field he had rejected—medicine.

Lady Bassett, a daughter of Sir David Masson, takes up the story:

I was first secretary to Professor Berry as head of the 5th Australian General Hospital and then secretary to David Rivett when he took over from Professor Berry and was later transferred to the

new 11th A.G.H. as registrar. This subsequently became the Caulfield Repatriation Hospital. I believe this was the only time that Australian medical doctors allowed a non-medico to run an A.G.H. in either wartime or peacetime. They recognised Captain Rivett (as David became) to be a splendid organiser. He had such a clear-cut, incisive mind he knew what he wanted to do and how to do it immediately.

No. 5 A.G.H. was located in the police barracks at St. Kilda Road, under the Professor of Anatomy, R. J. Berry. Very early David learned that meningitis had struck some of the training camps and men sent down to the A.G.H. were being allowed visits by family and friends who ran a high risk of receiving and spreading the infection. He acted decisively and the menace was ended.

At this stage, David was lecturing in the mornings to the scientists whom the country needed so desperately for modern warfare, then rushing straight to the hospital to take over administrative duties before noon. This led to the purchase of a second-hand Harley Davidson motor-bicycle. Professor Hartung, then a postgraduate student in the chemical school, recalls:

He spent some hours studying the engine and parts of the motor-bicycle until he was satisfied he understood them. Then he taught himself to ride in an hour by taking it round the less-frequented parts of the University with various falls to impress errors on his mind. He had learned the road code the night before. So now, after a couple of hours, he went down to the licensing authorities and returned in fifty minutes with the licence.

For the next two years the motor-bicycle took him from Airlie street to the chemistry school in Parkville early in the morning for his lecturing, then to the registrar's role at the hospital and finally home late in the evening.

The Colonel commanding specified as follows the duties of a registrar of a 1915 A.G.H. The registrar was in command of the Hospital during every absence of the Officer in Charge. He must 'directly supervise and control all activities of resident medical officers'. He detailed duties, arranged instruction in hospital routine for junior medical officers and lectures and demonstrations for orderlies. He was responsible for all clinical

histories and for correct diet and prescription sheets being filled by the medical officers. With clinical staff he would investigate any disability needing organised research. Inspection and supervision of dispensary, dental, hydropathic and massage departments were also the registrar's. In short, he ran the hospital, its staff and patients with the C.O. largely a backstop and supporting authority.

Two years of daily experience with doctors did not, according to Lady Bassett, increase David's respect for some members of the profession. He found many of them solely gynaecologists. Several had a tendency to panic in the face of epidemics combined with a marked unwillingness to risk personal infection.

Independent authorities expressed the view that Rivett had the flair for improvisation invaluable in wartime emergencies. His personal feeling was that he wanted to return to his own work as research chemist and teacher in the laboratory but it was two years before he had a chance to use his talents.

By the European autumn of 1916 it was clear even to Blind Dobbin that winning or losing the war hinged largely on who could make the best munitions fastest and employ them to obtain the ever longed-for breakthrough on the Western Front.

Britain had been stripped bare of scientists, especially chemists. Even when the handful who had slipped through the net into the services were recalled, it was clear to the top men in the Munitions Ministry that the motherland alone simply could not find the qualified men to compete with the Kaiser's scientific battalions. The leading scientific teachers throughout Britain were asked to name any men overseas who might help in the nation's emergency. Sidgwick, at Oxford, put forward David's name. An earnest request came immediately from London to the Australian government for his release and immediate despatch to Britain along with a score of other recommended specialists from Australia and New Zealand.

The first child to David and Stella, a son, was born in January 1917 and a few weeks later his father was sailing for Britain.

By 1917 the Ministry of Munitions was divided into ten separate departments. The key one for David and all chemists

was the Department of Explosives Supply. Following British practice its chief was not a chemist nor even an engineer. Lord Moulton was one of the most skilled patent lawyers in Britain (he became in 1919 a Lord of Appeal). A brilliant raconteur, reputed to have as good a palate for wines as any man in Britain, he carried enormous responsibilities through the last few years of war. They aged him prematurely and might have killed him had he not been able to place at the head of Factories Branch of his department a fantastic South African named K. B. Quinan, the general manager of the Cape Explosives Company. The drive, incessant urging and colourful language of Quinan transformed the rather sluggish English approach to mass manufacture of lethal chemicals. He shocked many Englishmen, both superiors and subordinates, but to colonials like David Rivett his non-sense, down-to-earth hectoring struck a responsive chord. As they saw it, the sole job was to double, redouble, then double again the supply of shells to the men in the lines. So process managers like David did not object—where some of the old school tie brigade were shocked—when Quinan told the assembled managers of all Britain's plants that they had to make their particular works a *factory*—'a place where you have your raw materials coming in at one end and finished product going out in equivalent amount at the other. Whatever you do,' added Quinan memorably, 'don't let it turn into a bloody, constipated caterpillar!'

David spent a fortnight at the central research laboratories of Brunner Mond, then eight weeks at an experimental plant at Sandbach in Cheshire—'a first experience with chemical plant, the Cheshire accent and the work of the munition girl. There was a lot of experimental work to be done and some of us spent many a long day and not a few nights over the puzzles.'

Thence he was shot into the post of process manager at the huge, brand-new, amatol factory sited 100 miles west of London in Wiltshire at Swindon, a railway workshop town of 60,000. Leaking vats at the outset nearly caused a total disaster comparable to that at Silvertown in London where an entire plant had just blown up with appalling loss of life. However, from an

initial weekly output of 100 tons, the factory (with 1,400 working a 56-hour week) was producing 1,100 tons of amatol in the October before the armistice. Salaries were low even for those days. The superintendent got the top figure—only £500 a year. Men averaged £3.6.7 weekly and women—the majority—45/-. For this wage the women shovelled crystals of ammonium nitrate at a rate of about half a ton an hour.

A year later David told the Melbourne Boobooks:

The outstanding characteristic of the women was their entirely admirable spirit. They entered the thing more than the men and realised that everything they did was helping those in France.

Their 45/- was a great improvement on their peacetime wages and on those offered elsewhere even in 1917. A colleague at another plant reported that a girl, offered 18/- for a 6-day week, declined the job saying that it wasn't worth coming off the streets for that sort of money!

During his months at Swindon, David spent much of his leisure seeking to improve the process by which ammonium nitrate was then produced. By 1918 he had tested and re-tested a scheme which achieved the production of ammonium nitrate by the interaction of ammonium sulphate and sodium nitrate in the presence of water both more simply, swiftly and, it appeared, more economically, than the Brunner Mond formula then in use in all Allied plants.

During the year, Marks and Clerk, Britain's leading firm of chartered patent agents, headed by Sir Croydon Marks and Sir Dugald Clerk, took the Rivett Process to the Patents Office. In May 1918, by Patent No. 8228/1918 under the Patents and Designs Acts of 1907-14, 'Albert Cherbury David Rivett of the chemistry department, University of Melbourne' was duly recorded among the Empire's inventors. The long process of clearing and investigating every aspect of the patent claim was finally ratified in 1919 under the heading 'Improvements in and relating to the production of ammonium nitrate.' How much the Exchequer might have been saved and the production of shells expedited if David had been given a chance to see the problem before late 1917 cannot be assessed. The long series of attempts by Brunner Mond, which later became Imperial Chemical In-

dustries, to enlist his services over almost 30 years, culminating in three separate bids to secure him as managing director of I.C.I.A.N.Z., may have stemmed from the impression his inventiveness and individual research capacity made on his colleagues at Swindon and in the Department of Explosives in 1917-18.

Yet despite quiet elation at this success, the 16 months at Swindon dragged as interminably as for most other young men separated from home and family by the conflict. Two or three days spent with his wife's sister Vera and her friends were almost the only 'leave' he took. He had little leisure and less enthusiasm for London's wartime gaieties. Every penny that could be saved from his pay was cabled home monthly for his wife and son in South Yarra. Absorbing and intense as the hourly responsibilities of the huge munitions plant were, it was a time when he simply lived, ate and slept with the job, longing, like everyone else, for the ending of a conflict that often seemed bogged down and probably interminable.

The three totally diverse experiences of conference organisation, hospital administration and munitions production from 1914 to 1918—helped David develop three qualities. He had always had a gift for getting along with people of all backgrounds and outlooks. 'Authority, instead of removing him from those under his orders, made him even more aware of their needs, sufferings, fears and lacks', said a later colleague. Perhaps unconsciously, he made a cult of getting as close to each person as possible to bring personal encouragement and leadership in their dangerous, monotonous or wearing task. These three experiences helped his native wit to work out the most comprehensive scheme for getting greatest value of work and planning from every hour of his day. By 1919 few men of his age had more capacity for arrangement and for initiative in organisation. Yet, colleagues of the 1914-18 period remember, above all, his feeling for those under him.

Years later scientific colleagues were to be moved or sometimes critical because of what they saw as the depth of David's involvement in those who worked for him and with him. His concern for the workers in Swindon during the war was prophetic of his attitude when bigger responsibilities came:

Time without number I was asked . . . what chance there would be of continued employment. The end of the war meant the possible . . . return to the old conditions of squalor. . . . On November 11 it was the girls who made the noise: the men were anxious and more serious than usual . . . perhaps if these people had not been so much like children they would long ago have found themselves and realised their power and by organisation have (abolished) the disgraceful conditions in which so many of them before the war were compelled to pass their lives—while England in general waxed wealthier. . . . No one can deny that there is adequate reason for profound change in the whole position of the labouring man in Great Britain. . . .

Speaking to the Boobooks in 1919 he made this prediction as a scientist who had been involved in making the latest weapons to kill:

It is only a matter of time to work out some chemical which distributed over a town . . . will render a great area uninhabitable by human beings for weeks. . . .

Several of his Swindon colleagues became, during the next decade, important figures in the great scientific conglomerate of Imperial Chemical Industries which was the post-war title of Brunner Mond & Co. The alacrity with which his recommendations and suggestions were taken to the authorities of the Munitions Department and of Brunner Mond during the last year of the war suggested to both David and his colleagues that a permanent berth in the huge English firm could have been his for the asking. He canvassed the matter in many letters to Stella but was, finally, convinced that a university chair with opportunity for his own chosen research in the laboratory was preferable to working with a commercial firm—even for a higher salary.

The last weeks of the war came very close to being his own last weeks. In late September, after 16 months of long hours, strain and his own ceaseless spare time researches, he fell a victim to the Spanish 'Flu which was scourging Europe. He was still tottering and barely convalescent at the armistice and, the moment the factory was closed, applied for repatriation to Australia.

The Australian summer was nearly over when he got back to Melbourne and at last had leisure to enjoy family life, to watch the forays of his two year old son and to begin the reconversion of his flower and vegetable gardens from the jungle they had become while he was abroad.

From late in 1916 until 1922 David and Stella's home was 'Lincoln', 321 Walsh street, South Yarra—the house they had saved to build. Walsh street was very much a family street. Stella's sister (Mrs. Tom White) and her husband lived directly opposite. Up the hill beyond Melbourne Church of England Girls' Grammar School was the family home of her father which, after Alfred Deakin's death in 1919, was to be incorporated as 'Winwick' with that of her elder sister (Mrs. Herbert Brookes) next door.

David enjoyed regular tennis at his brother-in-law's court. For 30 years, Herbert Brookes made the court a week-end centre for University and business men. Many overseas visitors joined in the doubles matches and the interchanges at the court-side that accompanied them. David frequently spoke of his debt to Herbert and Ivy Brookes. This was not only at South Yarra, but in the school holidays at Point Lonsdale and at Macedon. When he left the University, the Brookes's tennis parties gave him a chance to keep in touch with old staff colleagues and to meet the new men who came to Melbourne University.

Like half the young Australian males of his generation, parenthood really began for David on his return from the war. His son was already a prattling toddler rather than the babe in a crib he had left in 1917. The business of providing for three on the salary of a lecturer in 1919 was not fun. Today, comparable responsibilities—second in command to the dean of the faculty and professor—carry fitting emoluments. Then, in many of the faculties at Melbourne University, the salary was only £350 to £450 a year (against ten or twelve times that amount today even though costs have risen only approximately sixfold). A letter to his brother-in-law, at the beginning of 1920, tells the story:

I had quite decided that I must leave the University this year and take one or other of several fairly good technical jobs that were offering. There seemed little scope in the University and the

financial future looked worse than ever when the University Bill was introduced into Parliament. To my surprise, when I announced that I was leaving, the Council asked me to stay in consideration of an appointment as associate professor at somewhat improved salary. While the offer is not overwhelmingly tempting, we both think it inadvisable to refuse it, for there is much that is attractive in academic work in spite of its financial side. So it is now definitely decided that I remain and give up the idea of technical work outside. . . .

For a young scientist for whom men of the calibre of Arrhenius, Sidgwick, Masson and others had predicted so brilliant a career, the three years after his homecoming must have held a measure of frustration. Overseas—in London and in Europe—there were opportunities and financial temptations for anyone with his laboratory record, published work and exceptional experience in administration. Now, in his mid-thirties, he was chafing to deploy his full talents and accumulated knowledge. Today, apart from the exceptional opportunities in the U.S.A. for top scientists, openings to the talented are available at a younger age. But in the twenties, University usage in Australia lagged behind even the slow promotions of public service and private industry. The young country was far in the wake of America—and even of much of Europe—in recognising that top positions should not be automatically reserved for those already into their fifties and sixties.

The associate professorship in 1920 at £650 a year was far from riches. The Council of the University Association in its 1927 survey said:

The professors are almost the only class of men in the community receiving less now than 30 years ago. . . . Their tenure is now five years, they retire at 60 years of age and receive maximum salaries varying from £1000 a year to £1200. . . . No other body of men has been so severely hit by the great rise in prices. . . .

Votes—power—came from wheeler-dealing, from scratching the backs of the power groups—landowners, churches, the R.S.L., industrial combines. State politicians saw no votes in spending money on improving primary, secondary or tertiary

educational salaries and conditions. The University's needs were skimmed to the bone until ambitious young Australians of talent were to turn to the workshops, laboratories and well-endowed academic niches of the United States and elsewhere overseas.

In the years of teaching at the chemistry school, David was involved with a host of other University activities outside the laboratory. He became a patron and life member of the Melbourne University Boat Club. He lectured to the Students' Union, at their insistent request, to the Public Questions Society of which they made him president, as well as to each of the chemical and scientific societies in the State. He was unanimously elected State Secretary of the Australian Association for the Advancement of Science within six months of his return from Swindon.

His address to the Public Questions Society on the changing role of women in industry and society, given in 1920 and based on his observations at first-hand of the role played by women in ammunition-making in 1917, is still recalled—'ninety per cent of the whole undergraduate body must have packed in to hear him that day'. Listeners said it was 30 to 50 years ahead of its time in thinking about women's rights.

His lecturing had style. Basically it was a joy to lecture. The flow of words chosen by his scientifically accurate mind delighted the purists and his dislike of the florid or obscure kept even laymen abreast of his ideas. There was a hint of humour, a streak of fun, as well as undisguised enthusiasm behind his analysis of even intricate subjects. There are many tales told of his lectures by some of the men who have been among Australia's leading doctors for the past forty years because so many of them did their chemistry with him. Robert B. Withers, a prominent figure in Victorian education in the thirties and later a senior scientist in the field of food preservation, studied under Rivett in the chemistry school from 1922 to 1924:

. . . He taught his students much more than chemistry. Most of all he taught us intellectual honesty. I recall him explaining to a Part I Practical class the importance of recording exactly what was observed, not what was to be expected. He put it to us in

his characteristically witty manner that most people have 'honesty enough to keep them out of the courts' and went on to explain the difference between that sort of honesty and the intellectual variety.

David always struck me as completely down to earth in his thinking, and he placed little value on many matters to which others attached more importance. I remember him decrying as silly an argument on whether a chemical element should be called beryllium or glucinum.

Although critical of conventional thought in many ways, no one could be more conventional than he when it came to courtesy or the social graces. He never failed to express his gratitude for the smallest act of helpfulness or thoughtfulness. Sir David went out of his way to help his students. He was a lucid and interesting lecturer and an effortless disciplinarian . . . (he) resembled Thomas Henry Huxley (one of David's favourite writers) in many ways; he was a great fighter, a hater of humbug and a lover of intellectual honesty. . . .

Most famous of the Empire scientists in the twenties was Lord Rutherford of Cambridge who had led and inspired the team which first split the atom. Rutherford came to Melbourne to give a great public lecture at the University in 1924. He delighted David's chemistry students afterwards by spending a couple of hours with them sitting on the floor of David's study at Grosmont talking far into the night about the current problems of science.

David found most satisfying the chance in his University years—from 1919 to 1926—to combine research work with assistance to students. To anybody in trouble, at any time, David's door stood open.

From first to last at the University perhaps 4,000 or 5,000 students heard him lecturing. His own absorption and delight in the work ignited the spark in many students and they remember him vividly more than 40 years later.

The University years brought him into touch with some scores of colleagues from other faculties. Although a man later accused of mistakenly believing that others were gentlemen because he was, he soon found the pretensions of a number of professorial colleagues a source of amusement.

All universities—like many other human organisations—thrive on staff tittle-tattle and a measure of personal derision. But there is a letter received by David in 1926 from one with an intimate knowledge of all the principal figures on the University Council and professorial board. It suggests that snob-bishness and false values at the top bedevilled a University which, thanks to the earlier work of giants like Baldwin Spencer, Tucker, Masson and Lyle, had won a reputation enjoyed by few 'colonial' universities.

The fact is that the whole atmosphere of the University is bad—there is a complete lack of faith in the ruling clique re scholarship. (He then named two of the ruling quartet as 'intellectually dishonest' and two others as 'arid and narrow'.) The professors get attention from the ruling clique in proportion to their personalities and address. The scholars are thought little of and the diplomats get disproportionate attention. . . . The staff are always pinpricking each other. They don't seem to be very much concerned in holding up the lamp of real scholarship and supporting those who want to. . . .

The judgement would have less weight if it did not come from a man whose national stature and unique services as a servant of both State and Commonwealth place him among the ablest Australians in the first half of the twentieth century.

It was not long after his return from Swindon that he began compiling the final text, graphs and sketches for his major published work—*The Phase Rule and the study of Heterogeneous Equilibria*—based on the principles and research to which he had devoted most of his leisure hours at the explosives plant. Dr. H. R. Marston in his Royal Society Memoir—*A. C. D. Rivett*—comments:

Thoughts of industrial application, never far from his consciousness, overflowed into the preface of this essentially theoretical treatise. He stressed that firmly based theory had far outstripped application—only in isolated instances of works-practice had the heterogeneous equilibria of the several phases entering into most processes of chemical industry been subjected to systematic study essential for efficient production.

The slim book published in 1923 won acclaim in most of the leading chemical journals of North America, Europe and the British Commonwealth. For many years he was receiving requests and expressions of gratitude from leading foreign scientists who found his exposition of the phase rule invaluable in their own work. Advanced science students at Yale University were among those who made extensive use of the work as a textbook. There were German and other translations. Even as late as 1945, a letter from a senior executive of I.C.I.A.N.Z. expresses that company's gratitude and tells of the value its chemical workers found during the second world war from some of the note books of figures and formulae David had worked out during 1917-1919 and lent to the firm upon request soon after the Pacific war crisis burst on Australia. Writing in 1961, Dr. Marston remarks of *The Phase Rule* that '38 years later it remains as fresh, profound and authoritative as when it was published in 1923.'

In May 1922, a flood of letters and telegrams from all over Australia suddenly descended on 321 Walsh street. With unanimity the Melbourne University Council had accepted David Masson's urging that his successor in Melbourne's chemistry chair be appointed forthwith and that before Melbourne lost the services of the 'most brilliant chemist available in Australia' Rivett should be offered the chair. In effect he took over the full professorial duties as from the beginning of 1923 but this was a sabbatical year for Masson who retained the title throughout that year.

Old Beechworth and Albury friends, British scientists from the wartime Association meeting, doctors and orderlies from the hospital days, former Wesley and Queen's colleagues wrote delightedly. Each chemistry professor in other states—and various past students and student groups hailed the appointment of a 36-year-old Australian to a chair in a University which had, traditionally, looked to England and Scotland for its academic leaders. Rivett's appointment in 1922 was regarded by one eminent Victorian Cabinet minister as the first breaching in 'the wall of anti-Australian prejudice in favour of the mistaken snobbery of choosing academics from the Old Country.' Even



The Lincoln eight on the Isis. David (stroke) in the traditional rowing gear of 1909 with the O.U.B.C. (Oxford University Boat Club) cap.



Olive, Doctor Olive Long of Balwyn.



The Rev. Albert Rivett.

THE FAMILY

Eleanor (Nell), Headmistress of Calcutta Girls' High School, then Principal of University Women's College, Madras.

Christine, Doctor Christine Rivett of Wickham Terrace, Brisbane, and Macquarie Street, Sydney.



the critics of the University Council—and there were many—delighted in this selection.

Among the statements was one from the Students' Representative Council, signed by future Judge Fred Gamble, expressing 'the pleasure and pride they feel in the appointment to such a position of one of their own University men.' Some other comments were piquant or of interest because of the current or future roles of those who made them:

'Even Councils sometimes do the right thing' (Professor H. W. Allen); ' . . . delighted to be one of those who had the sense unanimously to approve the offer to you' (John G. Latham); ' . . . you expressed this as your great desire when you left for Oxford (1907). Perseverance and determination have been ultimately rewarded and worthily so . . .' (the coach in Arabic whose "generosity" had cost David that badly needed £60 for the Mollison in 1907).

' . . . everyone is simply delighted . . . Stella too is another great acquisition to the University' (Lady Baldwin Spencer); ' . . . splendid appointment . . . you are the first Rhodes man to attain genuine professorial rank' (Dr. J. C. V. Behan, Warden of Trinity); 'although to follow the Prof. (Masson) is going to be no easy job, you are going to do it better than anyone else could' (E. C. Dyason, financier and founder of the Dyason lectures); ' . . . you have achieved honour where it is most difficult to achieve—in one's own country' (Frank Shann, headmaster, Trinity Grammar); ' . . . a more popular appointment has never been made, the more so that you found Melbourne worth coming back to' (Dr. Gwyneth Buchanan). There were nearly a hundred more in similar vein. The thing that delighted even the non-scientists who knew nothing of his work was that for the first time—almost 70 years after its foundation—Melbourne had considered one of its own graduates worthy of one of its dozen chairs.

Immediately David and Stella had a problem. The University had seven houses in the Grounds available for its professors. That of Professor Nanson was to be finally vacated in August. It is a very large two-storey mansion immediately across Tin Alley from Trinity College, where today it forms the bulk of

University House, the staff building. On an Associate Professor's salary of £650 yearly it was far beyond their financial capacity—or needs for a family of three. However, for years he had been longing to get nearer to his daily work in the chemical laboratory. This lay only 400 yards east of the house. If he did not take it, there might be several years before another house in the Grounds became available. They moved from Walsh street to 'Grosmont' in the spring of 1922.

'Grosmont' was one of seven large brick edifices in the university grounds. Five—occupied at that stage by Professors Masson, Osborne, Agar, Berry and Skeats—stood in 'Professors' Row', east of the Conservatorium and on the west side of today's Arts School; stretching along the site of today's Baillieu Library. The other two were on the southern side of Tin Alley, east of the School of Agriculture. The larger of these, 'Grosmont', had been occupied for more than 30 years by the Cambridge mathematician, Edward John Nanson.

Here, in the winter of 1923, a second son was born to David and Stella. Here too—amid immense excitement—came their first car, a spanking brand-new buff T-model Ford, 1923 vintage, costing £250.

The Rivetts enjoyed Grosmont for five years. Its garden and high Victorian rooms made it a wonderful home for a young family. It was memorable for frequent embarrassments caused by its very size (a possum stuck beneath the slate roof and the bedroom ceilings turned one summer fortnight into a reeking horror of malodorous memory until it was finally located and removed) and for the propinquity of the zoo with its carnivores roaring through the night.

First at Walsh street, then at 'Grosmont', for the eight years after his release from munition-making, David probably enjoyed life more than at any time since his battle for scholarships had begun. On Sunday mornings in the garden he was full of quiet humour and indirect instruction to the boys playing around him. Collarless shirt, tan corduroy pants and cavalry boots pierced at the toe were his habitual garden gear. In attire—and outlook—he was a re-creation of his father, that tireless, gifted gardener through his 80 years.

He may not have thought much more about fatherhood than the average young man. There was the instinctive, taken-for-granted belief that the role of a father was that of a pal who always tried to show the humorous side of reverses, accidents, upsets and misfortunes. Before his son was three, Hickory-dickory-dock, Jack Horner in his corner and the cow with the afflicted horn were no more familiar in his ears than the jingle David's father had greeted him with at Yarrawonga thirty years before:

Albert Cherbury David Rivett
Went and sat upon a pivot,
Ate his breakfast like a trivet
Albert Cherbury David Rivett.

David himself followed his father in pronouncing the surname Rivett as if there was only one 'T'. All his sisters and brother and their children and grandchildren allowed for the second 'T' to rhyme with 'Pipette' or 'Quartet'.

Albert Rivett was a mighty walker—indeed walking came second only to gardening among his activities ex cathedra—and David had acquired much of his own philosophy in long rambles with his father through the bush at Yarrawonga at Beechworth, and afterwards whenever he returned home from his Melbourne or overseas studies. Now, most of the worthwhile interchanges between himself and the next generation took place on long, rapid walks. Until his sons were too old for such intimacy, they skipped along straddling his walking stick or holding his hand and taking two strides to his one. They walked for miles round the Botanical Gardens when in South Yarra. When they moved into the University Grounds in 1922 it was even better. There was a pattern, whenever time permitted, that as soon as David 'got back from the lab.' (as return from the Chemistry School was hailed) father and son went for a quick outing through the University Grounds. These hadn't then become the hotch-potch of architectural monstrosities that fill the space between Swanston Street and Royal Parade today. The pond, 'the University Lake', with its islets, ducks, waterhens, yabbies and water rats, always offered something new.

On these outings he discussed the boy's day, items in the papers, or Stella's problems with the domestic staff, which were perpetual. He cared very little about sporting results and thought most of the professionals or semi-professionals of the twenties would be better off doing something else. One day around 1923 with surprising, it seemed encyclopaedic, knowledge he inducted his son into the world of heavyweight boxing championships and the sad business of the great, but relatively small, Frenchman, Georges Carpentier, being unable to cope with the superior might of the Anglo-Saxon Jack Dempsey.

Many of the outings were by cable tram down Elizabeth street. The earliest visits to the Zoo used the last of Australia's horse trams which ran from Royal Parade directly across Royal Park to the Zoo gate. At night the household lay in bed listening to the roaring of the lions carried—unless the wind was from the south—across the mile of open ground that separated the cages from the redbrick home on Tin Alley.

In the back paddock at 'Grosmont' where Professor Nanson had kept cows and an odd horse, David bowled slow, good-length, fairly straight leg breaks while his son practised his shots. With a football they dropkicked or punted endlessly. Later, when the family moved to Malvern, there was an asphalt tennis court on which the boys played tennis, cricket and football for hours on end, always beseeching their father each Sunday to leave his gardening and 'come and have a kick' before he went up for his shower prior to carving the Sunday roast.

Seeing that at Queen's, and still more at Lincoln, he had been a rather successful athlete—at running, cycling, tennis and, especially, as oarsman—he was philosophic about the lack of sporting success of his two sons. He would turn up faithfully at matches of the B's and C's whenever he had a weekend hour. Excellence in sport never seemed to him of importance. Participating to produce a fit body and an alert mind was the centre and purpose of games. Success of the team or the individual was relatively unimportant. He carefully camouflaged his own participation in his youngsters' enthusiasm over Australia's Test Match or Davis Cup successes and was not unsympathetic to their miseries when England or the United States proved too

strong. After a lost intercollegiate singles he said: 'We're very proud of you, old man.' The despondent look in reply made him add: 'Look, you did your utmost. No one else has won a set. And you fought it out all the way after he got on top. It's better to lose like that than to win easily.' He meant it.

Having had a normal amount of school bullying himself (he was always an inch or so shorter than most of his contemporaries) he encouraged a philosophic acceptance of what could not be fought off but bought a set of boxing gloves and before each boy was seven tried to give him some idea of how to defend himself.

David placed himself in the boys' shoes without losing his sense of perspective about the interests or motives of others. Both his sons in childhood instinctively went to him with their problems and quandaries. Even 30-odd years later, in retirement, when a stroke had caused a slight shuffle in his walk, there was rarely better advice than when walking alongside him from his flat in St. Kilda Road towards Albert Park Lake. His letters were a shrewd assessment of men and motives in the Australian political scene. In letters about finance and shares his advice was sound, never speculative. He believed in men and management and bought shares in companies whose managers he knew to be dedicated and capable of decisions. He was not impressed by temporarily flamboyant results. He would not buy shares in tobacco companies or breweries although he was no wower about the drinking or smoking habits of his friends.

Even before the war, and much more so in the twenties, friends and colleagues had inducted him into some Melbourne clubs—notably the Beefsteaks, the Wallabies and the Boobooks. He relished the weekend outings with the Wallabies and generally returned with a fund of stories and information of the work of men in other fields. The stories recountable to the young and the general information, particularly of scientific, farming or exploring developments, were passed on at once. There was never condescension. He was a believer in stating all the facts that seemed relevant and leaving the young to draw their own conclusions without inflicting his own judgements on them.

In the University long vacation they usually went to Point Lonsdale to one of the Deakin/Brookes family homes or to a guesthouse on the other side of the bay—to Carrum, Sorrento or Portsea—or up to the hills at Healesville or Sherbrooke Forest. All through eight or nine years the favourite evening occupation was 'Father Reading Aloud'. His wife knitted or sewed while the boys sat by the fire looking at all those wonderful shapes that form in the depths of an open fireplace and David read fast and cheerfully—Scott, Dickens, Henty, Ballantyne, Blackmore's *Lorna Doone*, Kipling, Haggard, various volumes of world history. After a while the boys were expected to do much of the reading but their best moments came when they could persuade him to take over again.

As parents, many of us proceed on a basis of adjuration and reproof. It is easier. The excuse is one's tiredness from the day's (week's) labours. David preferred to carry out his own basic rules of conduct with the minimum of fuss, leaving the young to learn from his example. The firmest rules of the 'Ladies First' school were still in general acceptance in the twenties. His own father had observed them punctiliously as part of his lifelong adoration of David's mother. David carried on in exactly the same pattern—perhaps even more devotedly than either his father or his brother. He was always first on his feet when any woman entered a tramcar without vacant seats, the first in a group to open any door, and always treated his wife and all other women, irrespective of age or charm, like some piece of invaluable porcelain. This extreme courtesy can sound affected in these days. He wore it as naturally as he wore his woollen singlet or waistcoat in winter or the pair of old cavalry shorts in the garden every summer.

Make-up was an affair for a lady's decision. His own women-folk generally avoided anything beyond a little powder. But he did not share in the criticisms which his brother-in-law, Herbert, and others fired off against such innovations of the twenties and thirties as short skirts, painted toes, dark lipsticks or various extravagances of that era. Basically David appeared to believe that men should not criticise women old or young. He seemed

reluctant ever to believe that any woman was less than honourable, virtuous, gentle and rather badly done by—thanks to the mores of a male-dominated society.

In other women as sex partners he showed no interest whatsoever once he met Stella. Several of the wives of his colleagues said that he was the most charming and considerate of men. He was attractive to women but hardly realised it and either failed to see the advance or, if he did, ignored it. When told of it by a trusted friend or relative he invariably accused them of pulling his leg. If they could convince him he would vehemently assert they were mistaken and, at the same time, take very good care thereafter never to have any conversation with the said lady except in the presence of others and preferably in front of her husband.

The better values of the Victorian era and the more real thoughtfulness practised by a handful towards the other sex persisted with David throughout his days. In fact, he was incapable of taking any but the highest and kindest estimate of any woman until he was convinced that she had slandered, attacked or hurt some relative or friend. Then he could be as angered as anyone else in such circumstances.

To his daughters-in-law he was instantly attentive, considerate and amusing until, in his late sixties, the consciousness of his failing powers increasingly depressed him so that he began to exaggerate his own loss of those qualities which charmed women of all ages from the time he left school until well after he had retired. He had great admiration for a number of women—for none more than his wife's elder sister, Ivy Brookes. He had regard and affection for the wife of his old master and private demigod, Sir David Masson. Apart from his wife, however, no woman, except his daughter-in-law in the evening of his life, counted one fraction as much as his sisters.

With Nell, Chris, Else, Olive and Mary he had as intimate a link of mutual standards, loyalties and viewpoints as is possible between brother and sisters—a bond a great deal closer than many achieve with adult brothers or sisters who live in the next suburb. David and Ted, like the girls, expanded the deep

family ties automatically to embrace the next generation and were chagrined and shaken that in other families, linked by marriage, no such fundamental loyalty and sense of togetherness seemed to exist.

Most of David's university confreres remained acquaintances although some, like Samuel Wadham, were to become lifelong associates and friends. His closest friendships were in his own department where his one time student, E. J. Hartung, emerged as senior lecturer and then associate professor to David. This has caused many senior Melbourne graduates—both scientists and doctors—to claim that the chemistry school, through the twenties, had, in Masson, Rivett and Hartung, a constellation of teaching talent such as few, if any, Australian schools or faculties have had—before or since.

David himself gave all the credit to David Orme Masson, his counsellor, guide and closest friend. He had found in Masson precisely those qualities he prized and sought in those whom he wanted to trust and work with. In a very special sense his feeling for Masson defined his own vision of the good man of science: '. . . He afforded a living example of that spirit of complete intellectual honesty combined with the practice of sound logic which, with expert skill, is the foundation of all science. . . .'

Two of his many stories of Masson particularly delighted him. The first was Masson's total command of his students, as instanced by his arrival one morning in a lecture room showing abundant evidence of the throwing about of berries. Instantly he said: 'Gentlemen, I protest against being berried before my time.'

Masson's concentration was a legend. Watching the famous Davis Cup duel between Norman Brookes and Beals Wright early in the century, he lit one of the cigarettes which he virtually chain-smoked at that time. It was only when the prolonged advantage set and rubber came to an end that he realised with a start that the cigarette was ash between his fingers and had left a deep weal on each as it burned itself out.

Masson's absorption with an issue was a facet that inspired his pupil. On one occasion a lecturer who had bidden Masson good-

bye on Friday afternoon found him already in the laboratory when he arrived on Monday morning. Facetiously he remarked: 'One would almost think you'd been here since Friday.' 'As a matter of fact, I have,' said Masson. Sir Charles Martin used to say of Masson that no one really knew him *until they had started work with him—at 11 p.m.*

David consulted with him as with no other human being. Many years later, even as Masson's health deteriorated perceptibly, David still found his way to William Street, South Yarra, and laid his problems and the conflicts of priorities before the older man. Masson was his second father and few fathers, actual or created, could have perpetually aroused so much admiration.

The best talk with Masson was at nights after dinner or on occasional Saturday mornings. The Grosmont study looking onto the lawn and the elms lining the south side of Tin Alley would be blue with Masson's cigarette smoke and occasionally David, out of respect and liking for the man rather than for the weed, would puff at two or three himself. Masson once told Ian Wark that David didn't recognise himself as a smoker and was always on the receiving end.

About scientific matters on odd occasions, says Wark, 'ACDR and DOM fought like cats. Once . . . they became so heated in personal argument that they decided to conduct the controversy in writing.' Wark adds: 'I think DOM won but he was defending us so I may have been prejudiced.'

The tribute David wrote for a scientific journal on Masson's death illustrates better than any comment the things that David himself prized in the scientific mind. Indeed here were the very things that, in the decade before and in the years after Masson's death, animated his own decisions, his approach to C.S.I.R. and to the men who worked in it beside him:

Does a student meeting a difficulty in later life, either in his own science or in still wider affairs, ever ask himself how his former teacher would have faced a like problem and so gain inspiration and guidance? If he does both of these then that teacher was a master.

. . . Sir David Masson did more than inspire respect for science itself; hundreds of medical and other undergraduates . . . may

have forgotten most of his chemistry . . . none can have failed to learn from him. He sought truth and discovered it and, in his own incomparable manner, led others to understand and . . . practise his own method of attack upon any problem. . . .

He spoke of Masson's conducting a perfect experiment illustrating the presence of nitrogen and then hastily pointing out that he had not really proven it since another cause might have produced the same result. 'The demonstration of honesty,' said David, 'was worth much more than that of the presence of nitrogen.'

. . . In his laboratory research he always preferred problems that presented mathematical and theoretical difficulties. Mere measurement, which today so often passes for 'research', did not interest him.

. . . As a companion for a walk, or for a chat in front of the fire, Sir David was surely without equal. His rapidity of thought, quickness in sizing up a situation, his lucid expression of his judgement and the ripple of wit that was never absent made it ever a delight and an education to be with him. . . . He was a master of diction . . . an autobiography would have been most welcome but there was always a modesty and reticence about him which I am sure made an undertaking of this kind an utter impossibility for him. . . .

A distinguished Fellow of the Royal Society, reading this Rivett reaction to Masson, looked up with a curious expression: 'I wouldn't alter a comma—apart from the anecdotes. It is an exact description of David Rivett himself as I knew him over 40 years!'

One joint project in which Masson and Rivett were deeply involved from the first postwar years onwards never quite fulfilled their expectations or ambitions for it. The Australian National Research Council of which Masson was for many years president and Rivett joint honorary secretary, was the forerunner of today's Royal Australian Academy of Science. It embraced virtually every scientist of ability and distinction in the country and held a number of conferences at which members heard some of the finest papers given in many fields. In bringing to-

gether specialist research men from far corners of the Commonwealth and enabling men preoccupied with their own sectors of investigation to get a broad national, even international view of parallel, current developments, the Australian National Research Council through the twenties and early thirties was valuable. Yet both Masson and Rivett hoped far more from it and from its deliberations than they actually saw. Perhaps the science community in Australia was still too immature to enable the A.N.R.C. to climb to the heights scaled by the Royal Society over three centuries. Possibly Masson and Rivett expected their own enthusiasm and idealism to be reflected equally by the whole membership. But one feels neither would have counted the A.N.R.C. among the more worthwhile projects on which they lavished time, planning and intense effort. Finally the Council's funds were much depleted by a long-trusted treasurer who preferred the ladies, good living and hazardous investment to the scientific objectives for which A.N.R.C. funds were designed. His suicide upon exposure was one of the worst shocks that befell the scientific community in Australia. The A.N.R.C. survived for some years but the momentum that Masson and Rivett generated in the 1920's was never recaptured. After the Second World War, the Academy of Science, planned by Masson, Rivett, Julius and others as early as 1931, finally supplanted the ailing A.N.R.C.

New Year's Day 1926 found David firmly and happily wedded to the chair that had now been his for three years. In his colleagues—Hartung, Davis, Clendinnen, Cedarholm and others—he also had trusted friends on whose capacity and dedication he could rely absolutely. His courses were popular. Despite constant demands from outside associations, councils and committees, he was managing to carry on a reasonable amount of research. He dearly looked forward to stepping up his research hours sharply now that the inevitable chores of a new incumbent were satisfactorily out of the way.

As professor, teacher, administrator, parent and family provider, he could feel a degree of fulfilment. The uncertainties and doubts of the long apprenticeship for the decade after 1911

were all behind him. As 1926 began it could hardly have crossed his mind that he was about to step onto a path that would separate him from University life, until, more than 20 years later, he was to become one of the founding fathers of the Australian National University at Canberra.

CHAPTER FIVE

Launching C.S.I.R. for Australia

The Commonwealth Council for Scientific and Industrial Research (C.S.I.R.) from which today's Commonwealth Scientific and Industrial Research Organisation (C.S.I.R.O.) stemmed was brought into the world—actually if unofficially—on the 23rd of March 1926. The accouchement chamber was the suite of the Prime Minister of Australia, Melbourne, and the attendant physicians were S. M. Bruce, proposer, and A. C. D. Rivett, listener and man involved.

Harnessing science to develop the country and help its sparse population use its resources had been a dream for a long time. Back in 1916, the then Prime Minister, William Morris Hughes, had called in Masson and other leaders of science to discuss ways and means. The story has been told in many places, nowhere better than in George Currie and John Graham's: *The Origins of C.S.I.R.O.: Science and the Commonwealth Government 1901-1926*. But there were conflicts, delays and muddles. Finally the Institute for Science and Industry had been set up in 1920. Its headquarters were at 314 Albert street and its first director was Sir George Knibbs, a statistician and distinguished public servant of maturity and long experience. But from the outset the role, powers and facilities of the infant were unclear. Funds were soon reduced by Parliamentary and Government negligence to a derisory trickle. Long before that historic afternoon in March 1926, Hughes' successor, Mr. Bruce, had decided that something much better, more alive and heavily gunned was essential if Australia was not to remain a backwater while Britain, the U.S.A. and other countries surged farther and farther ahead in applying the fruits of science to raise the general standards of living of the population.

In 1925, Bruce persuaded the British government to release Sir Frank Heath to make a survey of Australia, its laboratories, workshops, projects and industries, meet its scientists and make a report on what was needed.

The Heath Report was not in Bruce's hands for many days in the summer of 1926 before the Prime Minister acted. He had for months been talking with his own advisors, with scientists like Masson, and other outstanding university figures, with engineers like Mr. George Julius of Sydney, and a wide cross-section of leaders in agriculture, industry and finance. Armed with the Heath recommendations he set out to give Australia the scientific guidance and assistance for which so many of its primary and secondary industries were now crying out.

The bulk of the Heath Report was unexceptionable to Masson, who, more than anyone else, had been trying to give teeth and vitality to the application of science in Australia for more than a decade. But on the vital point of the supreme direction of the new body, Masson's advisory council had recommended that three full-time directors be appointed. Heath suggested that control be given to three men as a part-time office. On 23 March 1926 Bruce met David with the statement that appointment of three full-time directors at high salaries was politically impossible. He said only general direction was required, not authoritative decisions on scientific questions.

At lunch that day at Menzies, Mr. W. E. Wainwright, the Prime Minister's right hand man, had brought together the three men whom the Prime Minister, after searching inquiries, had chosen to act as the Executive of the new Brucian Institute of Science and Industry. The chairman was to be George Alfred Julius, 53, inventor of the automatic totalisator and probably Australia's most internationally distinguished engineer. Senior partner of the Sydney engineering firm of Julius, Poole and Gibson and president or past president of every major engineering association in the country, he was also chairman of the Commonwealth Engineering Standards Association.

With him at the lunch was his colleague, W. J. Newbigin of Sydney, managing director of William Adams and Co., who was to represent commerce and industry on the executive. David

Rivett, 40, was to be the scientist. It was made clear in the next few days that both Bruce, as Prime Minister, and Julius, as chairman of the new body, expected Rivett to nominate the scientists and many of the problems on which the new body would try its teeth. The secretary of the old Institute would continue in that role. He was an Englishman, Mr. Gerald Lightfoot, 48, who had taken first class honours at Cambridge in Mechanical Science and was called to the Bar at London's Middle Temple in 1902.

In his talk with David, the Prime Minister emphasised that, despite the extra burdens of the job on top of the university work, he personally saw it as an opportunity for national service which David was uniquely fitted to tackle.

Before replying to the Prime Minister's offer, David talked at length with his old chief, Sir David Masson, and his brother-in-law, Herbert Brookes. The idea that he should tackle a key role in the new body while carrying on his full role at the university was repugnant to him as to Masson who had no faith in Heath's plan that three part-timers should operate.

That evening Masson set down on paper his feeling about the pros and cons of the scheme. As no man knew David's outlook and feelings better, it is worth while to give Masson's arguments:

Against acceptance.

1. Public work of one kind or another has handicapped you for years past in the matter of research. You have yearned for more time to give to it; and this offer comes just as you were shaking free. Acceptance almost certainly means giving up the freedom you wanted or, at any rate, postponing research for a few years; for you are not capable of undertaking such a job without doing your best for it.

2. There is a big risk that, in spite of your best efforts, you will find yourself associated with a failure. I won't put it stronger than that or press my personal view that the scheme is inherently foredoomed.

Reasons in favour of acceptance.

1. I feel that there is a better chance of success if you accept than if some other fellow takes it.

2. Dismissing the 'foredoomed' idea, it is work of immense importance to Australia and therefore as well worth doing as research.

3. The extra income is something that a man with responsibilities need not be at all ashamed to weigh in the balance.

So there you are; and I am sure that what you will decide will be right.

Yours,
D.O.M.

The long night of March 23 must have been one of the most difficult—and sleepless—of David's life to date. This was, in many respects, the kind of opportunity for which all that had gone before in the nineteen years since the Rhodes scholarship had been a preparation. Yet wisdom, to be amply proven in the event, whispered that as a part-time job, the task envisaged simply could not be carried out. So next day he wrote a letter which was to change the Prime Minister's thinking and—probably—the evolution of national research for Australia's development.

March 24th, 1926.

The Right Hon. S. M. Bruce, M.P.,
Prime Minister's Office,
Melbourne.

Dear Sir,

I have endeavoured today to consider fully all that would be involved in acceptance of a position on the Executive Committee of the proposed Advisory Council of the Institute of Science and Industry. It is unnecessary for me to say how conscious I am of the honour implied in your offer of yesterday and how fully I appreciate the significance to Australia of the effort to reorganise the Institute.

Put briefly, my feeling is that the task before the science member of the Executive Committee, if properly carried out, is more than I could perform in the spare time available to me as a University officer. I may be entirely wrong, but I think that the man who is to be capable of taking a share in assessing the relative scientific importance of varied problems, of nominating the scientific men to whom their investigation is to be entrusted, and of forming reasonable forecasts of their financial cost, has to devote himself very thoroughly to the work. He must see for himself, as

accurately as his powers permit, the condition of each problem, of the men whom it affects. To work upon second-hand evidence is to take too great a risk.

I feel, too, that as the science member of the Executive it would be necessary to keep in close touch with those members of the State Advisory Councils who are appointed for their scientific capacity. Contact merely by correspondence would be insufficient.

To do either, or both, of these in a huge country like ours, would involve more travelling and more continuous work than could be done efficiently by myself in the time available to me, especially as I am inevitably anchored in Melbourne during University terms.

It is because of a realisation of the importance of making the Institute this time a complete success and because of a conviction that I could not adequately carry my share of its work along with that allotted to me in the University without making a failure of one or the other, or both, that I feel compelled to decline the honour you have so kindly offered me. I admit a heavy sense of disappointment in doing so.

May I add that, in accordance with your wish, I have spoken of this matter to two people only. They are my brother-in-law, Mr. Herbert Brookes, and my former chief, Sir David Masson, and both will regard it as strictly confidential.

I am, Sir,

Yours faithfully,

A. C. D. Rivett.

He wrote to Wainwright, Julius and John Latham indicating his reasons for turning down what to almost any University don in his position must have seemed a heady, flattering and immensely exciting opportunity.

However, the Prime Minister had obviously made up his mind about the man he wanted. Next day he interviewed Sir John MacFarland and Sir John Monash, Chancellor and Vice-Chancellor of the University, about the possibility of freeing David from some or all University duties for that year, with the Commonwealth paying for the substitution.

There followed a series of interviews, involving MacFarland as Chancellor, Monash as Vice-Chancellor and Hartung, as the man who would carry most of the burden as David's deputy in the Chemistry School.

It took a few days for the university authorities to accept a plan devised so that Associate Professor Hartung took over a large part of the work and was in turn relieved of some of his own by a former student. The Chancellor only stipulated that David retain in his own hands the administration of the Department. Both he and Sir John Monash seem to have done their utmost to make David available for the year while obviously hoping to retain his services ultimately for the University.

By April all looked set fair and Julius, delighted, wired Rivett inviting him to join Newbigin and himself at the first meeting of the Executive (as it was soon to be known) on April 12 at Albert street.

There was some trouble about the position of Gerald Lightfoot. As former secretary of the Institute he had drawn up a scheme whereby the Secretary really chose what should be submitted to the Executive and communicated directly to the Minister. The meeting at Albert street decided otherwise. Following the discussion David noted a number of firm conclusions from which he seldom departed in the years to come.

The Executive decided that the Secretary would be in no way what the Director had been in the Institute that C.S.I.R. was to replace. A series of distinctly abrasive confrontations between Lightfoot and Rivett followed. Lightfoot's ambitions were quite legitimate. He was unlucky that he should strike a man, equally intent on controlling the new body, who had more appeal to both the Prime Minister and the new chairman.

The Executive decided to seek to control the personnel of the various State committees so that both primary and secondary industries of the State would be represented and they would have a hand in the appointment of State chairman.

Above all Rivett carried the Executive and later the Council in his view that one man should take ultimate control of each research activity. This would give him responsibility—affecting his reputation—for the success or otherwise of his work. If such a man wanted a committee let him appoint it.

This was contrary to the previous belief that every field of research should finally be controlled by a committee. It was to prove itself the key principle in C.S.I.R.'s future achievements.

That April he jotted down his views on *Functions of Executive*:

Executive:

1. NOT to act as scientific directors or judges of results.
2. To determine, on the best available advice, what problems should be attacked.
3. To find the best man to put in charge of the investigation of such problems.
4. To provide full opportunities to such men to solve their problems; if necessary greatly curtailing the list of problems to be tackled in order that those chosen may be concentrated upon and not made to suffer from lack of funds or attention.

The speed with which the Executive worked is shown by a sheet in David's handwriting listing issues drawn up at that meeting on April 12 for Julius as chairman to put to the Prime Minister on the 13th.

The questions in pencil, with the Prime Minister's replies inked in on Julius's return, were:

What is present position of Executive until Bill is passed?

IT CAN GO AHEAD AS IF POSSESSED OF FULL POWERS.

Relationship to Bureau of Commerce and Industry?

THE BUREAU IS DEAD.

Tenure of Executive Committee?

SUGGESTION 5, 4, 3 YEARS RESPECTIVELY, THEN 5 OR 6 SO THAT DO NOT RETIRE TOGETHER.

Can Committees be formed at present?

YES.

Can we send trainees at once? 4 to go at once?

YES.

If Bruce was fortunate to find a mind which went instantly to the core of the challenge, David was equally lucky to have as Prime Minister a man who wasted no time with red tape or doubts. Bruce backed his initial judgment by allowing the appointed men to act with maximum speed.

After that breakfast-hour of clarification between Julius and the Prime Minister, there was a lunch at the Windsor with David as host. In the afternoon, at a long meeting, the Executive settled 40 points raised by the Ministers of various departments. Then it emphasised its sphere as 'scientific investigation; not a department for the dumping of awkward queries.'

Next day, April 14, David urged the Executive to consider as the five main tasks of the immediate future:

- Animal pests and diseases
- Plant pests and diseases
- Preservation of food
- Forest products
- Fuel

By April 16 he had his list of potential State chairmen and a host of special recommendations for each State Council. There had been a searching review of the work left unfinished or contemplated by the now defunct Institute. The principle had been laid down that the Executive would not be involved in testing of processes suggested by private firms or individuals. They would however be prepared to go into any schemes laid before them by accredited scientists. Throughout its lifetime the C.S.I.R. was to be badgered by enterprising individuals trying to boost their own profits with the Council's aid. But the guidelines laid down before the Council existed in law have been a bulwark for later administrators.

Those weeks of the autumn of 1926, before the Act establishing C.S.I.R. had been placed before parliament, were possibly the most decisive and far-reaching in the whole formulative process stretching back to 1916. For this, the unstinted backing and encouragement of Mr. Bruce was of key significance.

It was in those weeks that the long boredom suffered in travelling to and from various scientific assemblies around Australia since the war paid off. David had obtained from his Australian National Research Council duties knowledge of who were the diplomats and talkers and who were the doers in most branches of Australian science. In each State he knew men whose integrity and dedication was beyond question. To these he

turned for advice and guidance about the first appointments that were to set the whole tone and standard for C.S.I.R.'s eventual development.

Historians hitherto have set the launching of C.S.I.R. as 1 January 1927, when the Parliamentary Act took effect, or, at earliest, at the first meeting of the new body's full Council on 21 June 1926. In fact almost all the vital decisions and principles that were to shape the extraordinary story of C.S.I.R.'s 23 years were taken in the hectic three weeks that followed those first meetings of principals and Prime Minister on 23 March 1926. David was fortunate that his highly individual and iconoclastic methods met with such ready response and support from the two men who could have aborted his adventure before it was officially begun.

Through the next 19 years George Julius and David Rivett, despite infrequent but heavy clashes, were to prove a most successful team. Several of their heads of departments believe the key factors were four:

- (a) each man was pre-eminent in his own field
- (b) each developed deep respect for the capacity of the other
- (c) their strengths and weaknesses were complementary
- (d) they both felt the task was a supreme challenge

In Volume I, No. III of the records of the Australian Academy of Science, George Currie and John Graham, make this analysis of Julius and Rivett:

Both men were possessed of intense nervous energy and by a passion for the development of Australia. Both had abilities of the highest order. Julius had the greater experience in practical affairs, Rivett greater experience of science and scientists. Julius was a son of a Bishop of the Church of England and Rivett the son of a minister of the Congregational Church, and both brought from this church background a flame of idealism which illuminated all they did. . . .

Sir John Madsen, the brilliant Sydney radio-physicist, had a number of opportunities of sitting at conference with the two men both in the twenties and later on. He recalled:

ACDR was the one primarily interested in research. Julius always gave the engineer's aspect and concentrated on the technical side. Often the two couldn't see eye to eye and went at it hammer and tongs. Both gave sound arguments and concentrated on the type of man you wanted. Finally they always reached agreement as to what would be best.

Sir Samuel Wadham, who sat on the Council and watched the impact of the executive on the councillors, found that the combined talents of Julius and Rivett were irresistible. Both Masson and Heath had envisaged a Council which had the final control over Executive decisions. In practice, Wadham found, it was never like that:

Julius was in the chair and any opposition to proposals was met by a broadside from Rivett. . . . In my view Rivett was one of those people who has the capacity to know what your next question is going to be in any argument and has planned how to meet it before you ask it. This capacity is somewhat frightening to lesser minds but it is the mark of genius in administration. I do not think he was always right in his judgements of men and was at times a little susceptible of flattery, but the organisation which he built as Chief Executive Officer was extremely effective in most of the directions into which it moved. To those who are interested in the advancement of science his epitaph should certainly be that of Sir Christopher Wren.*

Dr. J. R. Vickery, one of the brilliantly successful of C.S.I.R.'s heads of department, says that meetings of the Council 'were largely a monologue by Julius with pertinent comment by Rivett. Few others ever spoke unless spoken to'. He believes Julius 'while impressed with his own views was extremely susceptible to Rivett's advice. He never pretended to be a scientist and generally accepted wholly ACDR's representations on behalf of working scientists.' Julius, says Vickery, was a most successful engineer and entrepreneur with strong political contacts. He understood how strings were pulled behind the political scene. He was probably the best chairman available through the organisation's first two decades. Most matters had already been

* 'If you would see his monument just look about you.'

thrashed out by chairman and C.E.O. so that presentation to the Council was largely a matter of form. The system worked exceptionally well while C.S.I.R. was small and growing.

David and Julius had a leisurely look at each other, outside the office and their formal meetings, during the long train trip to and from Perth in August of that first climacteric year, 1926. Both were to address the Australasian Association for the Advancement of Science.

David's remarks in letters to his wife, show the depth of his regard for Julius. Whenever he was moved to criticism he swiftly qualified it with appreciation:

. . . he is a singularly capable man and quite the right fellow for the job. . . .

Julius gets a good grip on things pretty quickly . . . at present I prefer to share responsibility and certainly would not like to be in sole command. The Executive of 3 is a sound idea.

(Early in 1927, the third member of the Executive, the Sydney engineer, Mr. W. J. Newbigin, died suddenly. His place was taken by the Director of Adelaide's Waite Institute, Dr. A. E. V. Richardson, who had been Professor of Agriculture there since 1924. A large, cheerful, kindly and quietly capable man, he was an ideal foil for his more highly-strung and argumentive colleagues. He acted as David's deputy whenever David was abroad or ill. His presence added necessary balance to the Executive. A man of many friends and scarcely an enemy, C.S.I.R.'s development must always owe him much.)

In 1926 David revealed a revolutionary concept of the path to scientific development of Australia's resources. It did not accord with the advice expert committees had so often pushed forward in the various planning conferences. From the very beginning of his connection with C.S.I.R. he had one overriding aim. It was to find the best possible man in a given field and then clear the way for him at all costs to develop his own team, work place and methods with the minimum of interference or hindrance for administrative or financial reasons.

Major successes in the U.S.A., Britain, France and Germany over the last forty years have spelt out the verdict of scientists

on this thesis. Again and again, an inspiring leader has attracted the best youthful talent by his own inspiration and example. The results from the team thus formed have exceeded all expectation. With the lavish endowments at the disposal of researchers in the U.S.A., it is today commonplace for topflight men to expect exactly this kind of backing and facilities.

No such understanding of this approach existed in Australia in 1926. It was directly outside the whole system on which the Commonwealth Public Service had been built. Indeed it violated the general concepts of government-financed activity and the careful distribution of checks and balances built into every departmental project.

For its success, the Rivett scheme depended on the sheer quality and dedication of the chosen leaders. Initially, the task, which fell almost solely on David, was to attract top men from other forms of service where they were often quite content and well looked after. At times in the early years the fight was desperately difficult. Once, near the outset, C.S.I.R. reeled under a totally unforeseeable loss. There was also the nerve-racking experience of obtaining one leader (by universal consent the best man in his field) and seeing him rapidly collapse under a series of inner tensions and disabilities which had little or nothing to do with C.S.I.R.

David began his task with three assumptions. None of them would have appealed, then or now, to the Public Service Board or most senior public servants. But they were to prove invaluable, before the infant organisation was even three years old, when the bitter gales of the depression began to blow across the continent. With politicians, economists and planners backpeddling in every direction, the underlying philosophy of C.S.I.R. administration was exposed to prodigious strain. That C.S.I.R. emerged finally, virtually unscathed, despite the heart-breaking retrenchments, delays and compromises which momentarily vitiated so much that had been hoped for, was due to the strength of these principles. Grants from the Empire Marketing Board and the Rural Credits Development Fund were to help David to avoid dismissing valuable personnel.

The first was that the man at the bench had absolute priority. Once you had chosen the best man available for a particular line

of research the next necessity was to clear all possible obstacles in his path. The best and most enjoyable days David spent through his 24 years at C.S.I.R. were in the laboratories and in the field with staff, discussing their work, learning of their problems, finding their needs.

The second principle that followed from the first was that when pennies got thin—they were emaciated during the depression—everything that was left must go to the man doing the research. Administrative costs, any luxury or extravagance for top brass, was unforgivable while there was not enough for the requirements of the dedicated men who made up his team. 'Other, much lesser Commonwealth officers ordered cars and taxis at Government expense as a matter of course. Rivett always used the tram.' (the late H. P. Breen.)

The third and most important part of the Rivett code (he would have hated the word) was to give unlimited trust to the man chosen. If you were let down you delved for any reasonable excuse to give him a second chance. Fortunately his selections were based on a training of 20 years under that master, Masson, plus his own self-critical mind. So, very rarely in the formative years did one have cause to say that in any department C.S.I.R. had the wrong man at the head. Entomology, the sad exception, was saved from disaster by the quality of the staff and by early replacement.

From the time when Bruce made the necessary arrangements with the University authorities, David had several months to make up his mind whether to forego his chair and plunge into the unchartered waters. Many friends expressed forebodings. Those who afterwards spoke and wrote as if everything had been cut and dried once Bruce nominated his team are quite ignorant of the wracking battle that went on in David's mind throughout the autumn and winter of 1926. At frequent intervals, aspects of the new post so appalled or disgusted him that his letters indicate how close he came to renouncing it to return to the students and teaching he cared about and, perhaps above all, to the original research he loved, craved and now saw receding—perhaps finally—into the limbo of the unachievable. As solace, he even tried to set up a laboratory at 314 Albert street. Had he known that Bruce, his sponsor and protagonist, would within

two brief years, be swallowed up in a political whirlwind and swept permanently from government, parliament and even from Australia, there is little doubt that another man would have had to be found.

The whole atmosphere and values of politics nauseated him. Now he found himself in the middle of vicious currents and tides of personal feeling and prejudice. He was fortunate that little or none of this was against him personally. With remarkable unanimity, with scientists in the fore, his own appointment was welcomed in all six states. The early crack that the new triumvirate to control Australia's scientific development consisted of 'two plumbers and a pill-roller' delighted him so much that he frequently quoted it, thus helping to defuse it. But while his personal selection was scarcely questioned, he found, within days, that industry, commerce, the primary producers and above all the universities looked upon Bruce's new foundling with suspicion, fear and resentment. Jealousy was mixed with a great deal of scepticism inspired by the failure of the old Institute of 1920-26, failure for which poor George Knibbs was in no way responsible. He had been a statistician in a scientist's job.

Within a fortnight of the first meeting of the full Council, an old friend, a senior Cabinet minister, sent him an explosive screed which was a mixture of perceptive brilliance and unprovable scurrilities. The writer attacked the appointment of two members of the new Council, Masson and Lyle, who had been Rivett's own teachers, as 'both nearing seventy'. He put in a strong plea for the one Melbourne scientist whose inability to co-operate made it certain that his selection on C.S.I.R. would have instantly produced a rash of resignations from most of the ablest members.

Writing to Hedley Marston in 1961, Viscount Bruce himself recalled the feeling that accompanied the genesis of C.S.I.R.:

. . . I put forward a proposal for the creation of C.S.I.R. which met with a very determined resistance. The most surprising resistance came from the Universities and pure scientists. . . . There were very considerable difficulties to be overcome . . . principally:

- 1 To persuade the Universities that C.S.I.R. was not designed to filch their work, its objects being to assist them with funds

and in other directions to carry out more effectively the scientific work in which they were engaged.

- 2 To convince the pure scientists that we appreciated the necessity for fundamental research and in this direction were desirous of helping and not hindering.

We also had to obtain the support of industry. . . . A further problem to be faced—if C.S.I.R. was to play the part I envisaged—was the need for the organisation to be given time to prove itself. I felt strongly that if its financial resources were left to the whim of Governments and Treasurers, the organisation was likely to be strangled before it was born, because of inadequate financial assistance. . . .

The next problem was to find someone to run the independent C.S.I.R., as everything depended upon the selection of the right man. . . . This background leads up to the appointment of Rivett.

Rivett was entirely acceptable to the Universities and the scientists. His decision to give up the Professorship of Chemistry at Melbourne University—which meant the severance of a brilliant academic career—to throw in his lot with C.S.I.R. is perhaps an indication of how highly he regarded the work the organisation was setting out do. . . .

However, this was all said with the kindly illumination of aftersight. Nothing about C.S.I.R. looked particularly rosy to David Rivett during those testing, founding, exploratory months of 1926. His doubts indeed continued for many months after the Council was officially established at the beginning of 1927.

His letters to Stella during the long interstate absences give access to his thinking. In July 1926, he wrote:

If I ever take on this job as a fulltime business and the longer I wait the less I like the notion in view of all the inter-state jealousies and the pettiness of jealous University creatures. . . .

Even after a full year, in May 1927, he was writing:

No doubt it was a very good thing to take the job for to have refused it might have meant everlasting regrets based on ideas of what it might have been. ON THE WHOLE I AM STEADILY TURNING AGAINST TAKING IT AS A PERMANENCY. . . .

(He then listed all the reasons for leaving the University.) 'On the other hand . . . the job of C.E.O. is going to be a mass of

detail. Office work is really not a bit attractive. Chemistry will be absolutely crowded out; lab. work certainly and reading most probably. That means that I cease to be capable of ever returning to a chemical job of high degree. Then I see little chance of absolute security of tenure until I am 60 . . . chances of a chair being vacant and of my getting it are negligibly small. . . .

'Perhaps I am a bit tired at present—and a little over fed-up with the prospect of endless conferring with endless people and the everlasting necessity to try and reconcile conflicting interests and men. With all these committees—efficiency seems almost impossible unless one can travel perpetually and be on the spot everywhere and always to warn and guide. . . .'

A few days later he wrote:

I can see such infinite trouble in every direction—with all these State committees and the huge number of people to deal with all over the place, that I think it will drive me silly. It wants a callous, puddenheaded, clerical officer. . . .

That particular attack of dislike of the job was met by a shot in the arm in the discovery in Brisbane of his young sister Chris, from whom distance had cut him off almost entirely for 20 years. Christine, the first woman pilot to gain an A-certificate in Queensland, had become one of the top surgeons and women's specialists in Brisbane's Wickham Terrace. That reunion in May 1927 began 34 years of deep friendship and exchange of confidences about all things under the sun, an association which was to be a boon beyond price through all his difficulties and setbacks until finally he died with her at his bedside. He wrote to Stella ecstatically:

If I had known what this amazing little creature is like I would have dragged you here by force if necessary. . . . I honestly believe she could put her finger on the underlying causes of your perpetual struggle against ill-health and in so doing and in talking to you about it you would be simply fascinated. . . .

Even Chris, who was to give him a new zest for life just by being herself every time duty called him to Brisbane and who accompanied David, Stella and their younger son to Britain and

Europe in 1936, could not compensate for loss of his first love—laboratory research. The hankering persisted down the years.

Mumps laid him low in Tasmania at the end of 1927 and the old longing swept over him:

There is a paper in a recent number of *Zeitschrift* . . . on the hydration of ions which rather bears on some of the work I have done in the past few years and it may be worth while to write a note on it. I really must take active steps soon to get going with a laboratory at Albert street. It is my only hope to keep sane amongst all this damned crowd. . . .

Again three months later:

. . . have read nearly half of Sidgwick's book on the electronic theory of valency. It is excellent, especially the part on solubility which I must read again tomorrow. Feel quite depressed when I remember that my own research work has been so completely cut out of late. Somehow or other it will have to be revived. There is a room in the loft in Albert street which I should be able to fit up fairly well if only I could get the time for it.

He never did get the time.

The basic arguments against leaving the University—and thus abandoning the work he loved most—haunted him all that winter. They went rather like this:

He was now 40 and after all the striving the University goal had been well and truly achieved. Why should one leave this splendid house with its elm-fringed lawn, its ideal paddock and secluded garden for the youngsters, the stability and relative shelter of life in a professorial chair handed down from the scientist he admired most? Must not a national post involve work with politicians of whom he had little knowledge but whose values and utterances often seemed the antithesis of what he cared and strove for?

He was basically a man of research, a seeker after truth. Only a superficial survey was needed to see that this scientific executive was going to become immersed in administration. His interest, his sympathies, all his own training made him anxious to get down and share the problems of the men on the bench, the workers in the machine shops and laboratories who were trying

to find answers, solutions to destructive and hampering agents. Would he indeed cease to be a chemist? If this very new, un-blooded organisation did indeed grow and prosper and prove itself, would not that very achievement simply lay on the responsible chief an ever-widening accumulation of organisational problems and tasks? Swamped in paper, whether one led a team of ten or of a thousand, did not one cease in fact to be a practising man of science and become merely a clerical worker? What of the students? Wasn't his training, his admiration for the Massons and the Sidgwicks and Arrheniuses, partly based on their glowing faith in the need for passing on and inspiring new, greater and far wider knowledge and more successful searching after they were gone? How did you carry on this search, this seeking and fashioning and guiding of the best young men when you were entrusted with a national institution where however many councillors and fellow executives they gave you—you eventually must take most of the critical decisions?

Against this was one major consideration—the excellence of Hartung. The Masson tradition at the Chemistry School could be in no better hands. The renegeing of Rivett would not matter to even the best students with Hartung to step so efficiently into his shoes. The Masson-Rivett-Hartung spirit which had made it 'the most stimulating lab. in Australia' would be carried on and all the great Masson principles would be faithfully honoured. Only two years before, another famous professor had come out of the A.N.R.C. conference shaking his head. Rivett, he said, had made the speech of the conference but Hartung was 'almost unbelievably good. God help the Melbourne chemistry students with you two machineguns in front of them!' he exclaimed piously.

The crisis of decision (despite all the backlookings, he never reversed a major decision throughout his working career) came on the journey to Perth with the Juliuses for the A.A.A.S. conference in August 1926.

Was he influenced finally by eyeball-to-eyeball inspection on that long journey of the *genus universitatis*? We cannot know. But a measure of disillusionment and cynicism were inevitable during that five days of jolting monotony on the old Trans-Continental express. Repeated buttonholings by scientific and

academic colleagues anxious to put their own grievances, frustrations and jealousies into the ears of the new science chief stung him to write to Stella:

There is no doubt about it, many University professors are most abnormal, unreasonable, ill-balanced people. I begin to cease to wonder that they are regarded by the politicians as utterly unreliable men for positions of power. . . .

Some of the crowd are weird beings. I think they rather amuse the Juliuses who are not familiar with the bug-hunting species of scientist. . . . Really there are some queer fish with a most extraordinary incapacity to take a broad view of anything at all. I honestly do not wonder that people like Bruce and Latham shudder at the thought of putting anything like C.S.I.R. under science men only. Business people are bad enough but they do rub off their angles a bit more than seems possible for creatures like. . . . I sometimes feel quite apologetic for my class!

A day or two later there was an illuminating 'hunch' which colleagues of long-standing would certainly regard as entirely un-Rivett:

For some time I have had a curious sub-conscious feeling that I was going to be landed in it somehow or other—or rather ought to take it. Quite an unreasonable feeling but somewhat the same as I have had on previous occasions regarding several other matters of some importance.

The die was cast, Julius went to see the Minister, Sir George Pearce, in Perth on 27 August 1926. The gist of his representations was threefold:

1. As chairman he was satisfied beyond reconsideration that C.S.I.R. to succeed must have Rivett full-time and that there was no conceivable satisfactory substitute.
2. That £2,000 a year asked by Rivett for a five year appointment was exceptionally good value.
3. Could it please be finalised forthwith?

David reported to Stella by letter that evening:

Pearce fully agreed with the proposal to offer me £2,000. He showed J. a wire from Bruce supporting it. . . . Page being Treasurer may not be entirely complacent. If he is settled then it is

considered that at the next meeting Cabinet will pass it. Till then I say and do nothing at all.

Having burnt his boats, he concentrated on the financial security that might be in store for Stella and the boys even if Bruce did not survive more than one further election. Whimsically cheerful, now the matter was out of his own hands, he wrote Stella:

Out of £2,000 we ought to be able in five years to save enough to tide us over an interregnum in which another position has to be sought, if at the end of that time I get the sack. . . . With ten years at the job, we, aged 50, ought to be in a fairly sound financial position even on our own savings alone provided you don't force me into any risky speculation on the Stock Exchange and provided also that you continue to give me £17 to pay 36 guineas' worth of expenditure!

David was probably the only one who had any doubts. Bruce had long ago made up his mind and he was running the country. It was all official a few days later. David had said goodbye to labs and teaching—irrevocably.

For the next three years the decisive work among the thousand problems crowding each month onto the desk of the C.E.O. in Albert street, was finding the men to lead the various research teams. In retrospect this was David Rivett's unique achievement. In many cases, colleagues and close observers at the universities were satisfied that no other man in Australia—some said in the Empire—could have led that exceptionally talented team of supreme individualists into leaving the posts in which they were happily ensconced to join C.S.I.R. In other cases, exemplified by Sir Charles Martin, even those closest to both Martin and David were positive that there was no hope that the C.E.O. would get his man. But Martin at 68 followed him back to Australia a few months after they had talked together.

In the space of 36 months, from mid-1927 to mid-1930, the British world was combed for the best men to lead Australian research into the key priority problems. An incomplete roll of those whom David drew to C.S.I.R. in this period—either as

chiefs of division or destined before long to become chiefs—is worth looking at:

Brailsford Robertson

John Madsen*

B. T. Dickson

R. J. Tillyard

I. H. Boas

Francis Ratcliffe

J. A. Gilruth

Lionel Bull

James Prescott

H. R. Marston

A. J. Nicholson

James Vickery

and last, but very far from least, the unique

Charles James Martin.

To take three or four pages to sketch in outline the story, achievements and inspiration of each of these men would be a delight. Without them there could have been no successful C.S.I.R., without them the Council might have been as forgettable as its preceding Institute. Unhappily in one man's biography a score of potted biographies of colleagues cannot find place.

If one did disregard editors and publishers' limits, how fairly could one sum up the exceptional achievements of a Martin, a Madsen or a Vickery in a few lines? And what of the men, still unknown to C.S.I.R. in 1930 who were to mean so much to Rivett in the later years? What of Wark and Bowen, Clunies-Ross and Coombes, White and Rees? Each one of these men served greatly in his own right and should have his own fitting chronicle. So should that hard-core of central office personnel who did so much for so long with a twentieth (or less) of today's supporting staff and facilities. What of Lightfoot, Cook, Breen, Drake, Grace and others who helped to make 314 Albert street

* Sir John became chairman of the Radiophysics Advisory Board and of the National Standards Laboratory committee.

tick? What of those founding brethren (started 1/7/26)—G. F. Hill, R. W. Constable, H. T. Chadwick, P. Domec-Carre? What of Wally Evans? What of the female but equally essential cogs, the supremely efficient Ellinor Archer, the matchless secretary Agnes Slattery, the devoted Bronwen Thomas?

These people helped to make David Rivett's every day. They smoothed a path that often might have seemed impossibly rutted. Several of them idolised him. When I queried the use of this word in several personal accounts of those years to two older, hard-headed males who knew the score they sharply rebuked me. 'Of course they idolised him. They know it. You must know it. You must use it. Any other description is palpable understatement.'

Regretfully one must in the case of the chiefs reduce the sketches to two (with a word later about Sir Charles Martin). The first in appointment, the first to die, the pioneer for David's 'men on the bench', was Adelaide's Brailsford Robertson, a path-blazer in an organisation whose leaders specialised in treading the untrodden.

Born in Edinburgh in 1884, educated at Adelaide University, he joined the physiology staff of the University of California at 21. Specialising in bio-chemistry, he succeeded his father-in-law, Sir Edward Stirling, as professor of general physiology at Adelaide when he was 36.

Brailsford Robertson, in idealism, outlook and sheer energy epitomised the type of research leader around whom David Rivett hoped to build C.S.I.R. In 1926 he was named as first chairman of the South Australian state committee and a member of the Council.

The emphasis placed by all organisations and authorities on problems affecting sheep in Australia pointed to the necessity to bring Brailsford Robertson to C.S.I.R. as a permanent officer. There were months of difficult negotiations with the University of Adelaide, which, not unnaturally, was loath to lose one of its most brilliant sons to a new and untried national organisation. Those close to the University stated at the time that 'nobody except Rivett' could have carried the day in Adelaide. In any case, at the beginning of 1927, Brailsford Robertson became

C.S.I.R.'s first divisional head, chief of the Division of Animal Nutrition.

For the next three years the astonishingly rapid work developed and carried out by the laboratories, built for Robertson to his own design, was perhaps the most spectacular justification of the theory of finding the leader and backing him unstintingly.

Robertson concentrated on the sheep. Field stations at the Waite Institute, Adelaide, at Mt. Gambier, at Beaufort, Victoria, near Moree in N.S.W. and west of Rockhampton in Queensland poured in reports for the fundamental research Robertson was conducting in his laboratory. Never before had the problems of animal nutrition in Australia been tackled on such a wide front. David wrote in January 1930:

He built up a devoted staff. . . . The team spirit animating them was of the very best and the C.S.I.R. had good reason to congratulate itself on the prospect ahead of it for work of the utmost national importance. . . .

The confidence of graziers in all states he reached was in marked contrast with their early suspicion of academic theorists and 'test-tube farming'.

Then Fate struck a savage blow. Early in 1929, Rivett heard that Robertson, overworking prodigiously, was not in the best of health. Immediately he wrote him a very strong letter. Not put off by a reassuring telegram from Robertson he contacted Robertson's doctor who confirmed his own fears and suspicions. He then wrote Robertson: 'Take a holiday NOW. These things can be arranged if one is determined enough.'

Still concerned and well aware that Robertson had worries about his financial position and a burning zeal to get on with the multitude of challenging problems awaiting solution, Rivett wrote to Robertson's Adelaide doctor, a mutual friend:

He is not to worry about the financial position. Strictly according to Public Service rules he has six weeks on full pay . . . regardless of Public Service regulations it is certain the Executive Committee would fix things. . . . It is his enthusiastic devotion to our work which has brought him to such a pass. . . . Marston should be able to carry on the routine laboratory work. . . .

All through that increasingly difficult and stormy year, as the Depression gathered force, David was deeply concerned about his brilliant colleague. His letters to friends and colleagues of Robertson in Adelaide who might influence him spell out the story. But Robertson was one of that pathfinding breed of scientists who lose all consciousness of their own physical weariness and exhaustion in their obsession with the job. In the middle of January 1930, despite a high temperature traceable to influenza that developed into pneumonia, he insisted on going to his laboratory in a heat wave. He collapsed at the bench and was dead a few days later.

It was a desperate loss for Australia. Probably no one felt it more keenly than David who had seen all his beliefs and personal faith in the future exemplified by Robertson and his team's work. Paying tribute to his lost colleague at the invitation of the Melbourne *Herald*, he wrote:

Aged only 45, it seemed that Robertson had many years of brilliant work ahead of him. His vast investigations into fundamental principles equipped him in a unique manner for the attack he was making on the immense problems of animal nutrition in Australia. . . . No one can estimate the seriousness of the check his sudden passing has given to scientific work (for) . . . the pastoral industry.

Some of those closest to him believed that nothing in C.S.I.R.'s first 20 years hit David harder. But his immediate reaction was to seek—despite all obstacles—the one man whose status and leadership in the world of science might enable Robertson's work to be carried on with a minimum of delay and frustration.

In the Adelaide laboratory was Robertson's closest assistant and acolyte, Hedley Marston, a young scientist whose nervous system had prevented him acquiring those degrees which his brilliant mind easily qualified him for. There was no possibility of Marston directly succeeding his dead chief, but Rivett saw that if a prestigious international figure could himself pass judgement on Marston's capabilities, all the obvious pitfalls might eventually be avoided. In the event, this was achieved. The animal nutrition and the entire stockbreeding industry in Aus-

tralia was the beneficiary. But the battle was prolonged and extremely arduous.

There was one extreme contrast among the chiefs. David was never to forget the appointment. When the C.S.I.R. sought for a man to tackle the huge problems of destruction wrought by insects on the Australian economy one candidate stood out above all others. He was Dr. R. J. Tillyard of the Cawthorn Institute, New Zealand. Tillyard's collections and descriptions of insect life had made him a world figure. After difficult negotiations he was brought to Canberra, made a profound impression on members of both Houses of Parliament in a unique address and was—without query from a soul—appointed Chief of the Entomology Division of C.S.I.R. in March 1928 at a salary higher than that of any other.

This appointment could have been a major tragedy for C.S.I.R. Tillyard, for all his brilliance, suffered such mental stresses that he was difficult as subordinate, colleague or chief. Within months David had resignations pending from almost every scientist who had come into frequent contact with Tillyard. Julius, Richardson and he had developed tolerance in dealing with the wide spectrum of able men whose services they sought but no man so tried their patience or exhausted their sympathies.

In July 1933, Dr. Tillyard suffered a breakdown in New York. Effective control of his department had for some time fallen on the broad shoulders of Dr. A. J. Nicholson. Finally, after prolonged sick leave had failed to produce any assurance from experts of Tillyard's ultimate recovery, Dr. Nicholson, a Birmingham graduate, with a fine war record and superb service to C.S.I.R. since 1930 as Tillyard's deputy, took over as Chief of Economic Entomology.

A catalogue of C.S.I.R.'s triumphs in the field of primary production's problems in Australia has already been established in C.S.I.R.: THE FIRST TEN YEARS. David's view—repeatedly expressed—was that 95 per cent of the credit for this should go to the men on the bench. As, in science, leadership by guidance and example is possibly as important as in face-to-face conflict, this meant that his chiefs of division and their right hand men deserved the lion's share of the public gratitude for what C.S.I.R. achieved in its early years.

However, in his fight to attract to C.S.I.R. the world's very best scientists, he was blunt about what they faced. The window-dressing for which the Immigration Department was often criticised in the fifties and sixties in seeking to draw the hesitant to the sixth continent had no part in the Rivett approach. He thought—correctly it seemed from results—that the tougher the challenge the more likely it was to draw response from the top men in each field of investigation. His briefing to B. T. Dickson, professor of Plant Pathology, at Canada's McGill University, when the latter agreed in July 1927 to become C.S.I.R.'s second chief of division and to be C.S.I.R.'s chief mycologist, is typical of his candour towards the new men:

. . . very warm welcome. . . . I hope will to some extent compensate you for the difficulties you are going to meet as soon as you get here. We have an abundance of problems, quite sufficient to snow you under for some considerable time. Against that, we have practically no organisation whatever. In fact, we look to you, in co-operation with one or two other people here, to start at the very beginning and build something which should in time become a fairly powerful research section. This Council has been in existence for only a year and to a very great extent its plans have yet to be made. But briefly the object at which we are aiming is to get together a band of enthusiastic leaders in different branches of science (chiefly those associated with the primary industries) and to afford them every opportunity for initiating and developing organisations for attack upon national problems. Thus, when you get here, we shall be unable to offer you a properly equipped laboratory but we shall ask you to visit the various institutions in the country where plant pathology work is being carried out and to acquaint yourself as thoroughly as possible with the whole Australian position. . . . We shall then ask you to give us a lead to the right line to follow in developing that work. . . . It may be regarded as at least probable that you will want to set to work immediately in planning the erection of a main central laboratory as your headquarters . . . we shall be prepared to give you every possible opportunity to build up a fine organisation for mycological research. . . .

From the outset David had it in mind that no lasting solution to the great problems of Australian primary and secondary

industry could be found by importing proven specialists from abroad. He wanted to see young Australians who showed research capacity, given opportunity abroad to obtain the latest knowledge of methods and theories in their particular field and then to return to lead the attack on this particular problem. A fund was available and choice of the first nominees for C.S.I.R. studentships rested effectively with David.

A first choice was a 25 year old Melbourne and Cambridge graduate, James Richard Vickery. After working under Sir William Hardy at Cambridge, Vickery was appointed to the C.S.I.R. to carry out investigations in the field of cold storage. Following enquiries into export of New Zealand lamb, Vickery became officer-in-charge of a new Food Preservation section of C.S.I.R. at Brisbane in 1931. So successful was the work of this group that Vickery became Chief of a new division—Food Preservation and Transport. Its work was invaluable to the Commonwealth in wartime and afterwards in revolutionising the shipment of Australian meat and other foods to Britain and Europe. One of the first and youngest appointees of C.S.I.R., Dr. Vickery demonstrated that, given the opportunity, Australian researchers could rival any scientists abroad.

Outside the executive, no one was closer to David in the years of C.S.I.R.'s early growth than F. L. McDougall. McDougall, son of a chairman of the London County Council, had lived for some years in South Africa and then at Renmark as a fruitgrower. Stanley Bruce, for whom he acted as advisor at the Imperial Conference of 1923 and 1926, placed him in a key position as 'correspondent' or liaison officer in London. There, at Australia House, he represented both the Development and Migration Commission and C.S.I.R.

Clubman (Reform), bon viveur and golfer, McDougall had exceptional talents for representing Australian needs to Englishmen and for interpreting possible English responses to Australians. Growing involvement in C.S.I.R.'s affairs was evident in the Rivett-McDougall correspondence from 1927-30 and this further developed into a close friendship based on mutual admiration during the six months David was in Britain in 1930. Over the years McDougall played a major role in establishing

interchange of ideas and personnel between British scientific establishments and the C.S.I.R.

Frank analyses of the politicians and civil servants were mutually helpful. McDougall was a personal friend of several ministers in the National Government formed at the end of 1931 and an intimate of the editorial group at the Times. His insights into British politics were sharp and spiced with humour. This delighted David who had always corresponded on these lines with his own family but seldom received much on the lighter side from his scientists. He and McDougall could see an amusing side in even the grimmest cuts and setbacks and helped each other to keep frustration and genuine grievance in proportion.

The full value of McDougall's work as an oiler of the machinery of Commonwealth has yet to be assessed but David made no secret of his invaluable role for C.S.I.R. as consultant in London. (Sir George Currie and John Graham have partly explored the relationship in 'Growth of Scientific Research in Australia: The C.S.I.R. and the E.M.B.')

One of the many hats McDougall wore in representing Australia in various inter-governmental committees was membership of the Empire Marketing Board. David's faith and enthusiasm towards the Board was to reap rewards for Australia when the fog of the Depression suddenly quenched the bright morning sunlight in which C.S.I.R. had been launched. With money from Canberra cut to the bone, McDougall's successful advocacy (proposed by David) secured grants from the Marketing Board. Thus work which would otherwise have been abandoned was kept going. However, while David was far from happy that Australian research was not being paid for by Australia itself, he did not abate his insistence that Australians should prepare themselves for fundamental research. This should be their own work without relying on second-hand information from others.

He wrote to McDougall in April 1929 his reasons for insisting that young Australians should gain experience at the research centre at Farnham Royal, despite Farnham's preference for recruiting Britons who would remain in their country:



Stella Deakin, when David left for Oxford in 1907.

Stella and David in Germany in 1909 when they announced their engagement.





David's closest friend in his later years,
Doctor Hedley Marston, chief of the
Animal Nutrition Division of C.S.I.R.



The Executive of the C.S.I.R. from 1927 to 1945.
From left: Sir George Julius, Chairman, Sir David Rivett,
Chief Executive Officer, and Doctor A. E. V. Richardson.



The Chemistry School, Melbourne University, where David worked as student, lecturer and professor for many of the years from 1903 to 1926.



The Nobel Institute team of 1910. Professor Arrhenius is second from left at back with the charming women of his household in the centre. David in bowler hat is in the foreground with other researchers from half a dozen nations.

If we make it a practice to send our severe problems elsewhere and confine ourselves to the intellectually easier and less stimulating, though perhaps economically more productive, task of applying knowledge obtained in other places, we shall run the risk of definitely lowering the standard of ability of our own workers. . . .

From certain points of view it might be exceedingly wise for Australia to restrict itself entirely to the development of primary industry, leaving to Britain practically the whole of secondary industry. . . . England could get cheaper food, Australia cheaper products of engineering and other workshops. Economically then, it might have much to commend it, but on other grounds such a policy would be suicidal for Australia.

In their study of the C.S.I.R. and the Empire Marketing Board, George Currie and John Graham comment on this declaration of national self-reliance:

A great number of young Australian scientists go to Britain for advanced training . . . the policy of self reliance in science so clearly stated by Rivett and practised by C.S.I.R.O. and allied scientific institutions in Australia has assured the healthy growth of scientific research and scientific training in Australia to the great benefit of national development.

Today in the 1970's, with Britain entering the Common Market and her doors partly closing on many Australian primary products, Australian secondary industry has to compete abroad in other areas. The immense value of that adherence to nationalist independence back in the twenties now needs no underlining. Had David allowed short-term economic arguments to sway the decision, Australia in the seventies could well be slipping rapidly back to the status of a fifth-rate trading and industrial nation.

David knew that McDougall enjoyed the confidence of Stanley Bruce, (he had been advisor at all the Imperial and trade conferences of the twenties). David, appreciating his experience and wisdom, wrote to him rather as an overseas member of the Executive. He disclosed his mind and his hopes and forebodings more fully than he could to anyone outside Julius and Richardson in

Australia. Thus it was to McDougall in November 1927, that he showed how startled he was at the growth of the infant organisation's responsibilities:

When the C.S.I.R. was called into being in June of last year I doubt whether anyone expected that we would within 18 months be aiming so directly at a huge and expensive programme . . . a big irrigation station at Coomealla, laboratories for study of the preservation and transport of meat, fish, fruit; organisation of a big entomological department . . . establishment of a veterinary research centre, a forest products laboratory and a tropical agricultural institute. The nutrition labs. are going up while before many weeks are out we shall be drawing up plans for the mycological section and possibly for plant work in general. . . .

For 14 months, McDougall was David's confidant about his struggle to stall off a move to form an Economics Research Division and place it under C.S.I.R. He told McDougall that Bruce himself was active in the move and had asked prominent economists in Messrs. Dyason, Copland, Giblin, Mills and others to discuss among themselves formation of such a Division to assist the Government. The economists, he told McDougall in November 1927, 'are attracted towards the possibility of associating it with C.S.I.R. in order to obtain the necessary freedom which might not be available were they attached to any other Government Department.'

For once, Chairman and Chief Executive were in conflict. Julius supported the Prime Minister's view that C.S.I.R. might well take over a new department exploring tariffs and other highly controversial economic issues. David felt that C.S.I.R. was already overloaded. Economics, as was abundantly evident in the weekly, almost daily, controversies between leading economists at this period, was, he felt, far from an exact science. Political philosophy and bias seemed capable of producing—from alleged experts—diametrically opposed conclusions. David felt that for C.S.I.R. to intervene in a field where it was bound to become a party political football could be a disaster, possibly a death blow.

He wrote from the Hotel Canberra in January 1929:

Julius was a bit difficult over economics research this morning. I sometimes think he wants to take over rather an undue share of the government of the country. It is possible for an organisation no less than an individual to become a little conceited and I suspect that there is a tendency for C.S.I.R. to get ahead of its real earnings.

Fortunately the British Economic Mission decided that an economic research body should stand on its own feet. The Prime Minister, finally, was somewhat swayed by David's strong fear that involvement in party political controversy could affect C.S.I.R.'s other activities. By the middle of that month, David was able to confide to McDougall that he believed C.S.I.R. was to be spared this accretion. If so, he said: 'I for one shall throw up my hat with joy—though strictly in private!'

In many ways the McDougall correspondence, especially in C.S.I.R.'s first decade, was as refreshing to Rivett administratively as his exchanges with Sir Charles Martin were to his outlook towards science. McDougall's move to other fields gradually made their ties less direct; but it was a permanent asset for C.S.I.R. through the most difficult period of the thirties that its leader had the close friendship and counsel of such a man.

There were, happily, few points on which Chairman and Chief Executive were not in agreement. One of them was the menace, hovering over C.S.I.R. in 1928-29, of a move of headquarters to Canberra. That this was ultimately deferred until the late 1950's was a matter for intense satisfaction to many in C.S.I.R.—not least to the C.E.O. The turning point, as David told McDougall, came at a dinner at the Adelaide Club in early 1929, given to Julius and Rivett by Sir William Young, Chairman of Elder Smith, a stalwart for C.S.I.R. in South Australia:

W. J. Young gave Julius some good home truths about the folly of centring everything in Canberra—also some sour ones about the views which a good many people are taking about Canberra . . . the immediate point is that we scatter our divisions

a bit and put only entomology and botany in Canberra. . . . It will be possible to make a more and more sound case for remaining in Melbourne. . . .

More than eighteen months before the squeeze came, David predicted to McDougall the money problem that was to bedevil all C.S.I.R.'s plans and development from 1929 to the mid-thirties:

. . . we here are going to have a pretty solid fight before long to get the money we require for tackling adequately even only the major problems before us. . . . We are not yet a department the support of which is recognised as a legitimate charge on annual revenue. I frankly doubt whether we can do our job effectively on less than £250,000 per annum . . . though it will be at least three years before we reach that figure. . . .

This proved correct. Presently the politicians who had been enthusiastic for new C.S.I.R. projects almost every week were forced to cut the infant institution back so savagely that one Budget was about a third of the above figure. The fact that the infant survived this early onset of extreme malnutrition testified to the team spirit and pride built up in the first years of C.S.I.R.

Throughout the opening years of C.S.I.R., the Prime Minister's backing was steady and consistent. A note in February 1928, from David to Stella, gives the scene of the Bruces at home in those first years of the national capital:

Tied my tie fairly well. Off in car sent for us. Guests: Gepp, Gunn, Richardson and myself. Dining room at the PM's official house quite small, hardly as big as ours. Mrs. B. very nice. Sat on her left. She asked about you, knew of your illness, etc. I like her very much. SMB most friendly as usual. After considerable talk SMB and Mrs. B. played bridge while I beat . . . at billiards 100 to 73. I may say . . . is very bad indeed. Quite a nice dinner party altogether. . . .

In June 1929, despite the rising economic gale, he was writing to a member of the family America-bound:

Drastic cuts in departmental expenditure are being made—especially in defence. I feared at first that C.S.I.R. was going to be crippled—but the P.M. is taking a most sane view and has an-

swered that we are not going to be held back. He made a good speech at the Sydney Show luncheon last week. I had prepared some notes for him suggesting that economy in research at this stage would not be economy at all. . . . He went one better and said that it would be 'blatant stupidity'. Stout fellow!

However these were the last political days of Bruce, the founder, provisioner and defender of the infant C.S.I.R. Following the Hughes rebellion in his own party, Bruce went to the polls and was whirled out of office and out of Parliament. For the first time in 14 years Labor was in power. The C.S.I.R. executive, just reassured that in their year of greatest expansion to date the Bruce ministry had decided not to cut a penny from the £256,000 they needed, was apprehensive. The policy of Scullin's ministry to the C.S.I.R. was unknown.

Even in the stunning days after dismissal, the defeated Prime Minister had time to think of the body to which he had given life. A letter from 'Pine Hill', his Frankston home, on 26 October 1926, showed a strong sense of humour even amid political disaster.

My dear Rivett,

Many thanks for your note of the 23rd inst. . . . I spent a considerable amount of time with my successor on the question of the C.S.I.R. and am very hopeful that everything will go well with it. When I had finished I had almost convinced myself that you and Julius are two of the greatest men the world has ever seen.

With kind regards,
Yours sincerely,
(Sgd.) S. M. Bruce.

C.S.I.R.'s acute anxiety was unfounded in part. It soon emerged that the new ministry—Senator J. J. Daly was named as minister for the C.S.I.R.—had the highest regard for C.S.I.R. and for the work and goals already established. The trouble, as each week made clearer, was that money simply was not available. David wrote to Herbert Brookes, Commissioner-General for Australia in New York on 15 December 1929:

Naturally C.S.I.R. has had some anxious moments . . . there are difficulties ahead, but they are not quite what some people

expected. The Government is so keen upon our work, that its support—or rather its expectations—are, to me, decidedly embarrassing. Faced with an economic situation which demands huge all-round decrease in costs of production and determined not to touch wages, the Ministry has turned with almost a pathetic faith to SCIENCE . . . unfortunately one can detect a heavy failure to appreciate the limits of scientific work. . . . There is an eagerness for results, almost a child-like belief that they can be obtained for the asking . . . one asks oneself what is going to happen when they see . . . that an immense amount of plodding investigation is necessary before the road is clear.

Senator Daly, although he had been leader of the Opposition in the Senate before the election, frankly told David he knew nothing of C.S.I.R.'s work. David wrote:

I talked to him like a steam engine for about an hour and a half and gave him a whole lot of stuff to take away and read. He did read it too, and when he came back next week he said it had been simply a revelation.

However, Senator Daly's enthusiasm exceeded his discretion and he entered on a series of press announcements that greatly embarrassed David and his fellows who liked to finish a job before anything was said about it. However David liked Daly's openness and keenness to learn. C.S.I.R. could have fallen into far worse hands during the grim time ahead for all Australians.

Towards the end of 1929, David summarised for his new Minister the main divisions of the work in hand and in prospect, less than three years after the act establishing C.S.I.R. had come into effect. He pointed out that concentration had been on the primary industries partly because they were fundamental to Australia, partly because of the wide national character of their scientific problems. Secondary industries, on the whole were better equipped to set their house in order than the primary industries.

Of the first Division established by C.S.I.R., Animal Nutrition, he pointed out how little had been done previously, in a country depending enormously on the production of wool, to study the constituents of the pastures which the sheep converted

into wool and meat. The study of the mineral content of pastures, of a balanced ration in herbage, the introduction of new plants, the elimination of weeds were now being explored in C.S.I.R.'s Adelaide laboratory. Presently the work might be extended to the cattle industry as well.

The Division of Economic Entomology, opened at the end of 1929 in Canberra, was already investigating such diseases and pests as blowfly in sheep, buffalo fly in cattle, the red-legged earth mite, lucerne flea, the Tasmanian grass grub and termites in our woods, as well as other pests taking a toll amounting to millions a year from our industries.

The Plants division, also to be erected in Canberra would be tackling such chronic scourges as St. John's wort, skeleton weed, blackberry, Noogoora burr, Bathurst burr, blue mould in tobacco and others. The classic example of the possibilities in this division was the success of imported insects in curbing and destroying cactus in Queensland and northern N.S.W. The cactus had covered until recently, 55 million acres, and was spreading at a million acres a year. But *Cactoblastis cactorum* was now destroying the invader.

A soil research laboratory was being set up at the Waite Institute in Adelaide to meet the long omission of study of the soil on which the country depended so heavily. Much had already been done in the irrigation areas.

In both Melbourne and Sydney a Division of Animal Health was being established. It exemplified C.S.I.R.'s decentralisation of work and its co-operation with universities and every other scientific organisation devoted to the same ends.

Work already done in the field of Forest Products had led to the manufacture of paper from hardwoods pulp. Fundamental work already done was leading to the establishment of the hardwoods pulp industry in Tasmania (today's Boyer plant).

David suggested that the Minister emphasise that Australia had now reached a stage where scientific work was not some kind of luxury for abnormal men calling themselves scientists. This work should rather be described as a condition of our continued economic existence. The days were passing when wheat and fruit and animal crops could be raised from Nature's bounty.

Commonsense farming now needed the support of the highest obtainable technical and scientific knowledge.

Senator Daly was both enthusiastic and eager to help. But, like other Ministers, he found himself helpless amid the financial chaos. The first four months of the new Ministry saw the C.S.I.R. Executive almost distraught as enforced economies destroyed or postponed indefinitely, carefully planned development. The advice of imported British economist, Niemeyer, was leading to worse troubles. There was no animus. Money simply was, most people believed, not available and the axe was falling in all directions. Madsen's Standards division was the first casualty. In the opening weeks of 1930 the size of the economic gale became apparent.

On 28 February 1930, the bombshell dropped. The Minister officially informed the C.S.I.R. Executive that in view of the financial position of the Commonwealth, it would be necessary for the Council to prepare its estimates in such a way that it would be able to carry on until the end of June 1932, with what remained in the Trust Account, established in 1927 by the Bruce Government. This was about £190,000. The Minister also stated that no new works must be undertaken for the present.

In a blood, sweat and tears exercise, the executive trio cut the 1930-31 estimates from the £257,040 to £163,000. This abandoned all the new projects which had been urged by successive Ministers over the previous year and to which many hours of planning and preparation had been devoted. It was not enough.

In Canberra, in March 1930, Julius, as Chairman, told the Minister bluntly that the Council would have to abandon a number of investigations in hand from which encouraging results were in sight. The Minister said the financial position was exceedingly serious. It was essential that the Council should carry on for two years substantially with funds already at its disposal. It might be that in a year's time no further funds could be provided. In that case the whole C.S.I.R. structure might fall to the ground. He realised the Council had built up one of the most valuable weapons the Commonwealth could use for

re-establishing prosperity. But the first consideration was that the organisation must be saved, and that if practicable no men must be dismissed.

The Executive then set down its ranking of the order of importance of the different sections of its work. It set out the minimum sum required to keep each section going for 1930/31 and 1931/32. Then it would be possible to ascertain which sections of work starting from the bottom of the list must be cut out until the total sum for carrying on the remaining sections was reduced to the Government's maximum possible limit. On 12 March 1930, the Executive ranked its sections of work in the following order:

1. Head Office and Library.
2. The six major divisions—
 - (a) Animal Health.
 - (b) Plant Industry.
 - (c) Entomology.
 - (d) Animal Nutrition.
 - (e) Horticultural and Soils Research.
 - (f) Forest Products.
3. Food Preservation.
4. Imperial Agricultural Bureaux.
5. Radio Research.
6. Marine Biology.
7. Prickly Pear.
8. Fuel Research.
9. Mining and Metallurgy.
10. Unforeseen.
11. Miscellaneous.

Letters by David to his wife, to McDougall in London and to Ian Clunies-Ross of the Animal Health Department who was reporting to him from Japan, all written in that first fortnight of March, show something of his agony at the sudden abortion of so much hope, planning and work:

(to Ross) 'Instead of having next year something approaching the £230,000 at which heads of divisions estimate their requirements, we shall have to get through on £90,000. All new schemes

have to be cut out. . . . Even the Forest Products Lab. has to go by the board. . . .'

(to Stella) 'We simply have to live within the residue of our funds for two years. The situation is very black and we have been sweating all day at our Estimates putting things in a sequence—leaving it to the Government to decide at what stage in the list they will cease the progress of work. . . .'

(to McDougall) ' . . . position is financially as black as ever . . . no money available for two years beyond that which remains in the Trust Fund . . . present Government is not unsympathetic. On the contrary P.M. (Mr. Scullin) and Senator Daly, very seriously perturbed at having to tell us of our position. . . .'

On 10 March 1930, although he had been given a tremendous programme of inquiry and appointments in Britain for the rest of the year, as well as acting as scientific advisor to the Prime Minister at the Imperial Conference, David felt that to save money he should offer to forego the trip.

Under the heading 'Visit to England', David wrote to Senator Daly:

. . . If we have to live for two years on the £180,000 remaining in the Trust Fund, we are going to fall far short of the hopes of yourself and of ourselves in the matter of immediate scientific results. . . . I fear that on an annual Budget of only £90,000 there is nothing for it but retrenchment; cutting out first those activities which promise least.

In the circumstances and without consulting my colleagues, I feel it is due to you and to myself that I should again raise the question of my visit to England even at this late hour. Any personal disappointment I may feel if it has to be given up must be put out of consideration. . . . The visit will cost the C.S.I.R., if I stay away for eight months, about £1,300 counting my own steamer fares and allowances, payment to Sir David Masson, and extra pay to Mr. Lightfoot and Mr. Cook, but excluding rail fares in England and Germany which I cannot assess: One has to consider whether this money could be better spent in keeping work going in Australia.

The main object of my visit is to arrange co-operative scientific work with the Empire Marketing Board and various British Research organisations. As a rule this means a 50/50 basis. If I go

knowing that we in Australia cannot embark on new enterprises, shall I not be rather handicapped from the start? . . .

Does any good that I may be able to do by emphasising the Government's desire to stimulate primary industries outweigh these objections? . . .

If you still think I should go, that settles it. If not, I must cancel my arrangements at once as I am booked on the 'Demosthenes' which leaves Melbourne on the 21st.

Successive notes from Canberra on March 10th and 11th, 1930, tell the sequel:

10.3. Have had a word to Daly . . . handed in my letter. Simply had to do it. . . . C.S.I.R. seems to be in for a bad time. If the Minister still says go I shall obey with alacrity and with a perfectly clear conscience. Had I not sent the letter I should always have felt that those in the organisation whose work will have to be reduced would always have regarded me as selfish. . . . I feel better now that the die is cast and it rests elsewhere.

11.3. (telegram) . . . interview with Minister over stop trip still stands please post letters (all those to British contacts and scientists) and go ahead decided relief. . . .

David and his family sailed in the *Demosthenes* from Melbourne ten days later.

CHAPTER SIX

Interludes Without Playtime

1930 - 1936

David made the Australia-England voyage twice for C.S.I.R. before the war. A detailed account of his work and investigations for the Commonwealth might surprise even top executives who believe they extract the ultimate from each working day. Colleagues—both in Britain and at home—astounded at the amount on his plate and the eagerness of his consumption of it, begged him to protect himself a bit. It wasn't his way. A. E. V. Richardson said in a letter to a colleague in 1931:

ACDR went away with three ordinary men's work to do in six months. He has come back with every answer—positive or negative—plus some extra jobs which even his colleagues here didn't know had been pushed at him by various Government and university bodies. If he left a single item in the mass undone it has escaped us. His contacts in Britain are amazing and that with his peculiar concentration and driving zest make him a kind of one man army. He habitually leaves the rest of us panting in his wake.

David had particular assets for acting as spokesman for Australian science in Britain. First there were his contacts with scientists at every level from 1907-10, in 1913 and 1917-18. Secondly, thanks to Oxford friends and people like Bruce and McDougall, no door was closed to him. Thirdly he had exactly the approach the British appreciated from a Dominions representative. At Australia House people like Stuart Smith and R. G. Casey became his firm friends and the tottery British government of that traumatic year of economic crisis, 1930, gave him every possible assistance—as British scientists and the Empire Marketing Board demanded.

There was little time for play much as he loved introducing his sons to the country of his forefathers. But at weekends he

and Stella managed to explore with them a good deal of London and of the home counties.

They were a fortnight late in arriving in the spring of 1930 because the *Demosthenes* developed propeller and other troubles and limped through the long journey from Durban to London at barely 11 knots. But he made contacts of lasting value with scientists in South Africa working on food storage and fruit transport problems and used the 'lost' fortnight to do some of the reading that had never been possible since taking over as C.E.O.

In London it was a great year for Australians. The genius of Bradman and Grimmett was turning what had looked like a hopeless search for the Ashes into a triumph for Woodfull's Australian cricketers. The Imperial Conference in the autumn was to draw to Britain not only Prime Minister James Scullin but a host of Australian ministers and experts. David was chief advisor on scientific and economic development problems. He was appalled to find how little basic preparatory work for a constructive conference had been done by the various British government departments. Some of them obviously felt the whole affair—on which the Dominions set great store in seeking weapons to combat the economic blizzard—was merely a social gathering of the family, going through the motions of united planning and decision without any serious desire to change anything. The eagerness of English researchers—economists, scientists and engineers—for a far greater measure of Commonwealth co-operation to use the laboratories, field stations and workshops in each branch of the British world found no real response from the politicians at Westminster. David and other Australians had another major handicap. The economic chaos at home had reached a point where no commitments, however small, could be entered into regarding joint ventures without reference of the sum to Treasury and Prime Minister's department. Various repudiations and threats of repudiation of British loans did not make Australia a good word in the mouths of the City financiers already exercising a dominant influence on British governmental reaction to the Depression and gold crisis.

A series of agricultural, scientific and development conferences before the main meeting of political chiefs gave David

first-hand insight into the political flabbiness of the Empire's structure. Australia and New Zealand were a long way ahead of the other components in enthusiasm for much closer teamwork across the world. The British attitude was largely of lassitude tinged with infuriating complacency as if 'the colonies' couldn't really contribute much in solving the global problems with which Whitehall was grappling.

The Rivetts took a service flat in Cornwall Gardens off Gloucester Road, an admirable base for Stella's excursions with the boys to cathedrals, art galleries, museums and historic sites and occasionally watching the Australian cricketers at Lord's or The Oval. David and Stella entertained extensively and valuable contacts were formed across a wide spectrum of British research.

The theatre in the West End was at its between-wars peak. Marie Tempest, Sybil Thorndike, Edith Evans, Gertrude Lawrence, Margaret Rawlings, Winifred Shotter, Evelyn Laye and a host of fine male actors headed by John Gielgud and Godfrey Tearle delighted the Rivetts. Shaw was still providing copy for Fleet street almost every week with his iconoclasm. Dean Inge was bewailing the age. Across the Atlantic the Hoover boom had been punctured and Britons had a certain unchristian satisfaction that bad as things seemed in the Rhondda, at Durham, at Jarrow and similar areas of shocking unemployment, the plunge downhill of the fabulously rich Americans was even steeper and more spectacular.

In mid-June David went back to Berlin for the first time since his student days there in 1910. A major scientific conference was mishandled by the British delegation clerks so that none of the distinguished Dominion scientists present were allowed much opportunity to speak and one ill-briefed Briton apologised to the international gathering for David's inability to represent Australia when he was, in fact, sitting 30 yards away.

To add to the ineptitudes of many varieties committed by the British organisers David got a touch of ptomaine poisoning at one of the major feasts. The Dominions leaders finally left the conference with a high regard for their German hosts' organisation but without much pride in British fumbling. However,

over the next four months, David visited a number of British research stations and obtained a series of extensive analyses of new research opening up in use of fertilisers and soils, crop and animal husbandry which were to lead to initiatives in Australia in the years ahead. Even more valuable were discussions with Board of Trade members and other government economic officials feeling the way for Empire Marketing Board assistance in Australian research for primary production which David could see no hope of financing from Australian sources while the Depression-panic continued to freeze Canberra into nerveless inaction.

Throughout the summer he was deeply involved in study of the latest British and German attempts to extract oil from coal economically. With Stella he went to Frankfurt in September and made a detailed reconnaissance of the advanced oil extraction laboratories of the Metallgesellschaft. He learned that although the brown coal reserves of Germany appeared enormous, demand was likely to be stepped up so sharply that they might be exhausted within 100 years. This was more than two years before Hitler began to gear up the Nazi war machine with fuel drawn largely from brown coal conversion plants.

It was during this month that David finally persuaded Sir Charles Martin to ignore Lady Martin's resistance and promise to join C.S.I.R.'s Animal Nutrition division as chief in the New Year. David's delight—soon to be so amply vindicated—shines through all the disappointments of those weeks as the preliminary conferences before the Commonwealth Prime Ministers assembled waffled through many papers without making any new firm plans for Commonwealth co-operation and mutual research.

The Scullins, Garrans, Parker Moloneys, Brennans and other members of the Australian delegation arrived at the Savoy at the end of September. Scullin, in David's eyes, held his end up well at the formal sessions with the other heads of government. The famous J. H. Thomas, ex-railwayman become Britain's Dominions minister, was the personality of the Imperial Conference and stories about him, true and apocryphal, were legion. David found him shrewd, perceptive and amusing but

often he seemed to have failed to study his brief. Through the great formal dinners, the special Tattoo at Aldershot, the Imperial air pageant, a Horse Guards parade, the various excursions, there were invaluable links to be formed with political, scientific and administrative leaders. But the net results of the formal sessions of this great Imperial parade of talent were a total disappointment to those who had made well-researched, constructive recommendations to political chiefs with no tangible result.

David and Stella were entertained with a small group at tea at Buckingham Palace by King George V, Queen Mary and the Duke of Connaught. But he was very disappointed by the Guildhall dinner where speeches by Lord Cecil, Austren Chamberlain, J. H. Thomas, Canadian Prime Minister Bennett and Dean Inge failed to spark the huge gathering. Two days later they watched a massive Royal Navy demonstration from the deck of the huge battle cruiser H.M.S. *Nelson* as it manoeuvred and blazed at targets with its 15-inch guns. David commented: 'Vessel cost £8 million. Whole demonstration impressed one with economic wastage of warfare. Shooting was not very perfect. All torpedoes discharged at Nelson missed.'

On November 28 the family left for Paris on the way home. Stella revelled in the Louvre, Notre Dame and Versailles. David always had a slightly greater sympathy with things German than with things French—possibly because German chemists, scientists and researchers had been more useful in his lifework. After five packed days of sightseeing in Paris they went to the Palace of the Popes at Avignon and then caught the *Moldavia* for Melbourne on December 4 at Marseilles.

Just six years later, in mid 1936, David and Stella again sailed for England, accompanied by their younger son and David's sister Christine from Brisbane. This time his overriding concern was again about latest developments in the oil-from-coal field. He prepared the definitive, secret and never published report on this for the Lyons government after six months of investigations of plant with scientists and officials in both London and Germany.

David's conclusions about the prohibitive expense of the process for Australian needs as against the cost of importing oil

direct from the Middle East ended Government consideration of any peacetime construction of the necessary plant in Australia. The possibility remained that in a war crisis—if Britain and her allies lost control of the seas—it might be an invaluable source of fuel to an Australia which might be starved of normal tanker-borne supplies.

Although these two forays abroad were largely taken up by conferences, investigations of research plants, discussions with scientists about Australian problems and the endless burden of a massive correspondence dictated at Australia House to C.S.I.R. colleagues at home, David probably had more enjoyment and stimulus in both 1930 and in 1936 from the contacts made than at any other time in C.S.I.R.'s first 20 years. He obtained some exceptionally gifted young men for Australian laboratories and field work. He made openings for future C.S.I.R. personnel from Australia to get specialist training in their own fields in Britain. He managed to answer authoritatively some of the reasonable (and also the idiotic) requests and ideas that all ministries throw up at times for their advisors to develop (or rescue them from).

If the London theatre was once again a constant delight and revitalisation for both David and Stella they also greatly enjoyed their journeys across Britain to the north-east and north-west, the Midlands, West Country and Scotland and Wales getting an extraordinary insight into what was going forward in each research station or project of significance to Australian development. Board ship—travelling time at sea totalled 130-odd days on the two return journeys—gave David fresh air, exercise, a chance to read a little away from his C.S.I.R. problems and the opportunity to write perhaps the most valuable reports of his life regarding future possible initiatives for C.S.I.R. He had no time for smokeroom drinking, cards or shipboard flirtations but generally managed to enjoy himself thoroughly and get through what a colleague described as a 'fantastic' amount of constructive planning for new C.S.I.R. ventures.

CHAPTER SEVEN

The Thirties

Returning with a view of the nature of the world crisis as seen from the centre of Empire, David Rivett might have been dispirited at the prospect of leading a truncated team in curtailed activities despite Australia's crying need for research. However there was no trace of this. A few weeks after his own landing in the first days of 1931, Sir Charles Martin reached Adelaide. His very presence, his prestige and above all his gay spirit and contempt for money problems was, just as David had hoped, the ideal boost for morale—not only in Martin's own Animal Nutrition Division but wherever he went through the six States.

In David's absence several Chiefs of Division had been so worried that they had persuaded Julius to call a conference of Divisional Chiefs in Melbourne in mid-August, 1930. It had been made clear that in David's absence, the co-operation and understanding of each other's work and needs that he had built up by visits and correspondence had slipped. Faced with cuts and reductions that vitiated their aims, it was inevitable that there should be a sag in the high morale that had kept C.S.I.R. leaping along since 1926. But David's return, with the prize capture of Martin in tow, reversed the trend. Even the most frustrated scientist was prepared to admit that, whatever the disappointments imposed by the Depression, there could not be much wrong with an organisation and a leader who could persuade one of the great men of English science to emerge at 65 from retirement and abandon his own experimental laboratory to head a division of research 13,000 miles away.

H. P. Breen, the senior public servant transferred to C.S.I.R. at its inception in 1927, was a keen critic of the unorthodox way in which the Executive—and especially its C.E.O.—ignored traditional public service usage to get results. For 12 years he

made his representations in favour of standard public service practice. The fact that they were often ignored did not diminish his respect for the Executive's way of doing things or his perceptive analysis of their reasons for 'going outside the rules'. His comments on the Martin appointment therefore have peculiar bite and relevance:

The invitation to Martin could be classed as an inspiration. Who of the Executive suggested him? I don't know but as Martin had once spent some time at Melbourne University, I think it fair to assume he was the choice of the C.E.O. As a person he was a charming mixture of apparent child-like simplicity and unexpected, unobtrusive shrewdness. He was intensely interested in everybody and everything. One felt immediately at home with him; and his companionship was something to look forward to and a thing to remember for ever. I accept the verdict of his fellows that he was not only a first-class scientist but an inspiring leader.

English commercial catalogues of the day were full of 'Martin' laboratory instruments and gadgets. Inventing these as he went along with his work was an exciting hobby. In 'Who's Who' he described his recreation as 'Tinker'.

In appearance, Martin looked for the most part like an elderly, untidily-dressed farmer after a long day's tramp through the fields. His wife (Edith, I think) was sensitive about his appearance, and found it difficult not to reproach him in company. She roused neither a flicker of interest nor irritation in him. He was always the personification of relaxation.

Marston instantly made Martin his God. He worshipped him and was inspired by the clarity which the other's experience and probing intellect cast on each laboratory problem. Martin's health for years had been far from good and in Adelaide he was sometimes very ill and needed hospitalisation. A large part of the Rivett-Marston correspondence in 1931-33 was concerned with keeping the veteran as well as possible. The boost Martin's presence gave to Animal Nutrition and to other C.S.I.R. work and workers persisted long after he returned to England in the middle of 1933. Martin's own improvement in methods of 'tailing' lambs was greatly to reduce the risks of

blow-fly 'strike'. It presently became general practice throughout Australia. Under Martin's leadership the team Brailsford Robertson had formed was to make invaluable discoveries about the protein and mineral requirements of sheep.

Martin's contribution to C.S.I.R. was unprecedented. A figure of world stature had abandoned a satisfactory and comfortable post to tackle something for an infant organisation in Australia. No one meeting Martin—scientist or layman—ever doubted that he was in the presence of an exceptional man with qualities akin to genius. That such a man should come to work at this stage of his life for C.S.I.R. was an accolade that no King could have conferred—at least in the eyes of the brotherhood of scientists around the globe.

Sir Charles left Adelaide during 1933 but, until David's retirement, he remained the constant, unofficial advisor of C.S.I.R. His quiet, whimsical approach to problems and to political pressures alike made him invaluable. When in 1948 a hail of political roundshot descended on the Chairman of C.S.I.R. and his principles, Martin's total support and backing was there.

Charles Martin carried out invaluable research for C.S.I.R. at Roebuck House in Cambridge, following his retirement in 1934. This was experimentation on myxomatosis cuniculi 'with a view to the use of virus in the control of rabbit plagues'. The startling success of myxomatosis across Australia owed much to Martin's findings.

The tales told of Charles Martin's self forgetfulness and unworldliness are legion. What never changed, even when he was in acute physical discomfort (as so often in the last years of his life), was the sweetness and humour of his outlook.

On each of David's subsequent visits to Britain he always laid aside a day in his overcharged itinerary to visit Martin in the north and sit with him.

Each of us is the better for some beacon in the distance, particularly when the going is rough. To many scientists Charles Martin's total dedication was that beacon. It was David Rivett's good fortune that in addition he aroused in Martin affection and personal regard. These endured through the vicissitudes of Martin's health struggle throughout his last 25 years. In one of

his letters Martin spoke frankly of his friend's solicitude—'your tenderness overwhelms me'.

For David it was the peculiar veneration of a younger man for a master, a guru, who combined in his person many of the best characteristics of men like Arrhenius and Masson, plus the unique quality of his own, total selflessness. Until the day he died a sketch of Martin stood in a place of honor in his study.

In 1953 four years after his own retirement from the C.S.I.R. chairmanship, David was able, through R. G. Casey, to secure a grant of £2,750 from the Commonwealth Government to Sir Charles for his work on myxomatosis. Sir Charles, then in his 88th year, had never concerned himself with money and the timely recognition made his last eighteen months somewhat easier than they seemed likely to be.

Second only to the influence of Martin in C.S.I.R.'s desperate years of 1931-32 was the solid backing to C.S.I.R. from the Empire Marketing Board in London. David's contact with the director of the Empire Marketing Board, Sir Stephen Tallents, during 1930 and their co-operation up to the demise of the E.M.B. late in 1933, following the Ottawa Agreement, were invaluable to Australian research in those lean years.

A detailed analysis of the whole position of C.S.I.R. finance and schemes went from David to Tallents, three months after his return from London in 1931. It predicted with astounding accuracy the period of pinch and the stage at which C.S.I.R. might reasonably hope for some slight slackening in the savage curtailments of activities. The E.M.B. grant of £6,000 a year for two years to the Plant Industry Division had, David said, 'put new heart into the Division'. As to total payments of £40,000 made over several years to C.S.I.R.'s Division of Animal Health in Queensland, he said candidly: 'But for this assistance . . . it would be quite impossible to go on with the Queensland work at all . . .' In fact, the successful work carried on through the early thirties against cattle disease in the north was financed by a consortium, half coming from the Queensland Government, the cattle industry, the Queensland Council of Agriculture, and the meat exporters and the other half from the E.M.B.

David had an immense faith in British Commonwealth teamwork. In the scientific field he had seen some of the dividends

actually achieved. Therefore his article on the ending of the E.M.B. in 1933, 'The Empire Marketing Board: A Tribute, a Lament and a Hope' spelt out his heartfelt conviction:

In its six years of activity . . . it has done more to arouse an appreciation of the possibilities of mutual aid by teamwork in applied scientific investigation . . . than all earlier agencies added together. One pays tribute to it and particularly to its senior officers for a brilliant piece of Empire-building the effects of which will be apparent for many a day to come.

Apart from seeking to revivify the spirit in each of the Divisions and remaining sections of C.S.I.R., the Executive's year was chiefly taken up with the battle to find funds from non-Government sources so that vital work would not be interrupted. C.S.I.R. salaries had already been cut together with those of all public servants. Now the Executive proposed to ask staff to accept a voluntary cut provided the Government kept the existing organisation of C.S.I.R. in effective being after June 1932. The C.E.O.'s salary for several years was cut to just over £1,450 from the £2,000 laid down in 1926 when he accepted the post. To David it was the least of his worries. He was far more intent on keeping every possible good man at the bench. In any case frugality had been the fabric of his life before marriage and for nearly all the years since.

When, at the end of 1931, the general election swept the Scullin Ministry from office, the Lyons U.A.P. Coalition government was formed and Senator A. J. McLachlan of South Australia replaced Senator Daly as Minister for the C.S.I.R.

The change of ministry brought no fears to C.S.I.R. To the foremost soils expert in the Empire, his old friend, Sir John Russell of the Rothamsted Experimental Station in Hertfordshire, in January 1932, David wrote:

In the new Cabinet C.S.I.R. has some very staunch friends. The Prime Minister, I think, is well disposed towards us, but we have even stronger supporters in Messrs. Bruce (he was now High Commissioner in London), Latham, Pearce, Hawker and McLachlan. . . . We have no right to hope for increased revenues next year, nor, I think, would it be fair to press for them. Still it is

good to feel that our work is assured of keen sympathy from the majority of members of Cabinet. . . .

In a confidential report to the new Minister in March 1932, the C.E.O. spelt out the position of C.S.I.R. after two years of battering in the general cyclone of the Depression. A summary of the report suggests the scope of C.S.I.R.'s performance over its initial six years:

SOILS RESEARCH DIVISION: Seven major research studies completed ranging from the Murray Irrigation areas to the soils on the bed of South Australia's Lake Albert. (Adelaide H.Q.)

FOREST PRODUCTS DIVISION: Five major tasks completed ranging from the utilisation of hardwood pulp for the manufacture of paper to the saving of £300,000 per annum by treating Australian wood for butter boxes to avoid taint. Ten major projects in progress included surveys of methods of preserving fence posts and the treatment and utilisation of *pinus insignis* (*radiata*). (Melbourne at C.S.I.R. H.Q.)

PLANT INDUSTRY DIVISION: Four completed tasks embraced avoidance of blue mould in tobacco and scourges previously plundering pineapple, banana and apple growers. Ten further major tasks in hand from wheat rot to tomato wilt. (Canberra H.Q.)

ANIMAL NUTRITION DIVISION: Work of a very fundamental type being intimately linked with work in other parts of Empire. Ultimate aim: The complete study of nutritional factors governing the sheep industry. (Adelaide H.Q.)

ENTOMOLOGY DIVISION: While nothing completed, major work in hand on blow-fly control, buffalo-fly pest, white ants, etc. (Canberra H.Q.)

ANIMAL HEALTH: Completed investigations included black disease in sheep, WA's Braxy-like disease and internal parasites. Ten studies in progress from pulpy kidney of sheep to the Kimberley Horse disease. (H.Q. McMaster Laboratories, University of Sydney.)

The three sections, not yet Divisions, were:

HORTICULTURAL RESEARCH: Work at Griffith mainly on citrus fruit production and work at Merbein devoted to viticulture.

The work of Merbein was estimated by outsiders to have added £8 per ton to the value of the crop.

FOOD PRESERVATION AND TRANSPORT: Work on beef in Brisbane laboratory at the abattoirs. Work on citrus transport in Melbourne.

RADIO RESEARCH BOARD: Investigations into fading, atmospherics and other special problems of broadcasting.

Seven months later, pointing out that the Council had reduced its expenditure in the year to June 30th, 1932, by nearly 40 per cent of the amount provided by the Treasury for the previous year, David was able to show the Minister that of total expenditure for the four years ending June 1933, £175,000 out of £525,000 came from contributors (Empire Marketing Board, growers' associations, endowments)—half as much as from Consolidated Revenue and C.S.I.R.'s Trust Fund combined. 'It is impossible to follow up promising indications', he told the Minister bluntly. 'We are obliged to refuse urgent work in every direction. The call from the primary producer has never been so urgent nor has the confidence in scientific aid ever been so pronounced. . . .'

In the hands of many able men, C.S.I.R. could have perished in the Australia of the thirties. Governments of any political color were obsessed with the economic crisis. The lack of money and the need to find jobs for 300,000 workless—nearly 15 per cent of the labor force in those days—and the poor return for Australia's main exports were all political dynamite. Under these pressures, scientific research inevitably had a nil priority with all but a small minority of politicians.

It was perhaps lucky for David that all his life had been a battle to make just too little stretch far enough. It was possibly luckier still for C.S.I.R. that a man with his experience of extreme paucity of funds should have been facing all its problems. To the outside world—in retrospect—the thirties were the years of consolidation of the Council's work so that before the war arrived it had become regarded by all factions as a major national asset.

From the moment he got off the boat in the first days of 1931, David enforced his personal belief in 'everything possible for the research teams'. 'Cut administration and all executive

expenditure to the bone.' The overheads at C.S.I.R. made those of government departments look ridiculous. Face, prestige, outward show had no meaning at all for the Chief Executive. By saving every penny at head office, he somehow kept going the greater part of his key research staff.

The future director of the secondary industries section in Post-War Reconstruction, H. P. Breen, then C.S.I.R.'s Chief Clerk, would have liked to see a degree of comfort introduced at 314 Albert Street for headquarters staff, including the Chief Executive himself. He has commented wryly: 'ACDR never wished to spend any money on the administration at Albert Street. He wanted all funds kept for the man at the bench'. Once in the 1930's when R. G. Casey was Treasurer, Breen was called over to Treasury Buildings to bring Casey some papers. Breen took the opportunity to point out to Casey that C.S.I.R. needed more space. Casey wanted to know where the money would come from. Breen said it could come from funds that ACDR had earmarked for starting his Division of Industrial Chemistry. Breen never did get the extra accommodation he needed but David did manage to launch the new Division. It was the pattern throughout the thirties and one reason why C.S.I.R.'s performance constantly astounded the conventional Government departments.

Breen said:

I did not know anyone who did not like him as a person. He simply did not want a bureaucracy created. Although we differed at all points about his system we never had a quarrel of any kind. His object was simply to get the best scientific people available into C.S.I.R. There was no pattern about salaries or scales or grants.

ACDR was in the category of men who see something must be done and go straight towards the object without regard to the difficulties or associated problems. They get things done. This method was responsible for the booming of C.S.I.R. Of course, they need someone to sweep up after them.

The most trying part of the whole job in those years of penny-stretching and striving for results on a shoestring was the train travel.

From 1926 David spent hundreds of begrudged hours in the expresses—never really express—between capitals or on slow, back-country, milk-trains. Today's administrators, scientific or otherwise, who know they can be in any city in four hours and who do most of their flying in 60-90 minutes, find it hard to realise that, until the late thirties, all Australians with major responsibilities outside their own State spent many days each year in trains.

Two-seat plane travel has protective advantages (apart from reducing hours to minutes) over the eight-seat train compartment with access from a corridor along which all of 300 or more may pass looking within for a known face.

Letters and diaries reveal that in those first dozen years of C.S.I.R., David must have spent the best part of 200 days and nights in trains anywhere between Cairns and Albany. Apart from visits to inland irrigation projects, chemical, animal research and geological establishments, forestry centres and laboratories of many kinds, an average year would see him half a dozen times commuting to Sydney and Canberra and once or twice each to Adelaide, Brisbane and Perth. The letters he scribbled to wife and sons contained more of his appraisal of life and of current developments in the community than anything else he had leisure to set down from 1925 until his death.

Here is a typical moment of wearied whimsy on one of the journeys (September 1929):

This travelling game is no good for an old man, in spite of the freedom it offers from wives and daughters—and sons. We are getting near Wodonga: I have read until I am bored; the two ladies opposite are nearly as old as I am and far less interesting (as bad as that!)—so why should I rejoice at being on a train? I do not rejoice; I am sick of it. Even Punch contains nothing joyful. I have read a long account of Italian chemists at Florence and Siena. I have read with appropriate skipplings the unutterably dull address of. . . . I have read a paper in the German *Zeitschrift für Anorganische Chemie* on the mobility of H^+ and OH^+ ions; I began one on *Loslichkeit beeinflussung* and abandoned it unfinished. And all that was on top of two sausages, mashed potato and a cup of tea at Seymour, price 1/3d. Soon I shall buy a packet of

prunes, price 9d., on the Albury station and retire to bed with them—and them alone. . . .

The more ancient of my opposites in the carriage is reading a book called *Lovers* on the outside cover of which a seccotine kiss has been in progress without advancement ever since she took it out. She is reading with the utmost seriousness in spite of her 40 years—convincing evidence that spinsters ought to be permitted opportunities for sex experience in early life if only to prevent them being silly in railway carriages in middle life. One of the men is reading *The Motor Car and How it Works*. He is certainly a commercial traveller and though he does not look young he is probably green or he would not be wanting to know anything about how anything saleable works. It should be enough for him to sell it, without knowledge.

, , , The sniffy one is going to Griffith. . . . Anyhow she is not reading a book called *Lovers*—possibly she has had sex experience. She is fat and has long woollen gloves. The reader of the *Lovers* has tight kid ones—also a necklace of pearls about six times as big as any self respecting oyster ever made. She has offered to share her rug with the *Motor Car and How it Works*, and he has accepted half. Maybe both are thrilled though they don't look like it. . . .

On most occasions he boarded the train at Spencer Street with even his exceptional vitality drained. Interviews, discussions with colleagues, Ministers and leading agriculturists or industrialists did not abate the endless flow of paperwork that ended up on his desk from every corner of Australia. Delegation of minor things to others was not his strongpoint. Each time he boarded the train his old yellow attache case would be packed with papers that he felt he SHOULD digest before facing the invariably jam-packed schedule arranged in the city ahead of him. Within an hour, often from the moment he entered the compartment, he would be buttonholed. Innately considerate, he lacked the capacity to snub or indicate total lack of interest. So the train hours tended to get swallowed up; by a farmer troubled with foot-and-mouth on his property, by some old student or university friend seeking a place for a relative in the C.S.I.R., by a politician needing a stick to embarrass or defend the Government in debate. Moving constantly in all six States,

he was known to thousands of people. The almost bald head and pince-nez made him readily identifiable. Also there was an inevitable Train League—Canberra's 120 politicians of that era, the senior departmental people, the key executives of nationwide industrial concerns, the spokesmen of many national groups, unions and associations. Most of these people recognised him. A quite embarrassing percentage instantly wanted his ear. For a shy man, the jaunt between cities was never the leisure time he constantly hoped for. What even friends and colleagues who travelled with him seldom realised—he never acknowledged the suffering—was what the tobacco smoke, engine smoke and general filth of railway travel in those days before air conditioning did to his unprotected sinuses. Colds and sore throats were his lot on every other journey but he felt it was his problem not one to inflict on others.

For some of his companions, travel was a pleasant escape from domesticity—a chance for drinks, poker, bridge, gossip, smokeroom stories. He wasn't a jot censorious that men he worked with and liked did this. He wrote daily, often twice a day to Stella, communications precious to them both.

As unemployment deepened across Australia and factory, shop and workshop laid off employees, a great deal of public speaking was entirely negative. Jeremiahs and prophets of collapse and economic doom were enjoying a heyday. The tide of carping defeatism surged round his desk in Albert Street. His own response, having spent much time reading and thinking about the problems challenging men everywhere, was characteristic. He defined it in April 1932, in an address at the Melbourne University's Public Lecture Theatre to the assembly of the Teachers' College. His title was 'This Emergency!'

He began with two quotations, one from the American Professor John Dewey, the second from the British Minister, Walter Elliot. Dewey had declared that the function of trouble was to lead men to think. Depression, he said, was a small price to pay if it induced thought on the disorder, confusion and insecurity of our social life. Elliot had challenged another politician's jibe at the British Government for meeting the emergency with what seemed like permanent measures: 'For ten years many of us

have heard of this emergency and have waited for it to disappear. We of the war generation are now convinced that "this emergency" so called is nothing more nor less than the 20th Century!'

The 19th had been the last century of want, scarcity and inequality between food supply and human needs. In the 20th fear of want had vanished. Chaos had descended because we did not know how to adapt ourselves to beneficently changed conditions. In less than 100 years there had been economic changes far exceeding the sum of all those between the coming of the iron age and the industrial revolution. But in agriculture over the past 30 years, the plant breeder, the sheep and cattle breeder, the deviser of farming implements, the soils chemist, the student of plant and animal nutrition had effected a revolution in agricultural production. Whereas, David continued, in the nineties there had been predictions of wheat starvation for the world in 1931, those who lived in that year actually heard futile arguments as to whether the world was suffering from overproduction or under-consumption.

The achievements of agricultural science had even won consideration at the Imperial Conference of 1930—the first time politicians had paid heed to the effects of research round the world. He gave the exceptional growth achieved in Australian output of beef per carcass, wool per sheep, wheat per acre and prophesied (accurately, we find in 1972) that in the better rainfall areas of Australia, Australians would double the production of sheep and cattle.

Yet all this abundance of production throughout the world, which should have removed the spectre, had left masses in want because the system of barter, or of circulation, or of distribution, had become creaky. However, men could be found to adapt and replace this inadequate machinery to overcome current disorder and insecurity. This was the emergency. It would not pass by itself because it was the twentieth century and could not be sidestepped. He re-quoted Dewey: "The great scientific revolution is yet to come. It will ensue when men collectively and co-operatively organise their knowledge to achieve and make secure social values.'

The cause of mankind's troubles was a half-way, accidental use of science. Mankind would still pass through depressions . . . the graphic record of our unplanned social life. But men who had brought the technique of physical discovery to perfection would not abdicate in the face of this even more important human problem, concluded David.

This address contained something of the essence of his optimism in writings and in talks to many gatherings up and down Australia. He set out to remind the despondent of the feats already accomplished so rapidly in production and improvement of output and spelt out the challenge to re-think and re-plan the allocation and dissemination of this bounty. He had no political bias. He pointed to the good things in the Soviet system from which the rest of the world might learn as well as to its shortcomings. For others, the bias and one-sided selection to suit their ideology. For the scientist, for the intellectually honest, a fair appraisal of what was best in each system to point the way out of the pit of the early 1930's.

A year later, when the Chemical Institute of Australia held its national conference in Perth, he challenged the depression-ridden outlook with hard facts of material performance but went on to show that in his own concepts of a better future the goals were not material.

He reminded the assembled scientists that in the decade of the 1890's average Australian wheat yield had been $7\frac{1}{2}$ bushels an acre. In each decade since it had moved up to $8\frac{1}{3}$, $10\frac{2}{3}$, 12. Less labor was required to collect the far bigger harvest than the original labor force. Back in 1861 the average sheep in N.S.W. had given $3\frac{1}{3}$ pounds of wool; in 1932 nearly 9 pounds. Now 100 sheep were doing what 245 had done 70 years earlier, so that Australia's 115 million sheep were equivalent to 280 million of the old breed. He went on to emphasise man's control over nature in meeting all food and clothing needs. Then he put the paradox haunting Australia in the thirties in a cameo:

Japan tells us she can pay only eightpence a pound in our currency for wool and we say 'How awful! We once got three times as much!' And then Japan says that to liquidate the debt she will give us four electric light globes where previously she

gave us one. Again we say: 'How awful! Our industry will be ruined if light globes are so cheap!'

Then he revealed the outlook not understood by those who thought that David and his organisation were solely obsessed with material benefit. He asked the assembled scientists if we might not rid ourselves of the idea that the main duty of man was to be found in field, factory or office. Could we not exchange material goods 'for the other products of human ability which make no appeal to stomachs and are not wanted to cover bodies or to move them about . . . art in all its forms, music, sculpture, painting . . . beautification of landscape and of city and of home; the attack on superstition, upon the "mumbo-jumbo" which has held the world in thrall more sorely than fear of hunger or thirst; in a word the cultivation and spread of pure knowledge and beauty the opportunity for creative work of the most satisfying kind.'

He may not have known it, but he had stated the creed which lay behind the dynamo of C.S.I.R.'s development through 23 years.

In Sydney in 1932 he was to give almost the last of the scientific papers—there had been more than 30 over the years—containing fruits of his own fundamental research. This Liversidge lecture to the Australian and New Zealand Association for the Advancement of Science was on Electrolytic Conduction in Aqueous Fluids. He then stated his total creed about the importance of basic research. Liversidge, who had been professor of chemistry at Sydney for 35 years to 1908, specified that these should not be 'popular lectures dealing with generalities' but deal with 'recent discoveries and the directions in which further work might be carried on.' So he took a subject of absorbing interest to the chemical researcher, paying tribute to the work done in this field by his own great teachers, David Masson of Melbourne and Svante Arrhenius of Stockholm. Scientists present regarded this as an exceptional exercise in memory and understanding by a man whose nationwide administrative responsibilities had cut him off entirely from the bench for more than six years. What they perhaps did not recognise was that in

this work, opening up new horizons, lay his heart and the fruits of the years devoted to laboratory research.

The calls on David to speak in public grew heavier. Back in the twenties he had established a high reputation outside the chemistry school by his occasional addresses to the University Public Questions Society. As many of his colleagues and former students moved into executive jobs with firms, societies and associations, the calls on his time, especially for luncheons and in the evening, became heavier.

Ian Wark recalls a lecture on State endowment for Motherhood—real women's lib advocacy—30-odd years before Greer! He did his utmost to meet the demands of scientists' groups and chemical bodies but had he attempted most of the calls made on him he would have been speaking at least two nights a week apart from luncheons.

David Rivett's arch-enemy was time. On leaving the University house in October, 1927, they had moved to a two-storey house in Mercer Road, Malvern, perhaps six miles from the office. Other chiefs of departments already made extensive use of Government cars. David eschewed them as unjustifiable expense. This was by today's lights an error. In the Depression it seemed fine. Each day he left Mercer Road by tram shortly before eight, changing trams at Collins Street or walking to his Albert Street office. Any time between six o'clock and seven o'clock he returned by the same route with his attache case stuffed with reports from men in the field and scientific papers of all kinds from overseas and interstate. Almost invariably, by eight o'clock he would be hard at it at his desk having eaten, listened to his wife's problems of the day, and glanced briefly at the Herald, besides finding a few minutes to learn what had befallen the boys at school. Only some tough problem in their homework or exam preparation, or the telephone call of a colleague, then broke his steady working until around 11 o'clock when he went up to bed.

The main difference between the science chief and the enthusiast of the Oxford, Nobel and Melbourne laboratories—both worked 70 to 80 hours virtually every week—was that the decision pressures were now national. They now involved many

others and grew heavier as C.S.I.R. grew, and with it, the Government and public demands for its aid.

The Fitzroy Gardens opposite C.S.I.R.'s Albert Street office was a boon. On many days each month he lunched in the simple Gardens cafe with one or several of his colleagues or with a son escaping from school or university college. His idea of an adequate lunch was a small plate of sandwiches or at most a salad with a glass of milk. The oysters, whiting and chicken circuit had no charms for him. He had no narrow views about the drinking of colleagues and friends and sometimes joined in sipping a glass of sherry but had only contempt for any administrative officer or scientist who seemed at all the worse for liquor during working hours. Fortunately C.S.I.R.'s atmosphere of enthusiasm discouraged drinking even more effectively than the parsimonious salaries all personnel received during the Depression years.

Sheer lack of time forced him to drift out from, or actually drop, the clubs that he had enjoyed most—the Wallabies, the Boobooks, the Beefsteaks. He allowed himself to be talked into accepting the collegians' presidency of his old school, Wesley, as the Depression was making its survival a very close run thing. Against all his personal feelings, despite the workload from C.S.I.R. and its kindred bodies, he carried this presidency for a second term until the worst of the Depression was over and Wesley's emergence from it was in sight. He was also a Fellow and later a Council member at his University College, Queen's. But while fellow members of all these bodies stress the inspiration and drive he provided, the time demanded was only found by cutting out of his own life the relaxing hours that might have offered a chance to refuel batteries and to have a little quiet enjoyment.

When he could, at weekends, he snatched Sunday mornings in the garden at Mercer Road, still growing a few vegetables, pruning, weeding, grooming the place, but the timber and masonite shed he had built behind the house as a laboratory, to resume the experiments he longed to tackle, remained unused.

Walking remained his major exercise. He had no weight problem. Always frugal in appetites and outlook, he was bored

and often appalled at the wastage at official dinners and luncheons even during the Depression. Food as such did not interest him. He liked fresh fruit and vegetables and tended to avoid starch. He had rowed at about 10 st. 12 lb. at Oxford and was never more than two or three pounds above that weight over the next 40 years.

Rarely, then very rarely, he and Stella managed to get to a play. He might have seen three films in a year. At Macedon he sometimes found time to read a striking biography or work of impact like MacNeil Dixon's 'The Human Situation'. But, by and large, the cream of literature, on which he had sometimes feasted as undergradulate and lecturer, accumulated on shelves unread because there were only 24 hours in the day.

Yet it is quite wrong to think of him as work-weary, dulled by pressures, the edge taken off his enjoyment of life by denial of many of his favourite pursuits. A colleague, E. J. Drake, watching him at work month in and month out throughout his C.S.I.R. career, set down this sketch for his own history of the C.S.I.R.:

It is impossible to work with Sir David without perceiving a special quality in him but it is not easy to find a precise description for it. It might be partially described as detachment, but that is too cold a word to associate with his warm humanity. He is, however, remarkably free from the many inhibitory attachments in which most men are entangled. Having modest physical appetites he had no compulsion to dissipate his energy in the pursuit of money; being without vanity and desire for domination, he has sought neither social prominence nor power, preferring, even after great authority had come to him, to rely on reason or persuasion. (On occasion when he was forced into an authoritarian position his distaste for the role was apt to emerge as a mild excess of testiness.) He is utterly free from bigotry, including scientific bigotry, for he has a clear perception of the limitations of science. He is not an especially original thinker; his rare quality appears rather in his clarity of thought, precision in analysis and lucidity in exposition. He does not suffer fools gladly but generally with kindness, unless they are too puffed-up with self-importance. He has a delightful gift for irony; his comment on a long letter to a Minister for C.S.I.R. from an obvious liar was: 'My dear Minis-

ter,—I have read Blank's letter and have concluded that his talents are literary rather than scientific.'

Rivett could be very pedantic at times and would challenge the use or meaning of a word, e.g., I might have referred to an officer as being a permanent officer. Rivett would argue that there was no such type of officer—no such thing as permanency as the officer would eventually have to retire upon reaching a certain age. One had to be careful to refer to such a person as being permanent until reaching retiring age. Rivett had many verbal jousts with Julius and after one Executive Meeting the latter was heard to remark that Rivett put every word one uttered on to a chemical balance and then analysed it.

Rivett was very alert in debate and had a repartee of lightning speed, e.g., at an Executive Committee meeting discussion arose concerning a Draughtsman in our employment whose surname was 'Aa'. Rivett pronounced this as 'Mr. Ah' whereas I commented that he called himself 'Mr. A' (as in 'hay'). 'Umph', said Rivett, 'I suppose my pronunciation would be awkward when used in the possessive.'

He had need of his sense of humor, his irony and his rather chirpy little plays on words. For three years after he got off the Moldavia in the first days of 1931, he had little from Canberra except gloom. Fortunately, the initial C.S.I.R. team, while individuals had their quirks and even eccentricities, contained no third-raters almost no second-raters. It had several men of such drive, enthusiasm and competence that they astounded scientists in their own fields abroad by the amount of relevant research produced on a budget which—whatever Bruce's intentions in 1926—was little more than the bare running costs at the bench. What money there was did not get swallowed up with any Parkinsonian activities up above. Public servants, such as H. P. Breen, fought against the iconoclasm of treating the young researcher in the field more liberally than the head man treated himself or his colleagues at head office. But it paid off in results.

The divisional chiefs who really carried C.S.I.R. through the thirties and war years were all installed by 1935. A. J. Nicholson had officially taken over from the sick Tillyard in 1934. B. T. Dickson was chief of the Plant Industry Division; L. B. Bull was taking over from J. A. Gilruth in Animal Health; I. H.

Boas had Forest Products; J. A. Prescott from Adelaide University, had the Soils Division at the Waite; J. R. Vickery at the Brisbane abattoirs had forged undeniable claims to become a chief of Division when the Food Preservation Section could be given that status; H. R. Marston was leading the Animal Nutrition team in Adelaide although for a time, after various struggles, it was combined with Animal Health under L. B. Bull and only achieved full official independent status again in the 1940's.

Myxomatosis might have been introduced into Australia six or seven years earlier than it was, had not the war and the natural caution of the health authorities combined to bring about many postponements. C.S.I.R. had been concerned from the outset with various measures to combat the rabbit plague. But its direct involvement with the testing of myxomatosis sprang from a letter to David from Sir Charles Martin, a few weeks after he had returned to England after his 2½ years in Adelaide. On October 23, 1933, Martin wrote:

. . . I have also seen Jean Macnamara after her return from the Rockefeller Institution, full of the possibilities of destroying rabbits with a virus disease which she found some of her contemporaries working on there. The idea is not a wild one. The virus was discovered in 1896 in Montevideo where it destroyed the bacteriologists' stock of laboratory rabbits. It turned up again a couple of years ago in Chinchilla rabbiteries in three places in S. California. It merits looking into. That I will do if you wish. . . .

David did not hesitate. He sent a cable to Martin assuring him that whatever money he considered necessary for the work on myxomatosis would be forthcoming. Dr Lionel Bull joined Martin at Cambridge and worked with him on a series of experiments with various types of rabbits with results that were consistently successful. Bull returned to Australia in the middle of 1935, succeeding Dr. J. A. Gilruth as Chief of the Animal Health division, and bringing the myxomatosis virus with him. All work had to be conducted under strict quarantine but after much trouble about testing on various islands, success was achieved. The main experimenter in the field was an unquali-

fied but invaluable worker named Mules (who could hardly have been employed by C.S.I.R.O. under today's constitution). The letters between Rivett and Martin at Roebuck House, Cambridge, tell the full story of Martin's experiments and then the subsequent Australian battles with the health authorities to get adequate testing. Dr. Bull says the whole story was 'a superb vindication of Rivett's insistence on giving the researcher in the field a free hand, ridding him of bureaucratic interdiction and providing protection and financial backing'.

The full romance of the final break through is told to Martin in a letter from David in June 1941:

. . . You will remember the Wardang Island trial (myxo was first released by Lionel Bull on a 90-acre patch on Wardang Island off York Peninsula in November 1937) ended in failure; the disease would not spread and we blamed the social (or unsocial) habits of the bunnies. Bull refused to give up and decided to try for some insect vector. A likely one was the common stickfast flea or ECHINDNOPHAGA. Rather to our amazement it could not be found on Wardang—there must be some predator on the island . . . so we took 90 acres at Pt. Pearce on the mainland opposite Wardang, where oddly enough the flea flourishes. After the usual ritual with Howard Cumpston (the Commonwealth Health Chief) who did not like the idea of a mainland release, and with due and solemn quarantine precautions, Mules Jnr. built up a population of 500 rabbits in 13 warrens and then introduced the virus. In 70 days there were only 17 rabbits in the paddock; all were caught and all were susceptible . . . had the Wardang I experiment succeeded we should probably have drawn quite a wrong conclusion about the mechanism of distribution. It was just a bit of luck the flea cannot live there. . . .

The war brought delay but after the Pt. Pearce justification of Martin's experiments, David's masterly understatement of June 1941: 'It should be possible with the flea's help to do a lot of local reduction of numbers', was proven to the hilt all over Australia, five years later.

Dr. Bull's success with myxomatosis following that of Dr. Gilruth in combating caseous lymphadenitis, the scourge of cattle in the north, gave great prestige to the Animal Health

Division. Bull's emergence was yet another dividend from David's persistence in persuading Martin to come to Adelaide in 1931. When Bull left Martin at Cambridge in May 1935, to take up his duties as divisional chief, Rivett wrote to Martin:

Contact with you has meant a tremendous lot to him ever since you came out here . . . he was beginning to feel that he would never get an opportunity to do in veterinary work the best of which he was capable. . . . Your coming made an immense difference to him and, as you know, it was your recommendation that settled any doubt we may have had in the C.S.I.R. about the wisdom of inviting Bull to undertake very heavy responsibility with us.

One of David's imports from the Empire Marketing Board staff, Dr. Francis Ratcliffe, who had already made a name for himself in combating the depredations of the flying fox on fruit in the north, played a major role in the final successful experiments infecting with myxamatosis the rabbits in the test areas. He also had worked with Martin and, like Bull, was destined for high office in C.S.I.R.

However, the ultimate triumphs were just a vision in the minds of men like Martin, Bull, Rivett and a key pioneer, Dr. Jean Macnamara, when in 1934, Melbourne University made a bid to recover its former chemistry professor from C.S.I.R. to become its first full-time vice-Chancellor.

Murmurings about the likelihood that he would be the first man to be sought for the vice-chancellorship at Melbourne had reached David and some C.S.I.R. men at the end of 1933. (A couple hastily asked Julius if it were true that Rivett was leaving as if so they would like to offer themselves for his post. They would have been appalled had they learned that the Chairman wrote unambiguously to David that if he did go and either was appointed as his successor both the Chairman and—(he felt sure)—Richardson would instantly resign!)

Well aware of the extremely narrow outlook among certain members of the University hierarchy, David was entitled to think that, even at the eleventh hour, they would shy away

from offering the highest-paid and most powerful position ever created on the campus to one who had left them seven years earlier. He wrote to Herbert Brookes:

I have deliberately put it out of my mind ever since the first indication that I might be considered for it. . . . I certainly would not apply for the post but if they do me the honour of asking me to consider it, I shall do so most carefully. In many ways I am not the right (and certainly not the conventional) type for it.

To David's amazement the thirty-odd councillors, with one dissentient vote, duly offered him the post in April 1934. The dissentient, a Presbyterian fundamentalist, said he fully agreed with everything put forward about Dr. Rivett's pre-eminent qualifications. But he could not in conscience support an agnostic for such a post of responsibility.

The next few weeks for David and Stella were probably as difficult as the period of decision in 1926. The University post offered many attractions, above all, his knowledge of how much was needed to reorganise and modernise the whole structure of the University. While, as he wrote to Brookes, 'the new V.C., whoever he is, will not have plain sailing with some of the more narrow-minded and petty of his flock', he had ample assurance from both seniors and contemporaries at his old Alma Mater that no one could go in with more goodwill or trust. To a great extent, C.S.I.R. was now established beyond destruction and Melbourne University's acute needs offered a new challenge he knew he had qualifications to meet. The Vice-Chancellorship, for all its problems, seemed to offer a far less exacting role, sparing him the travel (and consequent worsening antrim troubles and allied ailments) and freeing him from the enormous pressures that his highly personalised conduct of all C.S.I.R. ventures inevitably imposed on the man at the Albert Street desk.

Against this, Julius and Richardson left him in no doubt that they stood aghast at the prospect of losing him. They were well aware of his frustrations and burdens in the C.S.I.R. post and knew better than anyone outside how much daily strain he

shouldered. From his personal viewpoint, they could well understand the appeal of the lighter University burden with no loss, indeed some apparent gain, in salary.

The general alarm of other C.S.I.R. colleagues made him feel that he might be accused of deserting a ship that he had largely launched, manned and steered. In London, McDougall, getting wind of the offer, appreciated David's dilemma. He wrote :

From the standpoint of ACDR I should find it very hard to come to any conclusion. C.S.I.R. is already and can become one of the major guiding forces in Australia. It is a hell of a job to be its Chief Executive if you have, as you have, a highly developed conscience. The University represents a less exacting task and a more certain position. . . .

David talked at length with Brookes and Masson and wrote to Bruce. Bruce's cable may have helped to consolidate his own decision. It read: 'THINK HARD, THINK AGAIN, BUT STILL SAY —NO.'

The press made a great fuss about the abnegation of a man who, offered more money in a less demanding post, preferred to go on serving Australia. This acutely embarrassed David. Money was not the chief consideration. Secondly, the University offer when analysed, allowing for heavy entertainment costs, was not so attractive as the published figures suggested. The Chancellor and other members of the Council were quite shaken at his decision. They had been certain he would accept. However, presently, they were fortunate enough to obtain from Cambridge the services of Dr. R. E. Priestley, who took up the vice-chancellorship in 1935, serving with distinction.

Learning of David's decision, Julius cabled his intense gratitude and delight. The Prime Minister's department put out a press release from Mr. Lyons saying that Dr. Rivett had informed him that he had declined the position. It was entirely contrary to his principles to bargain with the Government or to use the offer as a basis of bargaining. The Prime Minister added: 'We feel that the decision is in the best interests of Australia and that Dr. Rivett will, in his present position, be able to exercise a wider influence in the national interest.'

Actually the offer was to be repeated in September 1937, following the resignation of Dr. Priestley, who had come into headlong collision with the Chancellor, Sir James Barrett. Priestley, immediately he had resigned, wrote to Herbert Brookes, a member of the University Council, on September 7 1937:

Is there any chance at all do you think of Rivett considering the Vice-Chancellorship if it were offered to him? I am personally of the opinion that, if there is, the Council should ask him at once without waiting to explore other possibilities. . . . If he were to succeed me, I should then go away feeling that my resignation was an unmitigated blessing to all concerned. He has every qualification for the post including many that I do not possess. He has the confidence and the ear of the politicians and long experience in dealing with them. . . . If the Council asked Rivett to come and he agreed I should appear to myself a benefactor of Victoria. . . .

Priestley, while grossly underrating his own talents which he was immediately to prove at Birmingham, predicted accurately. Barrett, finding unanimity on the Council, immediately asked if Rivett would take the post. In writing to Brookes, Barrett mentioned gossip that Rivett was finding the C.S.I.R. demands too heavy and might now reconsider. Priestley and Barrett were right in thinking that Rivett was not entirely happy about certain major developments that 1937 had produced at C.S.I.R., as we shall see. But, as he wrote to Sir Charles Martin:

The Council very kindly asked me again to take the post. I was greatly tempted. . . . It is a great chance for some fellow to plunge in and pull things onto a brighter plane. But I had to refuse as it seemed almost impossible to leave C.S.I.R. at this stage.

He wrote to Barrett explicitly immediately. He was now in his own eyes completely identified with C.S.I.R. Great new problems and war clouds were looming ahead, in that spring of 1937. To his mind it was no time to shirk what promised to be very stormy water ahead. Over the following years Lord McGowan was to make various approaches to him on behalf of I.C.I.A.N.Z., but richly attractive as they were, he never again

seriously contemplated laying down the C.S.I.R. leadership until his retirement in 1949.

At its inception, C.S.I.R.'s task had been to provide the machinery of research and application of knowledge to problems in certain key fields. By the 1930's a great flood of experience and of knowledge unearthed in its laboratories offered the Council—and particularly the Executive—strong evidence pointing to rejection or reaffirmation of long-held national theories. In a series of submissions to ministers and in articles and public addresses, this developing philosophy of the national research organisation was gradually outlined. In one major field, despite continuing 'hot air' from some politicians, and unthinking publicists, David Rivett was now able to obtain effective acceptance. In the other key proposals he put forward, progress was appallingly slow and ultimate vindication was delayed for years.

A letter sent by David to Professor Griffith Taylor of the Department of Geography in Chicago in August 1933, succinctly sums up his rejection of the cherished myth of 'unlimited potential':

. . . The work of a body like the C.S.I.R. is continuously bringing home to one the folly of past declamations about the immense potential wealth of our vast empty spaces. Unless I am mistaken the whole trend at the present time is away from the idea of extension of areas here. We are coming to recognise that it is to the more intensive use of that part of the country which has reliable rainfall that we must look for development if we want to carry it out on sound economic lines. This doctrine is being steadily propagated by C.S.I.R.

By the 1950's, this guiding philosophy had been accepted in so many branches of Australian agriculture and breeding, that it seems today almost a truism. Forty years ago it was iconoclastic. It ran directly counter to a standard platform recipe for national pride and confidence in the future (even if precious little was being achieved visibly in the present). It says a good deal for the unobtrusive thoroughness of C.S.I.R.'s methods and guidance and for the esteem it was already establishing that it was able to go ahead with this philosophy without serious chal-

lenge. With C.S.I.R. as the fulcrum, the whole national emphasis in primary production was quite rapidly turned to more scientific exploitation of the best and reasonably good areas and away from the scores of schemes—not all meaningless but invariably very slow and immensely costly—for ‘making the deserts blossom’.

From the beginning of the 1930's, with increasing confidence and persistence, David began an attack on what now seemed to him the fundamental flaw in the nation's economy. A flow of reports from America and Africa in particular had emphasised the immense contribution that mineral wealth below the ground could make to national living standards. Through the 1920's and 1930's the U.S.A., Canada, South Africa and some of the Latin American states were making discoveries or developments of earlier discoveries which were transforming their economies. Yet Australia, since the great creaming-off of the gold rush and subsequent strikes, had left her three million square miles virtually unexamined, untested and entirely unexploited. The basic reason, David began preaching at all levels, was the lack of any national geological survey. Each state had its Department of Mines, each university had its departments of mining engineering, metallurgy and geology. But of co-operative effort, a pooling of knowledge and of data available, a national program to finance and carry out detailed search of what lay beneath the deserts, forests and great rocky outcrops, there was none. Politicians and leading industrialists alike were too obsessed with the immediate economic struggles. State governments and departmental chiefs were too jealous and distrustful of Commonwealth and of sister states, to make the major national assault which might provide a solution for many of the problems. The more David studied reports that pointed to similarities in Australian soil and rocks to those abroad where invaluable discoveries had been made, the more he became convinced of the folly of this involuntary conspiracy of neglect of what might lie beneath the surface.

Personal letters to many acquaintances and verbal and written suggestions to ministers were the quiet beginning of his campaign. Was it not short-sighted and most unfortunate, he

asked, that in a time of depression and world surplus—or inability to absorb Australia's major food exports—the nation should scarcely turn a stone to find what might lie below the ground?

In April 1934, he wrote a paper published in the C.S.I.R.'s journal that August—'Debts, Unemployment, Gold and the C.S.I.R.' Having discussed the crippling effect of war debts on creditor countries which could not accept repayment from debtor nations in foodstuffs or manufactured articles without creating unemployment at home, he urged that Australia begin a systematic national search for the 2830 tons of gold needed to liquidate the national debt. Australia owed Britain £554 million. Annual interest on this was £26 million. To repay the debt in wheat, wool or beef at ruling prices would lead to chaos as Britain was trying to protect her farmers with their rapidly increasing output per acre. But Britain was quite willing to pay £6 sterling an ounce for gold. Could not Australia with its reservoir of unused labor try to dig the external debt out of the earth?

He pointed out that no one could say whether the necessary 264 million tons of sevenpennyweight ore existed in reasonably accessible deposits but he believed Australia was a heavily mineralised country and the amount did not seem outrageous.

Economists must determine how the gold could be exchanged for paper currency or Government debentures and stock. Even with only five- or four-pennyweight-gold 'the game might still be worth the candle'. Although apparently fiercely inflationary, the process would turn the national debt from an external into an internal debt. He asked if this attempt to dig out our external debt, using thousands of men currently degenerating on the dole might be economically attractive. If so, C.S.I.R. and the Mines Departments of the states must assume a heavy responsibility.

C.S.I.R. had hitherto concentrated on primary industries—animal and plant production. In the current, glut-ridden, world market would further discoveries, boosting our crops, produce a bigger return than smaller crops equal to or just under market demand? He added the blunt conclusion: 'If we can do more good for the country by finding and selling gold-bearing ore

than by growing and selling wheat, we ought not to avoid a re-examination of our programs. . . .'

He did not minimise the task of training the men, determining the necessary metallurgical practices; meeting the dearth of trained geophysicists. But it would not be impossible even in a relatively short time. Australia had trained financial leaders, aware of the dangers of over-capitalisation in mining ventures, who could assist. With modern health measures and recent development of broadcasting, mining camps could be made very different from those of earlier days. They could offer attractions appealing to thousands of strong men and youths, condemned, through no fault of their own, to idleness and the dole.

There was an element of a gamble, David admitted. Mining men and economists must determine if the risks were worth taking. If affirmative, C.S.I.R. and other bodies must waste no time in getting action.

The Rivett argument created wide discussion. In December representatives of the Commonwealth and States met in Melbourne and over the next nine months about 5,500 men were found employment in a stepped-up program on the goldfields. £300,000 was set aside in the 1935 Budget to encourage gold-mining. By October 1935, C.S.I.R.'s Minister, Senator McLachlan, was claiming that gold production was up by more than £1 million. The Sydney *Bulletin*, in an editorial on October 30, 1935, pointed out that Rivett's proposition for redeeming the debt by digging out gold was now even more attractive since the price of gold had risen from £6 sterling to £7.1.7 an ounce.

Wide national publicity was given to an interstate conference of Ministers for Mines chaired by Senator McLachlan as Minister for Development at the end of October 1935. McLachlan told the State Ministers (Launceston Examiner, 29.10.35) 'that work of great value to the mining industry was being done by Sir David Rivett for the Commonwealth which had made £25,000 available for mineragraphic investigations, but there must be an extension of co-ordinated scientific work. . . .

'Sir David Rivett criticised the efforts of the inadequately staffed State geological surveys in Australia which was the

only Dominion which had no national geological survey. Grants made for the support of prospectors had attractions as a method of handling the unemployment problem, but as a method of laying bare Australia's resources it was equal to the examination of sea fisheries with hand nets. While not entirely useless, it was feeble and crude.'

This phrase caught the imagination of leader writers and columnists throughout Australia. The Melbourne Sun gave David top billing and a tribute in its 'A Place in the Sun'. At the conference, David's suggestion for a national geological survey by Commonwealth and States supplementary to what was being done by State agencies was carried. But State jealousies were again obvious. Victoria's Minister for Mines, Mr. Hogan, said a Federal Mines department might be contemplated but would never be countenanced.

Through the next two years a series of attempts were made half-heartedly to implement the desire for a full survey. They foundered on inertia and State parochialism.

David gave an overall picture of Australian mining at the end of 1935, in both speeches and writing. He said to the Beefsteaks:

Are we simply to abandon our inner and upper areas? No. We must study them with an intensity as yet unknown to us. . . . We do not yet know Australia sufficiently well to permit our using it. We abuse it through ignorance. Particularly are we ignorant of it from the miner's side. There is reason to believe we possess large mineral deposits. . . . The history of our handling of mining in the past three or four years is a disgrace. Wild cats—exploitation by company promoters—amazing failures by boards of directors—placing of faith in pick and shovel prospectors; it is a feeble story. Not only have we failed to use the geologist properly and to give him all possible modern equipment such as that provided by geophysics, aeroplane survey, etc., but we don't seem to realise how foolish we are not to do these things.

The political aversion to big-scale national mineral search was a weakness of outlook, morale and understanding. Much of the struggle of the 1930's might have been lessened if David and a handful of geologists, like Harold Raggatt, had not been left crying in the wilderness. A Western Mining Corporation in

the thirties would have been worth even more for national morale than for our overseas trade balances. But science and commonsense could only advocate. Power rested with politicians more intent on personal advancement and the party struggle than on the nation's most clamant needs.

In July 1938, writing to his friend E. C. Dyason, the Melbourne sharebroker and philanthropist, David said:

During the past 25 years no less than nine national conferences have been held in this country with the object . . . of trying to develop something in the way of a Commonwealth Geological Survey. Every single one of them has failed because of the intense parochialism of State Departments. . . . The general decision unfortunately was that there is no place for the C.S.I.R. which means for the Commonwealth, in geological work, which must remain still longer in half a dozen isolated, and in many respects ineffective State divisions. We now have the distinction of being the only Dominion in the Empire without a National Geological Survey.

As more and more was now pushed rapidly on to C.S.I.R.'s plate, almost everyone lost sight of this crying need. David felt that a major national opportunity of incalculable value was being sacrificed. He kept fighting and the logical supported his arguments. But the years slipped by before Federal action was strong enough to overbear the myopia of the States.

One of the pitfalls attending C.S.I.R. at the outset had been the resentment of University departments and State government departments at 'intrusion' by this independent authority with Commonwealth powers into territory traditionally theirs. For all his early years with C.S.I.R., the Chief Executive leaned over backwards in every public statement to pay tribute to the work of local State authorities and the value of their co-operation in C.S.I.R.'s national quandaries. Press cuttings of his arrival in each State give chapter and verse for this meticulously observed policy. Commonwealth public servants as well as Ministers were frankly envious of the exceptional ease with which C.S.I.R. could get quite startling innovations in procedure considered by State authorities. Ministers and their advisers, fearful of traditional State obstructions, were delighted when C.S.I.R. was prepared to broach any matter to the State authorities first.

The long serving head of a major State department gave this explanation of the phenomenon of C.S.I.R. recognition:

We had had experience of new Commonwealth authorities coming in, full of demands, and fairly bristling with the importance of their commissions. David Rivett came to you very quietly, explained his problem in detail, meeting your demur or questions as if he had weighed them all before you thought of them. He was so frank, so obviously concerned to do his best for the community that in no time he had you on his side. Ask the chaps in my job in the other States, they'll tell the same story. Basically, I suppose it was a matter of sympathy and sincerity. After a year or two, he enjoyed the absolute trust of everybody in the State machinery up and down Australia. Things that might normally have taken months were done for him in weeks or days. I don't know if the Council or even his Ministers knew how much C.S.I.R.'s instant and continued success was due to Rivett's personal approach.

Had he been allowed to drop some other national issues and concentrate on winning State support for the survey of natural resources, the mining bonanza of the fifties and sixties might have been glimpsed in the thirties when the need was most acute. As it was, a vital card in Australia's hand in the battle to beat the Depression was never played.

For David the last weeks of 1934 were among the most eventful. They began with a breakthrough for a vital Division. For years the most miserable and humiliating aspect of C.S.I.R.'s financial curtailments had been that the Forests Products Division had been indefinitely housed in backrooms and adjacent sheds at 314 Albert Street. Its chief, Isaac Herbert Boas, was a dedicated scientist but neither uncomplaining nor without temperament. He proceeded to vent a ceaseless protest at the cramped and quite appalling conditions by maintaining a maximum din with his machines and saws. This, says Dr. Vickery, was always stepped up to a peculiarly strident pitch whenever the Executive trio were meeting in Rivett's room not many yards away.

On one occasion Rivett told Boas he would like to visit the workshops and have a yarn with each man at his bench—as he did with every section of C.S.I.R.'s activities. Boas ordered the

maximum possible production of decibels. Vickery says: 'Rivett, for once, was not amused. He said so and that form of protest came to an end.'

At last, in November 1934, the Victorian Government offered C.S.I.R. a lease of land in Yarra Bank Road at £5 a year. The site was gratefully accepted for Forests Products. The best of facilities and equipment, as observed abroad by Boas, were gradually installed. One more of C.S.I.R.'s problems had been overcome.

On November 18, David's father, days short of his 80th birthday, fell dead in a moment of great drama in Sydney Domain. In the presence of more than 15,000 people, the Rev. Albert Rivett had just stepped back from a rousing address in defence of freedom of speech. This, he had declared was being flouted in Australia by none other than the Attorney-General of the Lyons Cabinet, Robert Menzies, who had refused permission for the invited European anti-Nazi leader, Egon Kisch, to land and speak to Australians. The cause was indeed one for which the old man had always been prepared to nail his colors to the masthead—liberty in British democracy. As the first crashing roll of applause burst on his ears, the independent man of God who had always thought simple men more important than famous ones, fell back with a stroke that killed him instantly.

The story of his father's last moments—a truly great ending to a life in which principle always mattered more than material benefits—was told that night in thousands of Sydney homes. Egon Kisch himself has told the tale with passion in his *AUSTRALIAN LANDFALL* (Secker and Warburg—1937). Two days earlier, Kisch had received a letter from Mr. Rivett which said in part: 'I am a very old servant of God, and I have the firm conviction that I am acting according to God's will when I speak in protest against the attempt to keep you away from my country. You are fighting for peace . . . my illness and my age (almost eighty years) have not prevented me from speaking on behalf of your release every day. . . .'

The wave of tributes to their father, both on the Domain and in the following days from all over Australia, especially from the

poor and the pacifists whom he had championed, meant much to his seven children. Dr. Lloyd Ross, historian of the Labor and Trade Union movement in N.S.W. has described him as 'one of the great men who inspired and launched the Labor movement on its upward path.'

That day was a watershed in the lives of the seven Rivett children. For their mother it was the end of all that had sustained her for half a century. In the shock of her grief she suffered a thrombosis that would have killed most strong men. She lay paralysed for many weeks and remained a total invalid nursed at home by Else until her death, two years later. For Nell, still teaching in India, for Christine in her Brisbane surgery, for Olive in one of Victoria's Methodist parishes with her husband, as for David at Albert Street, an era ended that day. For 30 years their mother's letters had kept them linked to the family and home as tightly as were Else, Mary and Ted living in Sydney. All seven had remained interlocked in a sense of clanship and mutual involvement, immensely strengthening in every personal crisis. Now the twin blows to father and mother appeared to threaten that exceptional closeness. But it was not so. In their totally different ways, Nell first from Calcutta then from Madras, and Chris from Wickham Terrace and later from Macquarie Street, stepped into the gap. Quietly, without comment, they took over their mother's work as family courier and commentator on all things pertaining to the seven and to the seven grandchildren who had followed them. David's debt to Nell and Chris was one he always felt he could never succeed in repaying.

Of his father he wrote to Hedley Marston:

My father was in his 80th year and it was a great thing to go as he did when feeling particularly fit and vigorously battling, as he had done all his life, for what he believed to be the right. He was a great anti-war fighter and he was intensely right in his attitude but so sudden and unexpected a passing gives a jolt to those who are left. . . .

The sheer flame of pride in their father, which characterised the Rivett children, startled some who looked in vain for any

trace of pride in them at their own, not inconsiderable, achievements.

Not many days after his father's death, the usual channels at Canberra told him that it was proposed at the New Year to make him a Knight Commander of St. Michael and St. George. For a man who had no time for pomp or pretension or for anything that separated a man from his fellows, the proposal was part shock, part pleasure, but mostly an appalling embarrassment. The deeply ingrained egalitarianism of his father mocked any title. He retained the same conviction. In the 1930's, however, with the great majority of his fellows, a knighthood, and particularly the comparatively rare KCMG, was a unique endorsement of performance when it went to a man whose record had no trace of party political services or of wealth. For C.S.I.R. this was major recognition, conferred on him as its leader. For himself, as a private citizen, he would certainly have refused it. Indeed for the rest of his life, he never used his title whenever he could avoid doing so—in introducing himself, in making bookings, while travelling, or in any sphere where neither C.S.I.R. nor Government duty was involved. His inner turmoil in 1934 was expressed in his reply to Sir Charles Martin's congratulations from Cambridge:

It is of course an Imperial scandal of the first magnitude that such a thing should have been offered to me. It is all right for Stella. She can act the part. I can't and should never have been put into it. . . . Yet to decline would have been horribly churlish and might have done harm for I believe our rulers in making their recommendation genuinely wanted to do honour to C.S.I.R. . . .

His colleagues at every level were less modest. They accepted it as giving C.S.I.R. new status but they were delighted for the sake of their C.E.O. himself. Their letters, wires and phone calls underlined a belief that without him there could have been no C.S.I.R. results comparable to those achieved. Knowing his extreme modesty, they were genuinely enchanted at the accolade.

It was six years later that he received the honor which he esteemed above any others. In 1941 he learned from the Royal

Society in London that he had been elected to its Fellowship—the eleventh Australian in 150 years to be so recognised. This time his delight—and amazement—were unconcealed. To Martin's congratulations he replied:

I have scarcely recovered from the shock for, on joining the C.S.I.R., I said goodbye to hope of ever being allowed through that door. It gives a thrill a joy such as I have not known before; but I am glad that a candidate is not called upon to give sound reasons for his own selection. Thank Heaven there is not an examination!

Throughout the thirties and up to the outbreak of the Pacific War which greatly curtailed travel within Australia, the C.E.O. was still visiting each State once or twice a year. These visits created a bond between the staff in each city and Albert Street. Miss Hilda Todd, for more than 20 years secretary of the Queensland committee of C.S.I.R. gives the pattern of these interstate pilgrimages:

On his first visit Sir David visited Professor H. C. Richards (Chairman of the State Committee) and several others and had talks with them and with under-secretaries of State departments and professors at the University of Queensland. Later some were appointed members of the Queensland State Committee.

All members attended the meetings and took tremendous interest in C.S.I.R.'s proposed investigations. They were, I think helpful in suggestions and criticisms. Results of these meetings (held in my office) were reported by me to C.S.I.R. Head Office.

In those early years the laboratory at Cannon Hill Abattoir (here J. R. Vickery was to do his invaluable work) was established by obtaining the co-operation of the Meat Industry Board after Sir David had discussed matters with the Director. Buildings were loaned to C.S.I.R. for experimental work and some were held for years and still are held. These arrangements entailed many visits and long discussions but were all very satisfactory owing to the diplomatic way in which Sir David made his requests as he created a nice feeling between the parties concerned which was very important. His enthusiasm was rewarded by the tremendous interest he aroused.

Sir David had a great ally in the Chairman of the State Committee, Professor H. C. Richards, who spared no effort to promote the interests of C.S.I.R. The Queensland State Committee was indeed a very active one. There is no doubt that Sir David's personality was responsible for the many friends he made and the good feeling which existed between the State departments and the C.S.I.R. The United Graziers was also on excellent terms with us and showed its gratitude in many ways for the help given. . . . The Graziers (a very strong body here) held Sir David and C.S.I.R. in the highest esteem.

Sir David never missed an opportunity to give praise and pleasure for anyone who did anything for him and that trait in his character endeared him to many. . . . He always went around the staff and spoke to each girl and asked about her family and never forgot from visit to visit the things that had happened or were about to happen to each . . . of course they were very impressed and thrilled . . . he really had the personal touch with all the C.S.I.R. staff. . . . Naturally, in latter years, as the Organisation grew it couldn't be quite so personal, particularly when the staff was to some extent controlled by the Public Service regulations.

In later years he told me he felt he had been in charge during the best years when there was more freedom to carry out one's ideas—but it is always like that when any organisation or business expands so rapidly, it wouldn't now be possible to keep in personal touch with every employee.

Sir David usually gave a talk to the State Committee on . . . experiments and proposed new experiments. One in particular stands out when he told the Committee of the establishment of the Aeronautical Laboratory at Fishermen's Bend. He went into such detail . . . and although I was not well-versed about wind tunnels and other technical details he explained it all so graphically that one could see it all. . . .

When it was decided that C.S.I.R.'s Chief Executive should spend the last half of 1936 in Britain on a series of conferences and inquiries, the Minister immediately pressed him, as Chairman of the Australian oil-from-coal committee to go to Germany to investigate the latest methods of transforming coal and water into oil. Politicians tended to talk as if Australian science had only to catch up with German tricks to transform the whole problem of transport fuel.

In fact, C.S.I.R. was already equipped with a full understanding of the processes and all the technical background needed. However, David, after many weeks of detailed correspondence with British and German experts, visited Oberhausen-Holtent to study the Fischer process plant there and then conferred with the chiefs of I. G. Farbenindustrie at Ludwigshafen and at Leuna in late August 1936. In England he had long discussions of British and Australian government policy and needs with the Prime Minister's advisor, Sir Horace Wilson, at 10 Downing Street. In November '36 he completed a detailed confidential report on the alternative processes with an estimate of costs of every stage of the process for the Lyons government.

On his return from England, David was asked to keep confidential his report on the feasibility of oil-from-coal in Australia. He reported solely to a sub-committee of Federal Cabinet.

In fact there was nothing about the process that could not be accomplished in Australia. But it was exceptionally expensive and obviously only worth consideration if war promised to cut off traditional supplies of tanker oil from the Middle East.

The year 1936-37 marked the ending of a chapter for the Council and for its chief executive. For almost exactly eleven years after that March evening in 1926 when Stanley Bruce had laid the cards on the table its work had been overwhelmingly concerned with the primary industries. Within months that whole emphasis was to change. Sweeping war clouds from Europe even more than political pressures, accelerated the process. Most historians and scientists are agreed that this was a watershed. After 1937, while none of the primary researches were discontinued, they had perforce to take the back seat. David and his Chairman became ever more involved in a host of demands and queries in new fields as politicians and Service Chiefs suddenly confronted the prospect of a virtually disarmed nation being drawn in to global war.

It is a good time to take a very brief assessment of that first decade. All who want to know the full story of each division's achievements can find them in 'C.S.I.R.: Ten Years of Progress 1926-36'. The deadpan reporting of the booklet—without a hint of comment or commendation—succeeds simply because

the tale of tasks tackled and performed renders comment superfluous.

To check the record it is fascinating to recall the exact words of the four main points of challenge laid down by the Rt. Hon. Stanley Bruce as Prime Minister in opening that first full meeting of the Council on June 26, 1926, and the response that, in all modesty, could be made ten years later:

Finance:

Challenge: ' . . . Show that there is a great work to be carried out and there will be no difficulty with regard to future finance. By showing the results that can be achieved . . . you will let the people of Australia see that in research work there is no limit. . . . '

Response: Once the panic years of the Depression were passed the Council never had serious trouble with Minister or Cabinet over funds.

Targets:

Challenge: ' . . . Best results will follow concentration of effort on certain definite lines to give . . . results in a reasonable time. . . . '

Response: Virtually all major problems tackled affecting primary industries were solved or close to solution in the first decade.

Liaison:

Challenge: ' . . . Task will be to act as liaison body with similar bodies in other parts of the world . . . greatest possible co-operation between research organisations of the Empire. '

Response: Fulfilled to the letter. Ideas developed and men exchanged not only with Britain but with New Zealand, Canada, South Africa.

Training:

Challenge: ' . . . great difficulties . . . unless we train up some of our own men . . . give them opportunities to visit other parts. . . . '

Response: Begun in first year. Some of men chosen—like Dr. Vickery in the Food Preservation Section—were about to

become Chiefs of Divisions and were saving Australia hundreds of thousands of pounds. The training process was at the core of C.S.I.R. development.

The man who, more than any other, had inspired these challenges and had foreseen and helped with David's responses to them, David Orme Masson, died on August 10, 1937. Professor Hartung recalls visiting Masson with David shortly before the end. As they left, David said to Hartung: 'Well, I don't think there is much chance that we will be like that—so clear and logical in everything in our eighties—not that we are likely to get there.' 'Speak for yourself', said Hartung, 'I have every intention of getting there!'

Even the Masson and Rivett families had only glimpsed part of the meaning to each other of the two men since David had first become Masson's student 34 years earlier. David wrote to the only other man he ever placed on quite the level that Masson had always held. To Charles James Martin, he said:

The passing of D.O.M. has left a fearful blank. I had scarcely realised how much he had come to mean to me. Almost to the end his mind was perfectly clear; he made one of his characteristic jokes with me just a few hours before the end . . . and that ends one of the best human associations that has come into my life.

Some months later to Martin again he wrote:

I miss M. more than I can say or even thought possible. He was a rare spirit and our evenings together every fortnight or so meant a lot to me—good occasions for letting off steam pressure. . . .

Neither the politicians, nor senior colleagues realised through the twenties and thirties how much the impact of Masson, the founding spirit of C.S.I.R., assisted the man making it work. Without him, David's lot was much lonelier—and harder. Masson's death bisected his 23 years with C.S.I.R. There was no doubt which half seemed to him the richer.

Three months later Senator McLachlan resigned from the Ministry. He had been C.S.I.R.'s Minister for almost six years. In a warm message of thanks and praise to David, the Minister

nominated as the outstanding achievements of C.S.I.R. during his Ministry:

1. Discovery of methods of transporting chilled beef to England;
2. Control of blue mould in tobacco in the seedling stage;
3. Development of vaccine for treating pleuro-pneumonia in cattle.

The reappearance of the Treasurer, R. G. Casey, as C.S.I.R.'s Minister in December 1937, moved David to confide to Martin:

. . . it is a great stroke of good fortune and I am personally prepared to order (but no more) the turning of catherine-wheels of satisfaction. There is heavy work ahead if we are launched on the sea of secondary industrial work and it will mean much to have a vigorous representative in Cabinet—and a thoroughly intelligent and interested Minister.

In fact, the Treasurer was in a unique vantage point, with his first-hand assessment of all the nation's competing needs as war loomed closer, together with his understanding of C.S.I.R. costs if they were to fulfil what was now suddenly being demanded. For months, different viewpoints on this question had imposed great strain on the habitually cordial relations of David and Julius. Julius had been the champion of a host of schemes and proposals for C.S.I.R.'s immersion in the problems of secondary industry. Politicians and business and professional friends had been urging that C.S.I.R. must now change its priorities. The Chairman had come to support proposals for tackling many projects at once, without first consolidating the machinery David thought essential to a meaningful attack on secondary industrial problems.

With understanding of the political pressures, Julius was right in foreseeing the inevitability of rapid expansion of C.S.I.R.'s role. But David, with his feet on the ground, gradually forced an understanding of essential first steps. In May, 1937, he had written to Martin at Cambridge:

There was much undisciplined talk about secondary industrial research when I got back but it is getting more reasonable and

even the politicians no longer expect us to solve all the problems of all the manufacturers in all the industries out of our subconscious minds.

The switch of C.S.I.R. into secondary industry and into many aspects of defence planning probably stemmed from a visit by B.H.P. chief Essington Lewis to Japan in 1936. He returned thoroughly alarmed at what he saw and urged the Lyons ministry to act immediately to produce planes and fliers. This led to establishment of the Commonwealth Aircraft Corporation under Group Captain L. J. Wackett. When David was leaving for Britain in the middle of 1936 he was asked to find the best man to chart the course for Australian aeronautical research. He discovered that H. E. Wimperis would be available to come out in 1937, after his retirement from British Aeronautical Research, and recommended his appointment.

Wimperis, quiet, immensely knowledgeable and expert, looked at the Department of Supply, the Defence Department and other Commonwealth sections and recommended that aeronautical research be placed under C.S.I.R. The Government, who shared the general recognition of Wimperis's outstanding ability, agreed, and in 1938 he went back to England and chose Mr. Lawrence Coombes of the R.A.F.'s Farnborough establishment to come to Australia as chief of C.S.I.R.'s new Division of Aeronautics and to establish laboratories on some acres the Government had found for C.S.I.R. at Fishermen's Bend in Melbourne.

By January 1938, the C.S.I.R. had convinced Casey that £143,000 would be needed for the new laboratories. From the outset, as war fears grew then became grim fact, money was poured into the A.R.L. Division in a way that made a mockery of past parsimony to other divisions. Coombes, coming fresh to C.S.I.R., says he was greatly stimulated by his contacts with Julius and Rivett. He found them 'very blunt' but the whole set-up was ideally suited to the fantastic growth of the A.R.L. under the impact of European war and then of Pacific War and the threat of invasion. Coombes turned to Wackett on all constructional matters and to David and Julius on the administrative

side. He says it was 'singularly fortunate' for Australia that A.R.L. was put under C.S.I.R. so that immediate decisions could always be had in the years of growth and development. The achievements of A.R.L. gave immense satisfaction to the Chairman who had been a vigorous champion of the project and visited the labs. frequently.

While the story of the Aeronautical Research Laboratories became fairly general knowledge before and during the war, only a handful of Defence leaders and Ministers had any knowledge of C.S.I.R.'s involvement in what was perhaps the most closely guarded secret work for national defences. David Rivett never gave a hint of the work to his family or closest intimates and the story of his and C.S.I.R.'s participation was not known to the writer—or perhaps to many others—until years after his death.

The key figure in the story was Sir John Madsen, professor of electrical engineering at the University of Sydney. Madsen had ties with C.S.I.R. from its very beginning. When the Radio Research Board was set up in the 1920's it consisted of Harry Brown as Postmaster-General, David Rivett and John Madsen as Chairman. Its objective was fundamental research into everything in the atmosphere affecting broadcasting and communications. Madsen was in close touch with work being done by Appleton at Cambridge and by Watson Watt for the British Post Office. When the Depression hit, Julius and Rivett, under orders to make drastic cuts, had to sacrifice someone. On the principle of 'last in, first out', Madsen lost out. However, Sir Harry Brown regarded the work as so essential that he went to his Minister. The P.M.G. Department found three-quarters of the money needed, C.S.I.R. contributed a quarter and the Radio Research Board was thus kept going through the thirties.

Exceptional research work on the upper atmosphere, including experiments that could only be carried out in the Southern Hemisphere, was done for C.S.I.R. through the thirties by three brilliant young men, Messrs. Green, Munro and Martyn. David Forbes Martyn began his researches into the upper atmosphere and the ionosphere for C.S.I.R. before he was 24. He read all

the available literature in this field and was in contact with Watson Watt in Britain. David, who saw Appleton and Watt in Britain in 1936, told Madsen that he regarded this work as one of the major fundamental research issues in the world.

Towards the end of 1937, says Madsen, he was called in by David to see how best the suggestion of H. E. Wimperis for the Aeronautical Research Laboratories could be carried out. They decided that while the practical work would be done in Melbourne at Fishermen's Bend, a new chair in aeronautics should be established at Sydney University to train men for the Fishermen's Bend project. Sydney University had specialised in higher frequency work and, with C.S.I.R., had the quality and numbers of men for the new work, says Madsen:

David Rivett was keen as mustard on this work. He always managed to keep abreast of developments and through him Melbourne and Sydney worked smoothly together from the outset.

At this stage the detection of planes and the word radar were never mentioned. Madsen recounts that at breakfast in a hotel in 1938, Wimperis asked him: 'Have you heard any rumours of anything special happening in London?' Madsen who had talked with Martyn said he believed there might be something afoot about plane detection. Wimperis, who was fully abreast of the whole radar development, was deeply alarmed as the only other man he had heard speculate on this was Lord Rutherford at Cambridge. The reason for Madsen's 'guess' was a letter to Martyn from an English scientist claiming that there had been much interference to planes during higher frequency work. Martyn and Madsen had concluded this could be due either to magneto defects in the planes or detection of the plane itself.

Wimperis told Madsen he was right and that an Australian should be sent to London. Wimperis left Australia (to choose and send out Coombes for A.R.L.) and not long afterwards the Government passed on to Julius and David a highly confidential request from the British Government that they should send over a top technical man in this field. David had been Chairman of a committee to which the Prime Minister had given the

unenviable task of choosing which of two exceptional applicants should be the first director of the new Commonwealth Laboratory at Mt. Stromlo. Dr. Richard Woolley was chosen by unanimous vote but the committee expressed to the Government its deep concern that the other candidate—whose work had been quite outstanding—should not be lost to Australia. This was D. F. Martyn and David and Julius now recommended that Martyn should be the man to go to Britain to meet the request of the British authorities.

Martyn flew to Britain in 1939 and on the very eve of the war was given the whole detail of Britain's secret radar network. On return he recommended to the C.S.I.R. the immediate establishment of a laboratory for radar research in Australia.

Reviewing the whole of this top-secret defence development from 1937 onwards, Madsen said: 'From the outset and right through the war we regarded Rivett as a lynch-pin in the whole defence planning. I know this view was shared by Shedden and the Service Chiefs. In every development we wanted for the various divisions of the Standards Laboratory, I got immediate action from ACDR. If an official letter was wanted we got it immediately. We never needed to wait for cash. Once he had said it would be forthcoming it was. ACDR was on very good terms with Public Service Board, Ministers of Supply and Defence.'

David presided, in 1937, at the Auckland conference of the Australian and New Zealand Association for the Advancement of Science. His scientific colleagues drew on his 1912-14 experience to help organise the Jubilee Assembly to be held at Canberra in January 1939. It was easily the biggest gathering of scientists to that date. Among the 800 who attended were H. G. Wells (who fell foul of the Lyons government by a blast against Hitler on arrival), Sir John Russell of Rothamsted and David's old Oxford tutor, Professor Nevil Sidgwick. Recognition of Sidgwick's penetrating intellect and exceptional powers of assimilation had come in 1922 when he was made a Fellow of the Royal Society. He had become mellowed, more confident, more masterly, yet more tolerant. David's reunion with him in Melbourne was a joy to both. Sir Henry Tizard, the great British

scientist, in his memoir of Sidgwick, described their joint adventure: 'His old pupil David Rivett, drove him from Melbourne to Canberra through Gippsland when it was ablaze with the worst bushfires within living memory. The pall of smoke, cutting off the sunlight, compelled the car to slow down to a crawl with headlights on early in the afternoon. Sidgwick thoroughly enjoyed the weirdness of the scene which he regarded as a realistic glimpse of inferno. . . .'

Inferno certainly did not claim them that day because seven years later Sidgwick was perhaps the most delighted person present when Oxford conferred on David its D.Sc. and Lincoln College made him an honorary Fellow.

Two developments in C.S.I.R., in the last year before the war came to dominate most of David Rivett's thinking and energies, gave him especial satisfaction because they were the fruit of years of planning, waiting and hoping. In 1938, Dr. Vickery was installed at new headquarters at Homebush outside Sydney. From here, as Chief of the new Division of Food Preservation and Transport, he directed research on the supply of foodstuffs, particularly perishables, to the fighting forces and to Britain throughout the war.

A year later David was to see his special project the Division of Industrial Chemistry, opened under Dr. Ian Wark. This was set up at Fishermen's Bend cheek-by-jowl with the A.R.L. site for Dr. Coombes.

At the beginning of 1938, to David's surprised delight, Dr. Richardson was persuaded to leave the Waite Institute and come to C.S.I.R. full-time as Deputy Chief Executive Officer. David wrote to Sir Charles:

To our intense satisfaction he is coming at the end of April. It will now be possible to maintain much more intimate touch between head office and the primary industrial research laboratories than I have managed to do in the past few years and his coming will also mean that I am freer to give attention to the new work on the secondary. . . .

The last 18 months of peace were altogether an era of revolutionary, almost breathless, change and expansion of C.S.I.R.'s

work and service. They followed a year of deep, sometimes desperate clashes between Chairman and Chief Executive about the nature, fundamentals and scope of C.S.I.R.'s new role. What finally emerged was the quintessence of the best arguments and vision in both viewpoints. More important, the tried team of Julius, Rivett and Richardson emerged intact to face the war-time problems which Ministers and Service Chiefs were to lay suddenly before Australia's scientists through the years of war.

CHAPTER EIGHT

Through The War — And Afterwards

Eight days before Hitler invaded Poland, C.S.I.R. was officially brought directly into secret work for Australia's defence. For the next six years David's involvement in selections, committees and top-level decisions, often referred directly from, or, to the War Cabinet, was continuous. Inevitably his personal contact with C.S.I.R.'s laboratories and projects in other states became less detailed. He regretted this intensely but it was unavoidable even though he was now working longer hours than ever. He recognised that until the end of the war its calls must have priority over everything else and that inevitably C.S.I.R.'s divisions, one after another, must become involved more and more in war work.

His colleagues felt it was intensely disappointing to a person of his temperament and convictions that the Council's work should be aimed at defence and destruction rather than constructive research for the benefit of the nation.

We have seen how David Forbes Martyn's researches on the upper atmosphere and ionosphere for C.S.I.R. from 1930 to 1939 led to his despatch to England to acquire the latest secrets of radar development. Martyn came back in August 1939 and was immediately involved in deep and fruitful discussions with John Madsen and David about bringing this revolutionary discovery in air warfare to Australia's aid. David had been twice consulted by the Prime Minister, Mr. Menzies, during August about the appointment of Australia's first major representative in Washington. It was probably during these two tete-a-tetes that the idea of a top-level meeting in Canberra about radar was suggested. In any case, on August 22, David with Madsen and Martyn took train for Canberra. Next day David lunched alone with the Prime Minister and Mrs. Menzies at the Lodge. From there they went straight to a meeting as secret as it was to prove historic. Even in diary and family letters David never used the word 'radar' through the first two years of war. This day he noted:

At 2 p.m. in the P.M.'s Room at Parlt. House began discussions that lasted about 2½ hours. Menzies, Casey, Street, Harrison (PMG), Madsen, Martyn and myself. All intensely interesting and very secret. Result—all our proposals accepted without any demur involving heavy expenditure and a devil of a lot more work and responsibility for C.S.I.R.

For two years those were the last words he wrote about perhaps the most vital contribution of science to Australia's war effort. Overnight a new C.S.I.R. department was established with Martyn as its Chief. The War Cabinet was given the full picture. It promised all necessary funds but no announcement of any kind was made. A completely new organisation was set up with the Army, Navy and Air Force Chiefs of Staff, Rivett and Madsen as Chairman. This secret body was dubbed the 'Radio-Physics Board'—a title which Rivett described as 'enough to confuse anybody'. Work went ahead with top priority in absolute secrecy. Madsen later said he and Rivett scoured Australia for men to join in radio research work.

In 1941, Commander Colvin, on behalf of the British authorities asked Julius and Rivett if a senior man could go at once to London to act as liaison officer with the British authorities over developments there. They decided to send Madsen. He began transmitting all information to Australia on microfilm by military plane. This went on for about seven months but he had no way of learning what use was being made of the information he was sending. With the Japanese threat looming, Madsen, after consultation with Lord Bruce, decided to fly back to Australia and was on his way when Pearl Harbour was attacked.

On return, he found that the 'board', now augmented from New Zealand by Frederick White (who was to become chairman of C.S.I.R.O. in 1959), had not been idle. Actually Australia had obtained two sets of equipment one of which was available for Darwin in time for the second raid there. Thereafter, with the Americans involved, all Australian cities and key points were gradually to acquire radar protection. The special requirements of long-distance war in the Pacific with large-scale removals of equipment by air were explored and prepared for.

The Radiophysics division was ahead of Britain and the United States in foreseeing what would be needed when the Japanese

entered the war. Sets of air-warning equipment were provided for the R.A.A.F. in the first weeks of Japanese attacks. After the initial disasters, the installation enabled Australian fighters to be up in the air with ground direction to meet the Japanese raids. Presently the Americans began using the Radiophysics Lab. equipment for their forces' protection right across the Pacific. Night operations and attacks on enemy shipping in adverse weather conditions were transformed by this work. The full story of the development of Radiophysics from the Radio Research Board, kept going so invaluable through the 1930's, has rightly been rated as one of the major Australian achievements of the Second World War.

Radio location work in Australia with all its consequences was perhaps the supreme endorsement of the Masson-Rivett creed of open fields for research without tying researchers to narrow, specific goals. Future release of the papers of the Chiefs of Staff may confirm Sir John Madsen and the P.M.G. chief, Sir Harry Brown, in saying David's service was 'unique' and 'irreplaceable'. Very typically, having begun it all in secrecy, David preferred to leave it unmentioned.

The new Aeronautical Research Laboratory under Lawrence Coombes was, of course, spectacularly expanded. It was instantly involved in research and developmental work for the R.A.A.F., the infant aircraft industry and the Department of Civil Aviation. Examination and testing of Japanese aircraft, engines, instruments and other equipment, production and reclamation of engine cylinders, salvage of aircraft components, development of hessian parachutes for supply drops and other investigations put this division into the forefront of the war effort.

Dr. Ian Wark's young Division of Industrial Chemistry was at once caught up in specification for charcoal for producer gas units, equipment for detection of magnetic mines, utilisation and allocation of rubber supplies and strategic chemicals and a host of problems put forward by the three Services.

However, it was not solely the new divisions, arising from the 1937 decision to take C.S.I.R. into the fields of secondary industrial research, that were concerned with war problems. Dr. Vickery's Food Preservation as well as the Chemical division was plunged into Service problems associated with dehydration and

canning of foodstuffs while preserving nutritive value. Dr. James Prescott's Soils Division was called on immediately the American forces arrived in Australia to advise on site selection and methods of construction of aerodromes. On the engineering side Perth's Andrew Bowden made invaluable contribution by his work on lubricants and bearings.

C.S.I.R.'s Irrigation research stations, like the Soils Division, were engaged in problems of dust abatement on aerodromes and production of drug plants on a large scale. Fisheries investigation, placed under C.S.I.R. in 1935, led to the opening of a marine biological laboratory in 1939, and staff and facilities were concentrated on securing maximum wartime fish and marine production with limited manpower and equipment. Demands for quick erection of stores and hangars in the north involved Forest Products in combating rot, termites and the attacks of insects and fungi on timber. There was research on redesigning and protecting munition and medical boxes. Australian timbers were employed for the first time where supplies of overseas timbers had virtually ceased in many areas.

Some of the patriotic blather sickened Australian scientists. They were more acutely aware than many others of the horrors hanging over the human race through translating scientific discoveries into new methods of annihilation. But a letter to Sir Charles Martin in June 1941 saw David stressing the positive side:

It would do your heart good to see our huge plunge into war manufacturing here. All the 'impossibilities' or many of them, are being tackled with an abandon that is most refreshing. The innate confidence of the Australian that he can do any job that any other fellow can do is at times amusing, at times disastrous, but always a bit exhilarating. To see a line of aeroplanes being turned out of a huge factory and wholly manufactured here is refreshing. . . .

What concerned David intensely was that the main goals, Australia's lasting needs, should not be lost sight of in the delirious surge for immediate ends. In a letter to H. R. Marston he said:

The hard spot of any consideration of a switchover of money and men to jobs coming closer to the killing of Germans is the danger that we may do more harm than good in the end by jeopardising

work, which, in what people like to call 'the reconstruction', may mean more to the country than any immediate war activity can. It will not be easy to be wise.

After the plunge into secondary industry in 1937, there were far wider differences of viewpoint within the Executive than had existed earlier. Several chiefs of division have given almost identical pictures of the Executive as they confronted it at this time. Here is one :

After taking my seat I would be asked to state my case. I was seldom able to talk more than a couple of minutes before Julius would cut in and talk for periods up to more than 30 minutes, while A.C.D.R. looked down at his desk and fidgeted with his papers (another said that A.C.D.R. unashamedly worked through correspondence and notes during these speeches). Richardson occasionally dozed and Lightfoot doodled on scraps of paper. Finally, when Julius at last paused for breath, Rivett would take the opportunity to succinctly summarise the Executive's views on the problem. Richardson might occasionally make one or two pithy remarks. . . .

This probably gives an unfair impression of Sir George's value to the Council. It was not mainly in committees, but in contact with politicians. He was flexible and extremely shrewd in his handling of the species *Homo Politicus*. Without his experience, ability to manoeuvre and thorough understanding of when to concede in appearance without surrendering the substance, the independent-minded scientists might not have had so smooth a run through C.S.I.R.'s first 20 years. From 1942 until his death in 1946, Sir George suffered greatly in health but his enthusiasm for the C.S.I.R. projects he had sponsored—such as the Aeronautical Laboratory—never diminished. The basic mutual affection and respect of the Executive trio survived the quite exceptional strains of these years.

In the secondary industrial field it was easier to concentrate on specific problems of the moment (emerging almost weekly in war-time). This channelled creative effort into quite narrow avenues. It appealed to the engineer in Julius. David, as we have seen, believed that the biggest long-term achievements came from unfettered research into general problems. There are two instances, advising one of his colleagues :

. . . (Your laboratory) will contribute to the knowledge the world wants and can use, rather than merely to the solution of the problem of the moment in the paddock down the road. Yet, incidentally of course, the paddock problems will be cleared up. . . . Whenever you want to shed the blinkers that would limit your view to the track favoured by our rulers . . . you can be certain that I shall enjoy anything I can do in assisting the process of blinkers removal and the resulting bolt down the road-without-a-signpost!

Towards the end of 1943, he wrote:

C.S.I.R. seems to me to be getting increasingly stiff in some of its joints. I find myself more and more out of line with Julius. He is tending towards the conversion . . . into a mob of testers for industry and I just hate it. If we are not careful our whole secondary industrial side will just become a mechanised crowd of house-keepers for factories.

H. P. Breen, who, in C.S.I.R. and then in Post-War Reconstruction, had unique opportunity to see the issues in the round, showed why there was executive conflict and a sharp difference between C.S.I.R. in the primary and C.S.I.R. in the secondary industrial field. He pointed out that in primary research C.S.I.R. did its laboratory or field work, published its results in scientific bulletins and left to State Departments of Agriculture the job of seeing the results applied by the farmer.

When it came to secondary industry there was no State instrumentality or indeed any private instrumentality whose job it was to see that published scientific results were interpreted to secondary industry . . . there was no organised means of ascertaining what were the problems of secondary industry. What happened was that the large, well-organised industries . . . gave specific problems to C.S.I.R. and contributed in money to the lab. work. But the mass of small firms (and in particular the engineering industry) had to fend for themselves. . . .

The Julius acceptance of C.S.I.R.'s handmaid role was valuable in wartime. Immediately after the war, David, as Chairman, gave the press a definition of C.S.I.R.'s stand:

C.S.I.R. has definitely set itself against encouraging any industry, great or small, to farm out its day-to-day running problems. Admittedly and unfortunately, war has forced C.S.I.R. (and not C.S.I.R. alone) into evil ways; there was no option. But we are struggling hard and successfully to emerge from the position of general practitioner for minor woes.

Nothing could be farther from the truth than to imagine that David Rivett was unconsciously opposed to the development of Australian secondary industry. He was indeed a protagonist for it, believing—and preaching—that an ever smaller proportion of the population could provide all the food, clothing, shelter, transport that the population needed. Giving the Macrossan Memorial Lectures in Brisbane in the middle of 1944, he said: ‘The building up of secondary industries to an extent scarcely contemplated five or ten years ago is . . . the outstanding call upon us in Australia from the material point of view.’

In these lectures, which won tributes from Sir John Latham and many more, he specifically nominated manufacturing industries to which Australia could address herself. It was a startling catalogue in wartime. Even with today’s hindsight it challenges inspection nearly 30 years later:

Shipbuilding . . . and all that must be associated with it in the production of metals, timbers and plastics. . . . The aircraft industry must not be allowed to slip away from us. . . . Remodel and rebuild our railway cars and trucks with our own aluminium and magnesium and new alloy steels . . . the motor car in improved and lighter type we should well be able to produce in every detail . . . huge developments possible in the manufacture of goods for electrical industry . . . production of building materials of new types and household accessories of all kinds. . . . I want to see us tackle in earnest . . . organic chemicals . . . pharmaceutical drugs, dyes, rubber, synthetic fibres, plastics, liquid fuels—all are within our scope. . . . Great engineering works await us in every direction: water storages and distribution systems . . . the prepared food industry (dehydration and canning) is full of possibilities. . . . Mineral industries . . . Australia has a great opportunity for the development of metallic and non-metallic minerals. . . . I do not

mean . . . export in a raw state. . . . I mean the complete treatment of them to finished products: metals, alloys, articles made therefrom, paints, special chemicals, ceramics. . . .

There was much more that may have sounded visionary that war night in Brisbane. Inside twenty years these were not hopes but accomplishments Australians took for granted.

War did not change the capacity for distortions among some vested interests. The year 1940 had not yet passed from the 'Phony War' into the destruction of France when David fell foul of the dairymen and their political lobbies. For many years he had been interested in the value of vegetable fats and their potential for feeding the world majority who could not afford butter. Study abroad in Germany and Britain had convinced him that most Australians had been brainwashed about the alleged superiorities of butter. In a war straining the economy it seemed to him wrong that there should be no scientific statement of the simple facts.

In a letter published in *The Age* in March 1940, David made this reply to outbursts by dairymen's spokesmen about the uncomfortable truths of the controversy:

Sir, I notice in your issue of Saturday last that the Australian Dairy Produce Board is perturbed at a statement, allegedly made by me, that the manufacture of margarine will be investigated at the proposed chemical laboratory of C.S.I.R. at Fishermen's Bend. As a matter of fact no such statement was made. The production of margarine has been studied for years in laboratories better and more expensively equipped than we shall be for some time to come; and methods have been developed in making an article which is said to challenge comparison with butter in palatability, energy value and vitamin content (A and D). There is no call, even from the margarine manufacturers, for further research work in Australia. . . .

In an address to the Australian Chemical Institute in Melbourne on 4 April 1940, later published as the pamphlet 'The Slippery Path of Margarine', he traced from the 1860's the history of margarine. ('I propose to make the g hard. An alternative

is to compromise and make it hard in winter and soft in summer. This however leaves the matter unsettled in autumn.') The row, he said, had started when he had spoken of Australia developing a margarine industry in view of the probable rapid increase of consumption in other countries under wartime conditions. Instantly, David said, Country Party ministers and others were denouncing the idea of 'Government-subsidised competition with one of Australia's most important primary industries.'

Then he asked the audience, as scientists, to study the situation. Unless he was mistaken complete suppression of production and sale of margarine would be welcomed in some quarters. 'In one State all table margarine must be colored saffron. The reason for choosing saffron is, I suspect, not purely aesthetic. It has been chosen (a) to make obvious to anyone that the substance is not butter, (b) in the hope and belief that foodstuffs colored saffron will *ipso facto* prove less appetising, and (c) because sponsors of the legislation did not care to go to the point of prescribing either jet black, or say, a dirty repellent brown . . . suppression of a competitor by force is a human instinct which is not exactly a newcomer into this troubled world'.

He sought an inquiry into the costs, process and waste of the Australian dairying industry and a look at Australian possibilities if the postwar world turned to substitutes for butter. This was done 20-odd years afterwards, too late for the dairy farmers ruined in the interim.

Successful growers of margarine ingredients today can look back to David's initial suggestion that 'if margarine is to take a big place in the markets of the future, then Australia should take a big place among its producers. . . . We as chemists may well give a warning to those of our contemporaries who think they can, by force or by ridicule and contempt, suppress a change irrespective of its merits, because it threatens their vested interests. The path of industry is strewn with the corpses of companies which refused to change either policy or product, and which saw in something new merely an enemy. . . . The man who thinks he can keep the butter industry where it is by damning margarine and doing nothing else is an enemy of Australian industrial progress.'

He held out the example of Japan's shrewd domination of the rayon industry when they saw that rayon must inevitably oust and partly destroy their own traditional silk industry.

In 1944, Dr. R. G. Aickin wrote from London of the vital role of margarine in Britain's fight for food. David replied: 'It is rather amusing to me that margarine should be taking such a prominent place in the national dietary. You are perfectly right of course in suggesting that Australia might well be producing it in quantity. It is only just utter stupidity that prevents us from doing so and I have said so on more than one occasion. . . .'

David refused to allow clamor from interested parties to silence simple statements of the scientific truth affecting primary industries. He never yielded on margarine. The facts are now universally accepted. The margarine manufacturer's Mrs. Jones advertising campaign in the 60's would have amused him.

Another cause for C.S.I.R. chuckles was the belated conversion of Australian woolgrowers to the benefits of scientific research amusingly told in a letter of October 1944, to Sir Charles Martin at Cambridge:

. . . You may remember that many years ago a big effort was made to induce sheep men to agree to a levy of 2d per bale for scientific work. Our old friend George Aitken battled hard but was beaten. He tried to raise a capital sum of £200,000 and got about £50,000. Then synthetic fibres began to appear. A levy did not seem *quite* so absurd an idea. 6d. was agreed to and the Australian Wool Board came into being; then the International Secretariat and so on. The war interfered, with the result that the AWB has about £200,000 accumulated somewhere or other. Synthetics interfered still more and of late the wool people have been showing signs of hysteria. Queensland *Country Life* even suggested that C.S.I.R. could not be trusted with wool investigations because I had suggested that Australia might do worse than make some fibres for herself—with graziers the principal company shareholders! I am black indeed but it looks as though C.S.I.R. is going to be so prosperous that I shudder for its health. It is, in fact, quite certain that a 2/- per bale levy will be imposed by Parliament before long and that the Treasury will add an equal sum. This means about £600,000 per annum to be spent on work for the sheep and wool industry—and towards the damnation of all synthetic fibres. . . .

Fear is surely the greatest driving force towards appreciation of scientific endeavour that Australia has ever known.

One C.S.I.R. crisis which absorbed the C.E.O.'s effort and understanding in the middle of the war was a personal clash between two research leaders. Each was doing invaluable work in his own field for Australia. The junior man insisted that his section must recover its independence as a Division so that he did not have to spend a large section of his time briefing and explaining developments to the Divisional chief. The Divisional Chief stated bluntly that if this section was taken away he would resign. Repeated consultations failed to solve the dilemma. David wrote to Sir Charles, who knew both men well, that he (David) must be 'a pretty poor boss' to be so helpless. However, finally, he managed to persuade the second Chief to accept a separation and both divisions prospered.

In another matter, two eminent C.S.I.R. scientists gave contrary advice to the Army, Navy and Food Control authorities. Dr. Vickery, the official C.S.I.R. expert in the field, suddenly found that the authorities were about to act on the other man's recommendation in a manner which, he felt, would create not only waste but a health danger. Vickery tells the sequel . . .

I immediately tackled X and a first-class row between us developed. It became so serious that I had to get A.C.D.R. to intervene. His handling of the situation was masterly; X's face was saved, his recommendations cancelled and a good working relationship between X and me established all with a minimum of fuss. I may add that X and I quickly became the warmest of friends, a friendship that continued intimately until his death; we were united in our admiration of A.C.D.R. and we both continued to judge C.S.I.R.O. policies by the A.C.D.R. yardsticks from the day of the latter's retirement.

Keeping scientists happy in wartime was not simple. From the outbreak, enthusiasm to help surpassed logic. There was constant agitation for allotment to special warwork. David had to warn colleagues against crying 'nobody is doing anything' because their particular skills could not be harnessed to the war machine in the first days. He quoted Sir Arthur Salter's suggestion that

scientists themselves review the problems where their knowledge might be valuable. Outside observers believed that, thanks to C.S.I.R., exceptional value in many fields was given to the war effort by Australian scientists.

A sense of fun, especially in life's tough hours, was one of the main assets the parson from Norfolk handed on to his children. The war burdens were the acid test of David's buoyancy. The antrim trouble and acute hay-fever which had become a curse would have made most people cranky, ill-natured and churlish. But David disciplined himself to make light of suffering. Friends and colleagues seldom got a glimpse of all he underwent but two doctors who knew most about his medical history passed the verdict that he was the most uncomplaining of patients—'completely free from any trace of self-pity, David was personally critical only of himself for the existence of physical disabilities that would have cut down the performance of most men.'

Those closest to him sensed that private anxiety about a son in Japanese hands enhanced the strains of additional war work and by 1945 had inevitably diminished his habitual optimistic responsiveness. Co-opted or asked to lead on various wartime councils and committees over and above those connected directly with C.S.I.R., he was persistently involved in work-weeks of 85 to 90 hours. Probably only his remarkable inherited constitution and contempt for drugs, alcohol and cigarettes enabled him to reach V-J day without a major breakdown.

Some people pass on almost all their worries and besetting ills to others. A minority not only absorb more than their share of the burden but act as self-erected wind-breaks.

Even close colleagues seldom got a glimpse of the strain on David of going home each day to an over-weary wife. The office cares, however heavy, never obtruded on his competence in meeting the problems of his wife, sons, close relatives and stricken friends. Equally he refused to bring anything affecting the domestic circle into his life with C.S.I.R. To the informed few this capacity to absorb strains without passing them on even involuntarily, was endearing and inspiring.

Foremost among those who saw this quality in David were his sister-in-law Ivy Brookes and her husband, Herbert. To them, he felt he owed more than to any colleague or friend. Through

the last 40 years of his life this friendship based on trust was of continuous significance to him. His brother-in-law, 17 years his senior, veteran in the arena of politics, had a half century's experience in the worlds of mining and big business, and with a broad humanitarian outlook which particularly fitted him for the role of counsellor. Ivy Brookes, a remarkable servant of the public weal in a dozen fields, was intensely practical. They both had such a keen affection for David and Stella that their hearth was always a second home to the Rivett family.

For more than twenty years most of the family holidays were taken with his brother-in-law near the top of Mount Macedon. Apart from the beauty of the garden and surrounding mountain scenery and trees, Macedon offered the two things David enjoyed most as physical recreation—walking and tennis. Until well into his fifties, when high blood pressure forced him to desist, he played tennis with enthusiasm and above average skill and revelled in the doubles matches at his brother-in-law's court—at weekends in Melbourne or during holidays at Macedon.

He had always been a vigorous walker. For a man barely of medium height he had a quick easy step. Even in his middle-sixties he used to stride around Albert Park Lake from his then home in St. Kilda Road much faster than the average young man walks today. Scientists scorn fetishes. Yet if he had a fetish it was fresh air. His love of bush and sea fed on the unpolluted breeze and atmosphere. But with a skin that burned brick red in twenty minutes he couldn't sunbathe as many did. He had an acute perception of the damage done in Australia by skin cancers from the sun long before ninety per cent of his fellows had heard of the problem. Macedon's high forests and deep valleys offered good walking without over-exposure even in the Christmas holidays. It was on long walks with Herbert, or sitting at ease above the flower garden that dropped away from the home, that he unburdened himself of some of the problems which increasingly assailed C.S.I.R. through the years—particularly after its war-time transformation. It did him good to state everything as he saw it—in complete confidence—to a sympathetic and experienced mind.

No one could have done more than the Brookeses. They provided in their hospitality freedom from domestic responsibilities.

In their homes in city and country he could converse with a wide section of men in public life, the universities and business men whom he met only briefly in the course of the normal routine of head office and travel for C.S.I.R.

In the middle of the thirties, about 1937, David and Stella had bought a block of land and built a sizeable house on a timbered hillside at the top of a winding country road, above the township of North Ferntree Gully. It was perhaps 18 miles east of their home in Mercer Road, Malvern. Immediately before the war and whenever pressures permitted during it, they would go up to this block either on Saturday or Sunday—not to sit down and enjoy the view, as most busy executives would have done, but to labor. David hoed, dug, picked, laid stones and planted roses, shrubs and trees until the whole front garden gave color and shelter to the hillside with tall, golden cypresses crowding along the 25 yards of driveway from the entrance gate to the front verandah and garage beneath it.

In his fifties and early sixties, David had far more physical exercise in this garden than at home or on tennis courts. The proof of his labors could be seen in the 1960's and 70's after he had died when the interlacing trees and rich shrubs he planted and nurtured had shot to heights of 20 or 30 feet. Stella did not rest either. What should have been relaxation in this quiet escape—mercifully without telephone for many years—became for her a self-imposed series of sweeping, cooking, cleaning and polishing chores in the house. However, it gave them both open air and complete freedom from others during some of the worst strains of those years. At times they got a few days together or an odd weekend on the hillside, sleeping well in the mountain air. It was only towards his seventieth birthday that, finding the physical maintenance beyond them both, they gave up the house.

From the outbreak of the Pacific War real holidays were out of the question. David's presence at interstate conferences was constantly demanded but, even with priorities, wartime movement was difficult and schedules proved unkeepable. Usually at Canberra his own or other Ministers occupied many hours. In each State, the press, hungry for facts about C.S.I.R.'s wartime work and expectations, laid siege. He did what he could to accommodate them with never a hint of the many projects that could

not be discussed in wartime. In cities other than Melbourne each day produced from State Ministers demands to see him. Defence personnel and those connected with any branch of C.S.I.R.'s developing activities, quite apart from C.S.I.R. personnel themselves sought him constantly. He was able to give only a fraction of the addresses which he was invited to deliver as soon as his coming was known to any State. But the attendance always astonished him. What he did not realise was that, to the informed everywhere, he was now regarded as the authority on an immense range of developments and national questions. His daily 15-hour performance rivalled his London peaks.

Sir Ian Wark recalls how one Monday David recounted at C.S.I.R. how he had spent the weekend digging a dam. That week it rained heavily and the following week Ian asked David if his dam had filled. 'No', he said with a rueful twinkle. 'The yabbies dug deeper than I did—down to porous clay below.' That dam never fully filled.

Stella generally entertained for him at the Lyceum Club where she had been a foundation member. She was active during the war in the University Patriotic Fund, the National Council of Women and at a canteen she organised at the request of the South Melbourne Council for the signals and cypher corps and dispatch riders.

The one place out of Victoria where he could relax a little was at Christine's home at Wickham Terrace in Brisbane. Her role as confidant had grown rapidly. She was Stella's principal physician through many ailments. With complete devotion to David she smoothed his every day in Brisbane. When his old Oxford colleague, now at the top of British science, Sir Henry Tizard, came out for the spring of 1943 (David accompanied him in basic discussions with ministers, defence chiefs and scientists in all States), Chris's role as hostess in Brisbane helped David enormously. Tizard, who had dug into the soft spots of the national war effort and made valuable recommendations to the Prime Minister, went back to Britain and became the foremost scientific advisor to the Attlee government. His first-hand insight into David's wartime performance had pleasant sequels on David's post-war visits to Britain.

During the war, the Rivetts moved from the Malvern house—far too large for their needs since the boys had established their own homes—to a comfortable flat in St. Kilda Road by the Albert Park tennis courts. This was nearer David's office and Stella's wartime volunteer canteen. When, in September 1945, the captive son returned from the Japanese camps, David, suddenly, according to his staff, 'looking years younger' was able to relish concentrating on issues divorced from war.

It was only then that he mentioned even to the family his two desperate nights after receiving written information of the first explosion of an atomic bomb in New Mexico earlier that year. He decided that his best course was to hand the document over to the Acting Governor, Sir Edmund Herring, who was a senior general in the army. But the Governor was away for 48 hours. David, who did not want C.S.I.R. involved in any way, was finally very relieved to pass over these momentous tidings.

Ill-health, which had taken toll of his energies and contribution for the past couple of years forced Sir George Julius to resign in mid-1945, although this did not take effect immediately. For a while, David went on carrying the two jobs. This was absurd. So it was agreed that Richardson take over as C.E.O. while David took over the 'part-time' chairmanship. A more incongruous arrangement than fitting one of David's outlook into a part-time role in an organisation which he had created and moulded would be hard to conceive. He simply went on tackling everything referred to him (and the bulk of work did not diminish, because every scientist still looked for him first as consultant and guide in trouble). Yet he dared to hope for a different outcome as his letter to McDougall in Washington in January 1946, just after the change became official, suggests:

You had evidently heard of the changes which have taken place here . . . Julius in hospital in Sydney . . . facing very severe surgical ordeal . . . gallant fighter and probably main hope lies in the will to live.

Years ago I promised myself that, when I reached 60, I would somehow or other escape from all the detailed work which is inseparable from the post of C.E.O. The Chairmanship gives me this chance and I hope that, in our immediate future, I shall be

able to get around far more to our many labs and maintain personal touch with the staff to an extent which has been impossible in recent years. We have something like 2,200 people on the payroll at present. Richardson takes charge as C.E.O. and he brings to the job tremendous energy, experience and wisdom. He certainly is not facing a light task because on top of all the normal changeover from war to peace there is the load associated with the admin. of the Wool Use Promotion Act and all that it involves.

The C.S.I.R. had changed fast during the war. Its leaders—with Julius retired now—were pre-occupied with a network of new roles—many of them without prior survey. A major concern was that the assumptions under which C.S.I.R. had moved with such success in its first dozen years were now increasingly under challenge. The dangers to all that was best in scientific endeavour seemed to David to threaten principles from which he could not depart.

. . . Unless we can keep C.S.I.R. free from all the straitjackets that are all too freely offered to it from all sides, we are not going to count very much in 20 years' time, even if we do succeed in the meantime in doing a job or two that wins favour from the press, populace and politicians. I fully believe . . . that we shall fail in the end unless quite 50% of our effort is directed to finding out how the machine of Nature works, without a thought as to whether that knowledge may or may not be useful in this decade, or next century, in showing farmers how to save 6d. or politicians how to increase revenue from taxation . . .

Close colleagues say these words expressed the quintessence of his philosophy. His loathing of central administrative interference with the chiefs of Division—probably an inevitable war-time growth—had reached a peak before the end of the war. The head-on clash on principle was seen by him in these terms (July 6, 1945):

. . . There has to be a fight about this sort of thing before long. I am becoming more and more perturbed over the way in which certain members of the Council, with little to do and no real conception of the intellectual state of a genuine seeker after truth, are wanting to push their way into the details of work which is the prime responsibility of Chiefs of Division . . . characteristic of

most engineers who have the workshop idea of running research. They want to lay down just precisely what each man is to do and would, if they were perfectly honest, probably attach a time schedule and a summary of the results desired . . .

Ridiculing suggestions of a bigger head office executive to examine and probe the work of the Division, he added: 'This is just the sort of thing I have always striven to avoid, having been possessed as you know, by the apparently ridiculous idea that Chiefs of Divisions, if rightly chosen, are the right people to determine their own programs without anything in the way of super-Chiefs at Head office to see that they never deviate from the straight and narrow path. . . .'

Transferring from the role of Chief Executive to Chairman, he set down, in February 1946, the crisis as he saw it:

At times I am in grave doubt as to whether it is humanly possible for C.S.I.R. to run on present lines. There is no other organisation in the world that pretends to cover such a huge field of endeavour. There is strength in the laboratories—though not always in their leaders. But on the head office executive side the situation is alarming. Textile research alone needs an executive officer to itself for the next 12 months; the road to it is, as yet, as dark as pitch and made a little darker by the diversity of advice given to us. The Defence Services are clamoring for a Defence Scientific Advisory authority and look to us for a lead. It needs very concentrated study, thought *and* fighting. The scientific conferences ahead will keep a good executive man full time from now on.

Contacts with all manner of other activities are demanded—Northern Australian development—Departmental committees and conferences ad lib.—visiting delegations from U.K. and America. Every Division of our own needs far clearer attention and help from Head Office than it is getting.

The ending of the war has removed a flood of inhibitions. Projects are pouring forth in spate; they require decisions, not merely on their merits but on their *relative* merits, for they cannot be adopted at once even if the money hurdle were surmounted. Men are lacking.

Altogether I feel at times that the organisation has grown quite beyond the adequate supervision of an Executive committee.

Then he turned to his own position following the retirement of his chairman, Julius, and his own assumption of that role:

My own case is not simple. I am convinced that the Chairman *must* be a part-timer, not wholly dependent on the Government for a living. There *must* be someone free to use the final argument of resignation in the event of a clash on principle—maybe with the political folk but more likely with the people who are in our midst and would turn us just into housemaids for industry . . .

The C.S.I.R. chairmanship cut his salary to £1,250, taking £208 from his superannuation. 'After about £600 has gone as an income tax effect, the balance is not highly attractive. So I have taken two directorships—one on the National Mutual Life Association and one on I.C.I.A.N.Z., both offered to me long ago but not takeable before. They are interesting but they mean time to make myself familiar with new tracks. . . .'

At the end of 1946 he wrote:

I have almost given up hope of getting any sense introduced into those parts of C.S.I.R. (clerical work—requisitions—pay—leave, etc.) which are perforce dominated by Public Service practice. The bigger we grow, the greater the demand on all sides—from Chiefs, from C.S.I.R.O.A.* from the overdriven H.Q. group of clerks—for rules and rulings. I get weary of it. If we can keep the scientific side clean and bright we shall do well; after all it matters most. Yet even there the pressure to get over to the advertising side (so-called extension work) is getting depressingly strong. It attracts the mediocrity and my God! what a lot. . . .

All the time we are being urged to be like practical, successful men who, when they see a hole, plug it up—instead of being academic weaklings wanting to know what *caused* the hole.

It is at this stage that we may ask if the enormously swollen post-war C.S.I.R. had outgrown the practicalities of a personal leadership eminently successful for so long: Dr. Vickery's statement that 'despite greatly increased numbers in C.S.I.R., A.C.D.R. was always at hand, encouraging and advising and always ready to listen to our troubles and protect us from rather frequent attacks by ill-informed or malicious people' leads to

* C.S.I.R. Officers' Association—a wartime development.

belief that his analysis of the chief flaw in A.C.D.R.'s running of C.S.I.R. is probably exact:

He told me (Vickery) on many occasions that his job was important only in so far as his influence could be exerted to protect, encourage and get the best facilities for the working scientist. His interest was really personal and in such an atmosphere the research workers could not do other than give of their best. These personal relationships were admirable and often led to an undue proportion of his time being given to the scientific workers' problems, personal and otherwise, often, I fear, to the neglect of broad problems of policy which needed his attention. This, I think, was an important defect of his administration, amounting almost to an inability to delegate authority to others. The otherwise wholly admirable personal interest in his men was carried to such lengths in an expanding organisation that A.C.D.R. often got really bogged down.

In these months immediately after the war, as he tried to leave to his friend Richardson the role of Chief Executive and to 'liberate' himself in the chairman's role, David told his family and intimates that he was very conscious of failing powers of memory, concentration, ability to get through work. His standards were so peculiarly his own that even those seeing him daily were unsure if it was merely his habitual self-criticism. Certainly there was no sign of it when he led a party of Australian scientists abroad to conferences in Britain in June 1946. Following a Royal Society conference there was to be a Commonwealth Scientific Conference, originally planned by Lord Bruce, for promoting closer scientific co-operation in the British Commonwealth.

The Australian delegation was nominated as David Rivett (leader), Lionel Bull, Macfarlane Burnet, E. J. Hartung, E. S. Hills, John Madsen, Hedley Marston, Hugh Trumble, with Jack Cummins as secretary. Some of them, with David, left Mascot in a 4-engine Lancastrian 9-seater and hopped steadily to London over three days. It was a major adventure for all of them. They saw far more of Asia, the Middle-East and Europe than today's jets permit. It was almost a decade since David had been out of Australia. The perpetual pressures of the years fell away and his diary had hints of a younger traveller to whom the age of sixty had seemed infinitely remote.

June 7. Conditions in plane very noisy; difficult for talking; fair for writing; good for reading; and excellent for constipation. Remarkable how much is packed into small space—humans, baggage, seats, etc. . . .

Borneo . . . a vast, well-watered land barely occupied as yet. Why not tip part of Europe into it? . . .

June 8. Sumatra . . . amazed at the number of meandering rivers. Abundant water must make this area ideal for rice . . . Crossed Indian coast 30 miles north of Madras. So near! (to his sister Nell, principal of the Women's Christian College there) . . . Felt amazed and appalled at the next 250 miles. Land is divided into small fields but all is barren . . . scarcely any trace of vegetation. Erosion is just amazing. General impression is that of an immensely sub-divided desert. Very numerous villages always in sight. What do people live on? . . .

Next day at 6.30 p.m. they were at Heathrow. It had taken 80 hours, 26 on the ground, 54 flying, at an average of 200 m.p.h. He was up at 6.15 in the morning, walking to Hyde Park Corner from Cumberland Hotel, then plunging into a day of discussions and masses of paper at Australia House before dining at Mount Street with the Wimperises. For Englishmen it was the Whit Monday holiday but he was back into the London swing of 1930 and 1936 as if he had never been away. His diary names sixty people, mainly scientists and engineers, with whom he talked in the first 96 hours.

June 13. . . . Lancaster House luncheon by Government to meet Aeronautical Research Conference delegates . . . Sat between Lockspeiser and Sir Charles Darwin . . . By taxi to Nobel House to see J. H. Wadsworth (director of I.C.I.) at 4. Taken in to Lord McGowan who discussed Australian affairs with me and asked me to be chairman of I.C.I.A.N.Z. in succession to (Sir Leonard) Raws. He and W. urged me to accept and I asked for time . . .

The pressure from Lord McGowan had first begun in the 1930's. This was not the first time the I.C.I. had sought him. For David, with assured friends on the British and Australian boards the proposition was financially extremely attractive. His last working years would have been far smoother and less destructive to his tiring system had he accepted. He was not blind to this but the old sense of duty was again too strong. The I.C.I. offer was

more than three times his chairman's salary at C.S.I.R. and in subsequent letters Lord McGowan made it clear how anxious the giant British firm was for him to take charge in Australia. Had he considered self, the first chapter of this book would never have been written and he might have been spared for a happier, less ravaged, evening of his life.

Just before leaving Australia, David had had an illuminating letter from his old friend and colleague for 20 years, the Commonwealth's postal chief, Sir Harry Brown, who spoke bluntly:

You are a constant worry to your friends that you do not manage to shift some of the burden elsewhere and not continue to carry such a terribly heavy load yourself. You have done it for so many years, and particularly during the war years have you carried an intense burden of responsibility; and now in a few weeks you are off to London to lead the Australian delegation . . . disappointing you are going to travel by air . . . I hoped . . . you could get reasonable rest on a sea trip. . . .

Nobody could say that David was not warned of the effect of cumulative over-taxing. Those who loved him and appreciated best what he gave were helpless to persuade him to ask less of himself. A plainer warning was the sad cable that reached him now in his third week in London announcing the death of Sir George Julius. It was just 20 years and three months since their first meetings in Melbourne with Lord Bruce when they had seen C.S.I.R. born. David felt deeply for Lady Julius and Sir George's son with whom he had enjoyed a long friendship.

It was during this month in Britain that there developed the issue which meant so much torment and self-searching in the post-war years for conscientious scientists everywhere. The traumatic showdown between government and scientists in the U.S.A. was also coming to a head. His diary gives some cryptic hints of British feeling:

June 14. . . . 4 p.m. with [Sir Henry] Tizard to Athenaeum . . . he is rather bitter about treatment being meted out to scientists now the war is over . . . long talk with T. about physicists . . .

June 15. . . . Dr. Snow [C. P. the novelist] in charge of recruiting scientific personnel for Civil Service . . . had discussion about position. He may visit Australia in January.

June 16. . . . 7.15. Supper with the Wimperises and Madsen. Sir Henry and Lady Dale came in after 8 and he talked much, largely about the struggle to maintain freedom in research and publication. He has asked all University vice-chancellors to agree to [let their scientists] do work for Government and Service organisations but only on the understanding that full publication will be permitted. . . .

David probably sensed at this time that here was the issue that was going to dominate the remainder of his scientific service. Right around the globe the major figures of science whom he respected had no doubts that science and secrecy must be incompatible. The ultimate interest of human beings could not be confined by nationalist fears and phobias. Knowledge was to sweep out the dark corners of human suffering and misery. This was what David had drawn from Arrhenius, from Masson, from every major figure in the world of science he had contacted over 40 years. In no country did the politicians like the doctrine of scientific revelation. They were obsessed with atomic fear cries that the spy revelations and scares were to enhance enormously.

But someone had to fight the stampede to gag science. All over the English-speaking world in the last half of the forties men stood up to court vilification, misrepresentation, unpopularity, dismissal and acute personal suffering in the name of science. There was not really room for doubt who would be the man in Australia.

The morning after the meeting with Sir Henry Dale, was the opening of the Royal Society conference. David noted:

. . . president of Royal Society . . . made speech and the King (George VI) read a good one in response. Presentations followed—Canada first, Australia second . . . shook hands with King and Queen. Then presented my team calling names aloud (so all could hear.)

At this meeting there was great pressure from the Indian delegation that the Australian group should visit India before returning to Australia. National pride and sensitivity was involved (India was just 13 months from independence and full nationhood) and circumspect diplomacy was needed to avoid trouble.

Sun. June 23. Met Wadia (Parsee) and took him for a walk to discuss the question of the Indian trip. Put it to him that we want to take it very seriously and that August-September is a bad time and our present team not the best possible. For example we have no soils man, nor a general agriculturist. He agreed and did not think Indian Govt. could take proposal for postponement as a discourtesy. . . .

But it was not all so serious. The scientists revelled in the chance to exchange views and news with contemporaries from whom they had been cut off since before the war. The daily accounts are full of talks with names known to scientists everywhere . . . Cherwell, A. V. Hill, Stratton, Appleton, Chadwick, Fleming, Bowden, Cockcroft, Oliphant, Florey, Blackett and many more. Sir John Anderson welcomed them to the House of Commons Members' diningroom and David responded on behalf of all the Dominions. He had several good talks with Lord Bruce and, on June 27, to his great delight, 'over by bus to Roebuck House and spent over two hours with the Martins'.

On July 1st at the Sheldonian, robed in all the splendid solemnity of the Oxford academic procession, he was made an honorary Doctor of Science of his old University. A congratulatory note from Washington some weeks later brought from David a typical disclaimer. He said that he and the other heads of Dominion delegations knew that their degrees were 'of the official type . . . those of Burnet, Best and Collip were due entirely to the recognition of the fine research work they have done in their respective laboratories.'

It never changed—this regard for the man at the bench and relative contempt for the scientific administrator, leader, organiser. Fortunately perhaps, others had a different view of the quality of work he had been doing.

After the degree conferring there was an amusing sequel in an atomic energy discussion at the Clarendon. ' . . . Cherwell mostly pessimistic about the possibilities of atomic energy—decried popular expectations. Blackett took the contrary view and an exchange of pleasantries followed. . . .'

At Burlington House, where the scientists heard a glowing account of the possibilities of U.N.E.S.C.O., David thought he

had hit out too openly in suggesting that not all the grandiose expectations of international organisations were always fulfilled. To his amazement he was fervently backed by the leaders of other Dominion teams and was overwhelmed with congratulations after the long session ended. Twenty-six years of subsequent history has confirmed his viewpoint.

At Buckingham Palace he enjoyed talking with the King and Queen and the Queen Mother who had been following the science conference closely. But on the rigmarole of repeated presentation he had a two-word comment: 'Stupid business!'

Perhaps the most marked development over previous visits to Britain was his willingness now—at 60—to express opinions on a much wider range of matters. Indeed, when the Indian delegation held its formal dinner at the Savoy, he dared to tell the Indians 'that the English would be far more effective in India after they had got out—as in Australia!' One Indian thanked him deeply.

At Nobel House on July 25, Lord McGowan again made a strong attempt to get David to promise to take the I.C.I.A.N.Z. chairmanship. The offer was exceptionally generous. In a few years his retirement pension for life would have been far higher than he received after 23 years with the Commonwealth. But David felt Stella was against it and this apparently killed any hesitation in his own mind, particularly when he found Sir Lennon Raws was not anxious to retire just yet. McGowan did not want David to talk to Raws. But he insisted on it and, finding Raws not wanting to go, dismissed the matter. Stella's view was that while financially the post was most attractive, David would presently have felt 'caged' had he been engaged in one particular commercial undertaking after serving the whole community. This is a matter of viewpoint. He was already in his sixty-first year.

There was the usual flurry of elaborate dinners with British ministers before the scientists began to drift home. One of the happiest moments of the trip was the offer of an honorary fellowship from his old Oxford College, Lincoln. Sir Henry Tizard wrote: 'It is one of the nicest honours we can have, I think, unsought, unexpected and given by men who really know our work. . . .'

David was back in Sydney by mid-August having discharged a host of commissions for various bodies including Melbourne University and for the embryo National University at Canberra which was henceforth to demand much of his time.

No attempt can be made here to detail the part David played in the inception of the idea of a National University and in the actual foundation and early development from the last months of the war until the very end of his own strength and abilities in 1958. Once in 1926 with the future National Librarian, Sir Harold White, he had walked backwards (because the dust was too fierce for their eyes) all the way from the present site of Parliament House (then building) to Hotel Canberra discussing ways and means of eventually founding a national university for advanced research. Now, in Britain 20 years later, he was asked to sound out the great Australians whose agreement or refusal to come would mean so much for the prestige and early growth of today's Australian National University. The fact that Oliphant and Hancock duly came (and that Florey very nearly also came on a permanent basis) was, according to two former founding councillors, 'largely due to their regard for David and his personal intercessions both in 1946 and again three years later in Britain.' However that may be, the full story of the A.N.U.'s genesis and its early struggles, disappointments and eventual strength will duly be told elsewhere when all the documents of the period 1945 to 1958 are placed in the hands of a historian. For David, the work was perhaps the last great love of his life and from the age of 59 at the war's end until a cerebral haemorrhage finally struck him down in his seventies he gave it all he still had to offer. Some of the in-fighting was harsh and tough, but the idealist elements among the founding fathers had a far greater share of success against the 'politicians' (both academic and actual) than anyone could have foreseen. Perhaps, after 1951, the way was made easier by the real personal admiration the Prime Minister, R. G. Menzies, cherished for several of the founding fathers.

The immediate post-war years represent a watershed for many of the world's foremost scientists. Detachment from the world of politics and decisions—if ever as complete as in popular myth-

ology—ended abruptly. Across all the continents, top scientists studied the developments at Oak Ridge. Their public exhibition at Hiroshima and Nagasaki had evoked a horror that shook their lifelong faith in the desirability of scientific research. Many brilliant men found their whole past philosophy suddenly exposed to doubts.

David was deeply moved by the same abhorrence which filled some of the most respected British and American scientists. Years of painstaking research appeared to have been channelled not to the liberation and betterment of human beings but towards their total destruction.

At the same time, for a thinking minority, the demographers' figures of the coming population explosion seemed to point a direct challenge to almost unoccupied Australia. In the general preoccupation with personal re-establishment after the war, someone had to call politicians, public servants and the general public to awareness of a demand that must grow with every passing month—the demand of ever more hungry mouths.

At 60 David's own dislike of the limelight remained acute. His prestige with Government, with colleagues at the head of the Services and the various wartime agencies and with his fellow scientists would have surprised him had he ever for a moment considered it. Many a man with retirement just ahead might have decided that, after making discreet recommendations in the appropriate places, he should keep quiet and see out his time.

To David this was quite unacceptable. To him, it seemed like letting down the young men, especially the young scientists who could not hope to speak with the same weight. For himself, he realised there could be nothing but unwanted controversy, criticism, strife. His medical condition was far from adequate for the strains of this new role. But passionate conviction told him that this was no time for keeping silence and conniving at things that might do irreparable damage in the near future.

After 20 years of evading publicity while pressing on with the job—what a newspaper dubbed his 'genius for getting things done'—David now gradually changed. He came to feel that he must speak against the fashionable political climate of censorship and suppression of publication of scientific advances. There was

after all a preacher in his stock. David's evangelism was not for a deity but for a commonsense deployment of science.

As the unassuming organiser of research began to step into areas of controversy, it is interesting to see him through a new pair of eyes. In the spring of 1947 one of Sydney's foremost writers, Ronald McKie, was sent to investigate C.S.I.R. and its leader. A comprehensive three-page survey appeared in June 1947, in the Sydney *Daily Telegraph*. McKie wrote:

Rivett is small, slightly built and bald with a long nose and steady blue eyes. His almost unlined face is pink, his smile boyish and his voice soft, pleasant and completely unemotional. He dresses soberly and is moderate in all his tastes . . . he prefers when off the scientific chain, to play a set of tennis, dig his garden or read philosophy . . . (he) looks like a gentle professor of botany. He is sensitive, considerate and friendly, a man who doesn't pretend to be exceptional in any way. This is perhaps the secret of his personal charm and his undoubted ability to get men to work for him.

But his conventional restraint is deceptive. He is a tremendous worker, sincere, extremely intelligent and holds strong, almost idealistic, opinions about his responsibility as a scientist to society and about the part scientific men must play in the uneasy future.

(Rivett) says: 'The Council has nothing to do with the manufacture of atomic weapons, and I don't think we should be brought into the work because of the secrecy involved. I oppose any form of secrecy in the scientific work we are doing but if there is to be secrecy it is better for defence work of this kind to be carried out by special staffs and laboratories not connected with C.S.I.R., thus leaving it to the Council and Universities to maintain the free traditions of science.'

An American atomic scientist has said that the so-called secrets of the atomic bomb are only a set of engineering procedures which other nations are certain to develop within a few years. My opinion is there is no defence against the atomic bomb. The only hope is an international control of nuclear energy.

McKie added: 'Sir David tells us in his quiet but direct way we must learn to use science for peace or liquidate ourselves as a human community.'

David Rivett's attitude to secrecy in scientific research is best conveyed in his own words at that time:

. . . Assuming security to be the present democratic demand and aim, how may it best be obtained in international relations of the current power-politics type?

'Through secrecy!' is the impetuous response when scientific effort is under review. But 'Through achievement!' is the quieter reply of the thoughtful man and woman, and it is the answer that appeals most to those people in whom scientific spirit, ability and self-confidence are strongest.

Do any of us seriously believe that the peace-loving democracies of the world, if they maintain the traditional freedom which inspires individuals and keeps them on their scientific toes, will lag behind dictatorships in the acquisition of knowledge of Nature, and in the adaptation of that knowledge, for economic strength, for furtherance of peace by reduction of poverty and suffering, for power behind an international police organization and even, at the end, for direct war technology?

What are the barriers to achievement? Without doubt, the first of them all is secrecy. There is an incompatibility between secrecy and achievement which far too few people realise, let alone fully appreciate. No one need labour the point that in today's world some measure of defence secrecy is tragically inevitable and unavoidable. But it is equally true that secrecy, unless most carefully and intelligently applied, may be the main factor in precipitating calamity . . . He who trusts too fully in secrecy to save his country will handicap it and ultimately betray it. Like an alkaloid, a small dose may be necessary, even desirable. A large dose may be poison. A wise physician is required to prescribe the dosage. . . .

The situation at Fishermen's Bend, where C.S.I.R.'s Aeronautical Research Division and the Division of Chemical Industry shared both the site and certain buildings, was comical. Wire-mesh screens had to be built down passages and stairways to separate secrecy-controlled Aeronautical Research of C.S.I.R. under Lawrence Coombes from its sister Division under Ian Wark.

The whole business of fences, guards, passes and security apparatus was anathema to David. He fully accepted that Defence had a right to insist on these things but they were no part of C.S.I.R.'s scientific research. Having accepted it in war, there was, he felt, no need to accept it in peace. H. P. Breen saw at first hand David's role in the dispute which ended in the Department

of Supply taking over the Aeronautical Research Division, thus leaving C.S.I.R. free from security restrictions. He says: 'He believed with all his being the duty of the scientist was to explore and publish his findings. He regarded any deviation from this as a betrayal of principle and a disruption of the purposes for which C.S.I.R. was founded.'

The danger to science of the post-war secrecy panic was simultaneously denounced in U.S.A. and Britain. Writing in the *Atlantic Monthly* of January 1947, Professor Norbert Wiener said:

The measures taken during the war by our military agencies in restricting the free intercourse among scientists on related projects, or even on the same project, have gone so far that it is clear that, if continued in time of peace, this policy will lead to the total irresponsibility of the scientists and ultimately to the death of science. Both of these are disastrous for our civilisation and entail grave and immediate peril for the public.

The Third Report of the United Nations Atomic Energy Commission in 1947 said bluntly:

Secrecy and integrity in science cannot flourish together. They who preach secrecy for security are false guides. That way lies war.

Sir Henry Dale, a president of the Royal Society, told the British:

If national policies fail to free science in peace from the secrecy which it accepted as a necessity of war, they will poison its very roots.

On November 29, 1946, David, deeply involved, wrote to Hedley Marston:

. . . Many of the senior men in the Defence Services would be only too happy to have C.S.I.R. instructed by the Government to take responsibility for all the scientific research work that may be demanded in connection with certain projects now under consideration. This would, of course, be utterly calamitous from our point of view. Secrecy conditions would at once enter and it would be impossible for us to continue on the lines we now follow in our effort to assist primary and secondary industries to make life more tolerable for the human race. . . .

The world climate of suspicion in 1946-48 was built up by successive spy revelations in the northern hemisphere. Public misunderstanding of what was involved in the term 'atomic secrets' fed the ugly atmosphere. The revelation, that brilliant scientists, without bribery or blackmail, were handing over wanted information and formulas to the Russians, dealt a savage blow to scientists everywhere in the free world.

In the prevailing atmosphere the freedom given C.S.I.R. by Lord Bruce inevitably was now in grave danger. Political feuding made it almost certain that someone would ring the alarm bells about security simply to embarrass the ministry of the day. The tocsin was sounded by one who was not an Australian but became temporarily involved in defence councils. Before long he had personal clashes with the Secretary of Defence and conceived a keen resentment against David Rivett over a personal issue. He had an intense dislike of the freedom accorded C.S.I.R. scientists. He advocated imposition of wartime security checks on all having any connection with scientific work of defence significance in post-war Australia. While moving to a post outside the defence scene, he whipped up a scare campaign in a section of the press.

The Chifley ministry was fighting for its life on the bank nationalisation issue. It had no time or energy to spare for defending an abstract principle—the freedom of science. The ending of the 'Bruce Charter' and a new bill bringing C.S.I.R. under the Public Service were firmly planned in the Prime Minister's mind months before the 'smear debate' of September 30, 1948. The Government papers are not yet released but how the vice closed over David's objections, stage by stage, can now be traced.

On May 20, 1948, the chairman of C.S.I.R. and his Minister, Mr J. J. Dedman, had a long talk. David recorded next day:

He was very sensible and is firmly opposed to our joining the secrecy gang, taking oaths and all that sort of thing. He seemed to think that our Act laid it down that we were to be a free scientific agency; but I think it does that only by implication.

If however we were forced, in Aeronautics and other sections to subscribe to the Security vow, he thought the Government would be obliged either to put the Division under the Department of

Supply (which now includes Munitions) or to get a new Act requiring every member of the staff to take the customary oath or attestation never to make public any item of information coming to him in the course of his official work. Just think of the implications of such a position.

He is worried about it all but agrees that we must tackle the problem at once. The appalling mess in which American scientists are finding themselves is a warning to us . . . I shall of course fight against secrecy to the end (my end) but I have no great faith in some colleagues who are likely to be realists, i.e., people who take the path of least resistance, shrug their shoulders and say that a national institution must do anything (including selling its soul) required in the alleged interests of Defence.

Publicity had its effect on the Prime Minister and David's fears were fully confirmed. On August 17, 1948, he was writing to his Minister:

From our informal talk in the plane last Friday evening I gained the impression (I hope wrongly) that you are definitely inclined towards placing C.S.I.R. under the Public Service Board. To my mind, this would be so great a disservice to scientific research in Australia that I feel I must be perfectly frank with you and say at once that I shall feel compelled to do my utmost in opposition to any such move.

From this stand David never departed and his own resignation from the C.S.I.R. chairmanship eight months later was in exact fulfilment of this pledge on what he regarded as a matter of scientific integrity.

In the August letter he quoted to the Minister the judgement of the former head of the Public Service Board, Sir William Clemens, that the development of C.S.I.R. could never have been brought along so effectively had it been required to proceed along the lines which the P.S.B., of which he was Chairman, would have required. David added to this the report that top British scientist, Sir Reginald Stradling, had just completed to the Government of New Zealand. This outspokenly condemned the New Zealand civil service's handling of scientists. It urged the Government 'to consider the type of organisation in use in Australia.'

By now, the Prime Minister had called on two top public servants—the chairman of the Public Service Board, Mr. W. S. Dunk, and the chairman of the Commonwealth Bank, Mr. H. C. Coombs to report on C.S.I.R. and its constitution.

The Minister forwarded David on August 25, 1948, the Prime Minister's briefing to these two public servants. It said charges that secret information to which C.S.I.R. officers had access was not adequately protected had aroused concern. It also seemed possible, the Prime Minister wrote, that the structure of C.S.I.R. might need some review in view of its growth from the smaller, more compact, organisation originally conceived. The Government wanted to be in a position to meet reasonable criticism of these points and felt this should be possible without affecting the efficiency of C.S.I.R. or impairing the sense of free enquiry 'to which scientific workers justly attach such importance.' He asked Dunk and Coombs to 'discuss the question fully with Rivett and the C.S.I.R. executive'.

David's reaction to what he felt amounted to Treasury control, a great feature of the post-war Australian scene, was:

In former days our Ministers asked to be convinced by our direct arguments. They then regarded it as their business at Ministerial level to get the money from their colleague, the Treasurer. Today D. asks whether we have Treasury agreement in advance and this seems to me to be shirking his own legitimate responsibility. . . .

If I were a bit younger, I would enjoy a fight like this and would gladly travel round to every laboratory of C.S.I.R. to rally the staff. But the old heart is not equal to any strains . . . the fact is I am not doing and cannot do the Chairman's job as I think it ought to be done—so am I justified in hanging on to it especially now that Richardson is obliged to put the brakes on? . . . There is nothing to show for my continued effort to deal with Chifley (the real villain of the piece) and Dedman.

A fortnight after this letter was written the Opposition's time bomb burst in the House (see Chapter I). That sealed, beyond any remaining hope, the intention of the Prime Minister to bring C.S.I.R. into the Public Service Board's orbit.



Ted and David (about nine) as budding musicians at Beechworth in the 1890's.

A.C.D.R. at the conference table
(London 1946).



Subject and author (a year or two ago!).

Thank God for these Australians

PROBABLY no family in the world could match the academic splendour and practical social achievements of the Rivetts of Sydney—five sisters and two brothers, who have sacrificed great wealth that could have been theirs to devote their lives to benefiting humanity.

Each Rivett chose a specialist field and won distinction in it.

with three other girls, a coaching college in the Block, Collins St., Melbourne.

Her idea was to help people who could not afford a University education.

Soon she looked for a wider field; the education and emancipation of the women of India was a challenge she could not resist.

A WOMAN ALONE Indian Adventure

When she came out a man jumped up before the angry mob, a rabble-rouser who had once been banished from India by the British.

He told the people what this woman was doing for them.

The mob formed itself into a

his sacrifice he has developed for Australia one of the most efficient research organisations in the world. The C.S.I.R. has added millions to Australia's annual income.

HATS OFF TO THE RIVETTS

● Elsie, the third child of the manse, was the only one of the family mob to take university degrees.

Social work in the slums claimed her and she hadn't the time to spare for lectures.

A youth club she formed became the one bright spot for children in the squalor of Surry Hills.

She shared with her elder sister Eleanor the strange quality of attracting people to her and winning their devotion.

One night the wife of a notorious drunkard rushed into the club seeking protection.

Elsie comforted her and then led her home anticipating trouble from the husband. Nothing happened. But, as she left the house, from out of the street shadows came a host of little ragamuffins.

'It's all right Miss Rivett,' piped the leader. 'We heard you talking and came with you as your bodyguard. If that fella had a' touched you, we was gonna thrash him.'

In the past 30 years Elsie Rivett's

Sir David, doyen of the group, chose science and, as chairman of the Council of Scientific and Industrial Research, is now the best-known scientist in Australia.

Then, in order of seniority, Eleanor chose teaching, Elsie chose sociology, Olive, Christine and Edward medicine and Mary teaching and sociology.

RIVETT TRADITION Love of Freedom

Their father was a fiercely independent Congregational Minister who made a soapbox in the Sydney Domain his pulpit and the slums of Surry Hills his parish.

The love of freedom and humanity he instilled into his children influenced them all in their selection of a life's work.

Their father died in the back of a truck after making an impassioned speech against the Federal government for refusing to admit Egon Kisch, European socialist, into Australia.

But his spirit was strong in his children.

● Eleanor, the eldest, set the academic pace for her brothers and sisters.

She graduated M.A. with first-class honors from Melbourne University and proved herself something of a suffragette by setting up,

If we could extend this story of one Australian family to the whole Australian Family the noisy home-grown Moscow boys, the sit-pat, go-slow, do-nothing brigade, and the professional 'knockers' would fade away like flies in winter.

Lately we've introduced you to some grand Australians. This week meet the Rivetts. Their story is news.

In 1907 she went to Calcutta as principal of the London Missionary Society's Girls High School, then a microscopic institution.

Thirty years later, when she left to take charge of the women's college at Madras University, she had built it into one of the biggest schools in India.

The Indian nationalists say that this frail woman did more than any other for Indian women.

During one violent riot Eleanor Rivett went to visit a sick family in a slum quarter. News spread that an English woman had entered a house. Hooligans assembled, chanting a revolutionary song, waited to seize her as she emerged.

procession with Eleanor Rivett in the centre, and, still chanting the song, bore her in triumph back to the safety of the university.

In Bengal, Eleanor started a renaissance in Indian arts and crafts which developed into a national movement.

She was awarded the Kaiser I Hind (King Emperor) gold medal in 1946 for services to the State and was the first white woman ever to receive it.

After 40 years in India, Eleanor is now living in the Rivett family home at Gordon, Sydney, working for closer India-Australia relations.

● Sir David went to Melbourne University two years after his eldest sister to do medicine.

At the end of a brilliant first-year, one of his professors said to him: 'If you want to make a fortune carry on with medicine. If you wish to help your fellow men do science.'

Rivett chose science.

A Rhodes Scholar in 1907, he took a D.Sc. at Cambridge as well as at Melbourne.

He was deeply interested in a research career when he was asked in 1927, to become deputy-chairman and chief executive officer of the newly-formed C.S.I.R.

Few people realise how it hurt him to abandon his own research and become an administrator. By

contribution to society has been more than 15,000 good citizens made out of slum material.

Her reward: The joy of helping the children.

● The next three members of the family, Olive, Christine and Edward, all became doctors.

Olive, on graduating in medicine and surgery, married the Rev. Long, a Methodist missionary, and worked with him for many years in India, Fiji and Australia.

Never in her life has she earned money from her medical skill.

In Fiji her courage is still remembered. She arrived with her husband when the Indians had just been freed from their labor indentures and were celebrating with riots. Where there were sick to treat she went fearlessly and savage men stopped fighting to bless her as she passed by.

● Christine is probably the most highly rated woman surgeon in Australia today. She is famed for her work with children and at one time was in charge of the Brisbane Children's Hospital.

● Edward wanted to be a doctor, but for certain family reasons it seemed he would not be able to fulfill his ambitions. He took a job with the Adelaide Steamship Co. and for four years studied engineering.

(continued overleaf)

Then he won a university exhibition and switched to medicine, graduating with first-class honors in company with John Hunter, Australia's most distinguished doctor.

Youngest of the family, Mary, now Mrs. Matheson, after graduating B.A. with first-class honors and the university medal in philosophy at Sydney, took her M.A. at Cambridge University, specialising in psychology in which she obtained first-class honors.

CHILDREN'S LIBRARY

Then she ran across an old house in a London slum set up as a children's library.

An idea flashed and she hurried back to Australia to found the now famous Children's Library Movement.

The name of the movement indicates only a fraction of its function.

Mary Rivett, with the aid of her sister Elsie, whom she co-opted, aimed at providing Australian children with a means of expressing their thoughts, emotions and impulses in a way both satisfying to

themselves and socially acceptable.

The objective was to give them arts and crafts, drama, dancing, puppetry and kindred forms of expression.

There are now 25 of her centres in N.S.W. and in many other States.

A small, nervy, unruly boy came to one of the centres. He seemed interested in drawing. Materials were given to him and he was left alone. Again and again he drew the same scene—a gruesome murder.

He moved on to puppetry and, still unguided, played a macabre murder with the dummy figures.

Slowly, he began to change the plot of his play until murder was no longer the theme.

As the puppetry became happier, the boy changed until he became normal and the memory of witnessing his own father commit murder faded away.

There, in brief, is the story of the Rivett family, a group of grand Australians without vanity or personal ambition, but all inspired by their father's philosophy—the betterment of mankind.



The C.S.I.R.O.'s David Rivett Laboratories at Clayton, alongside Monash University, were opened in 1966 by the Rt. Hon. John Gorton.

Dedman sent his final reply to Rivett on October 27, 1948.

I admit the cogency of many of your arguments; on the other hand there are aspects much wider in scope than those dealt with by you and which have to be taken into account by the Government in deciding the form that legislation will take. . . . Although I am impressed by your arguments, I do not feel that they override other considerations. The Bill will, therefore, be proceeded with as now drafted.

David's final acknowledgement that his efforts to save C.S.I.R. had failed came in a letter to Dedman, four weeks after the attack in the House:

. . . I realise that it is hopeless to convert you to my conviction that it will be a grave misfortune to transfer the general research work of C.S.I.R. to Public Service Board control. Doubtless the wider aspects to which you refer are political, and I can only say that it was a sorry day for science when its present association with politics was brought about . . .

. . . At any rate I can feel that I have done everything in my power to save the spirit, enthusiasm and successful working of the C.S.I.R.

. . .

Then the old impish delight of his father in making fun when things were worst asserted itself. He reminded the Minister, himself a Presbyterian, of this story:

A Scots Presbyterian minister was exhorting his flock to repent and give up their bad ways lest they suffer dire penalties in the next world. He warned them eloquently of what might be ahead. 'Ye'll find y'rselves one dee wi molten lava opp to y'r waists and 'rade hoot ashes opp to y'r naicks, an' sulphurous fumes cerrcling roond y'r heidd, an' ye'll cry to the Gude Laird: "O Laird, we dinna ken it was be like this or we'd ha' listened to oor parson when we were on airth!" And the Gude Laird, in his infinite compassion and maircy, will look doon on ye and will say: 'Ah weel, ye ken noo!'

Surely one of the nicest ways adopted, inside or outside Parliament, of telling a Minister whither his policies were destined.

By December it seems that Mr. Dunk became so impressed with C.S.I.R. argument against the original wording of the Bill

that he forwarded Mr. Dedman in January 1949 some vital changes. However this brought a very categorical reply from the Minister that the December draft was the final report.

By March 1949, David had both the Dunk-Coombs report and the new Act. The essential disappointment was that the way was left open for a future minister to assume control to an extent that placed the C.S.I.R. on a similar footing to any other Government department. By this time, David was reasonably satisfied that no such intervention was contemplated by the Government of the day or their senior public service advisors. But honesty made it unthinkable to hide from anyone that the old absolute standards of freedom and independence no longer existed even if there was no present intention of taking advantage of the powers conferred.

He wrote in April 1949, to Professor W. J. Dakin of Sydney:

The wording that has been chosen gives the P.S.B. almost full power over selection of staff and determination of terms and conditions. It does not however follow that the Board will exercise this power in a fashion that may be unfortunate from our point of view. If wisdom prevails, not much change should be brought about . . . In his second reading speech the Minister practically gave an assurance that the clauses to which we have taken objection did not mean just what they said, but of course the trouble is that such things are interpreted according to their precise verbiage long after the second reading speeches of ministers have been forgotten.

To Mrs. Nora Roberts, Sir George Julius's secretary, who had been involved intimately in C.S.I.R.'s foundation and struggles for many years he wrote: 'They have taken the course feared by Sir George Julius in his last two or three years, though for the time being we have warded off most of the worst possibilities. . . .

To his old friend and mentor Sir Charles Martin at Roebuck House, he summed up:

C.S.I.R. troubles . . . came to something of a head last month when the Government repealed the Bruce-Page Act of 1926 and replaced it with a new Science and Industry Act 1949 . . . the wording of the Act is simple and clear and the way is open for radical

changes to be made sooner or later, all in the direction of bureaucratic, departmental control of scientific work. I dislike it all intensely and know quite well that had the original Executive Committee been asked to work under the conditions now laid down we would have refused to have anything at all to do with the job.

Perhaps in these days of the Controlled State, this sort of thing is inevitable, and people who think as I do are merely demode: but admirable as P. S. Acts and P. S. Boards may be for the purposes for which they were designed, I fear their application to scientific endeavour and to the best men engaged in it. C.S.I.R. will continue, of course, but I have misgivings about its soul. Maybe the fact that the new law changes its name to C.S.&I.R. *Organisation* is a little ominous. These political bureaucrats are so sure they can organise everything. . . . There seems to me to be in it all a determination to bring C.S.I.R. closer to industry and to day-to-day little *ad hoc* problems. They think we have developed too far on the University model, giving too much thought and money to fundamental work. But then our Universities are just not doing this work and we have to build our own foundations as you know. The politicians think we can rely on other countries to supply them for us—but they are shortsighted.

In mid-1948 just as the confrontation with Dedman was coming to a head, Richardson had had a severe heart attack. On recovery he went away for a month and his physician said he must never again exert himself physically. The doctor told David he would have recommended complete withdrawal from the job but for his fear of the psychological effect on Richardson.

David was more completely alone that winter of 1948 than at any time with C.S.I.R. Those who shared his convictions with enthusiasm were not in Melbourne. Masson and Julius were gone, Martin in England, Richardson laid low. Yet, in letters, the old wit—and a refusal to take himself or impending trouble too seriously—shone out:

You had better learn—as I am trying to do—to ‘delegate’ responsibility to other people even for doing those things you know they can’t do properly. Then you will perforce soon find it necessary to support (sic) all sorts of things which you do not approve, or else of course admit failure as a delegater. At that stage, the state of your morals will be such that the attainment of the haven

of retirement will seem the only thing worth attention. Please cremate this treason.

A month later . . .

I'm sure you will understand that I shall tell the Council at its next meeting that I am not satisfied with the way that I am doing my job. The game of trusting other people to do things is far more wearing than doing everything oneself. . . .

By the New Year, once he knew that all hopes of amendment of the Bill were dead, he opened his heart to Richardson and they agreed that they would stand down together in April 1949, when the new regime took effect. For one who had no illusions of infallibility, David was exceptionally single-minded throughout these last 12 months with C.S.I.R. He had no doubt how Masson—and the other men whose code he revered—would have reacted. As he wrote to one of the many who shared his convictions:

Like you I am unhappy about the future. The main danger as I see it is that people will knuckle under to the bureaucratic regime and, by avoiding fight and seeking comfort, they will gradually reach a condition of tolerant acquiescence in what they formerly knew to be wrong. A generation will arise that knows not freedom and will be content to do without it. Then some day an old battle will be fought over again.

In an editorial on April 2, 1949, entitled 'The end of a Chapter', the *Melbourne Herald* said:

Retirement from the C.S.I.R. of Sir David Rivett as its Chairman and Dr. A. E. V. Richardson, Chief Executive Officer, marks the end of a notable chapter of Australian progress. With wise administration and a reasonable latitude to conduct its affairs in the interests of scientific research rather than in conformity with bureaucratic regulation the Council has given first class service to Australia. Its prestige is international and its work is paying high economic dividends. The Council has been a continuing proof of the wisdom of allowing experts to get on with the job in the way they find best. For reasons, the virtues of which are not apparent, the Council is to be replaced by an Organisation following more closely the traditional bureaucratic lines. To what degree this will

incorporate the merits of the old system we have yet to find. The experience of other autonomous bodies such as the A.B.C. whose powers have been whittled away has not been happy. We may hope, however, to be spared a parliamentary standing committee on scientific research.

Members of the C.S.I.R. up and down Australia and overseas felt shock and depression at the news that they were to lose simultaneously both Rivett and Richardson. The messages from groups and individuals came in for months and the sense of having lost a personal leader and exemplar shines through each communication.

From Britain the C.S.I.R. staff wired: ON EVE OF YOUR RETIREMENT ALL OFFICERS AND STUDENTS WISH TO PAY TRIBUTE TO YOUR MAGNIFICENT LEADERSHIP OF THE C.S.I.R. AND YOUR CONTRIBUTION TO SCIENTIFIC RESEARCH AND DEVELOPMENT IN AUSTRALIA.

The Melbourne *Herald* announcement might have pleased any man. Under the 'streamer'—'Sir David Rivett retiring' it carried the main heading—GENIUS FOR GETTING THINGS DONE.

In the review of his life work it said:

Those who do not know Sir David Rivett will wonder why they haven't heard more about him and the work he has done. To his friends this is easily understandable. He shuns publicity and self-advertisement. . . . When C.S.I.R. was founded, many so-called practical men considered it was a waste of money. . . . Their resistance and the apprehensions of Government departments and Universities regarding the intentions of the new body had to be overcome.

It was Sir David's human qualities, his natural modesty and understanding, coupled with his tireless energy and administrative ability which overcame these resistances and doubts . . . Although he is not the founder, Sir David Rivett can be called the father of C.S.I.R.

On May 18, 1949, the Prime Minister, having 'safeguarded his flanks' through the Dunk-Coombs Act, he had instigated, was

anxious to put on record 'my own and the Government's very warm thanks for all you have done for C.S.I.R. and the country as Chief Executive Officer and Chairman of the Council. From the recent testimony of Sir Henry Tizard and other eminent British scientists, it is clear that the standing C.S.I.R. enjoys overseas is no less high than in Australia and that this is due not only to the great work it has accomplished but, in no small measure, to your personal association with the Council. . . .'

The Minister, Mr. Dedman, in his letter spoke of the 'magnificent contribution you have made to the Commonwealth. . . . It is given to few men to play as great a part as you have in the growth from infancy to adult stature of such an organisation as C.S.I.R. It must surely be a source of comfort and satisfaction at this time for you to know that this instrument, which is largely the work of your hands, stands so high, not only in the estimation of the Australian people but in that of scientists everywhere. . . .'

The Commonwealth Scientific and Industrial Research Organisation (C.S.I.R.O.) which replaced the Council (C.S.I.R.) under Chifley's Act of 1949 has now been a *fait accompli* for 23 years. How far were David's fears of enslavement of the new body to inelastic bureaucracy realised? How much did those who worked in the new Organisation and made it operate find that David's lost battle handicapped their own work and idealism?

Go to half a dozen senior men who knew both C.S.I.R. in the 1926-49 period and C.S.I.R.O. in the 23 years since and put up the question and you will find them split down the middle. Sir Ian Wark, a devoted admirer of David, says the fears were unrealised. He puts the answer in the mathematical equation:

$$\text{C.S.I.R.O.} = \text{C.S.I.R.} + \text{O.}$$

Sir Samuel Wadham, who watched the two bodies as member and consultant for the 30-odd years after he came out from Cambridge in 1926, says:

The Act of Parliament which changed C.S.I.R. into C.S.I.R.O. was a great blow to Rivett. In many ways it was a logical administrative adjustment. In the first place it abolished the fiction that the Council made most of the decisions. Secondly it allowed the

Government to have some knowledge how the money was being spent because it put a Treasury official on the Executive. Rivett's feeling was that this was the thin end of the wedge and the Government would turn C.S.I.R.O. into a normal government department . . . I think it is fair to say that the dire results which Rivett feared have not eventuated but politics is a long game and some day a Minister may arrive who finds circumstances in favor of turning C.S.I.R.O. into another government department. . . .

On the other hand, writing for the Royal Society, Dr. Hedley Marston in his draft memorandum on Rivett said:

The effectiveness of C.S.I.R. as a government instrumentality has never been surpassed. Its strength was the stimulating simplicity of David Rivett's leadership. His penetrating influence . . . inspired a jealous regard for corporate honor rare in Government agencies . . . After his retirement . . . addition of the 'O' reflected . . . a profound change of the relationships between the executive body and its scientific personnel—'We' gave place to 'They' . . . Although the feeling of scientific freedom in approach . . . was still encouraged, confusion of relative values entered, spirit wilted.

. . .

Dr. Lionel Bull, another divisional chief with long experience of both C.S.I.R. and C.S.I.R.O., said he felt that C.S.I.R.O. had not been the same success since coming under Public Service Board influence. 'From 1927 to 1949, the Executive could, within very wide limits, do what they believed to be right. Salaries could be decided according to necessities and the final decision rested with the Executive. Once the head of Department could convince the Executive of necessity to appoint someone they could go ahead. Today the Executive wants Ph.D. degrees, etc. . . . At least five heads of department have expressed grave dissatisfaction with the set-up and growing interference by the Public Service Board. The Board has always insisted it has nothing to do with appointments only with terms and conditions, but in effect this gives them power to veto. Consequently good men are lost to better offers elsewhere.'

Lawrence Coombes, chief of the Aeronautical Research division, has strong views on the effect of the Public Service Board on C.S.I.R.O. He agreed with Dr. Bull, saying—'Valuable men were

lost through prolonged delays in approving suggested appointments. By the 1960's there was much disillusionment. The chiefs then felt that David Rivett's bitter opposition to the government takeover was amply justified by subsequent experience.'

Dr. E. G. Bowen was the first chief of the postwar division of radiophysics. He says: 'In the 20 years I have been with C.S.I.R.O. no one at the top level has since established such good contacts with ordinary members of staffs. . . . The system in Australia which owes all its qualities to what Rivett insisted upon from the outset is the best and most encouraging under which a scientist can work . . . the system which now replaces it has obvious shortcomings. C.S.I.R., as David Rivett established it and as I found it in the thirties, gave the best climate for research. . . .'

On balance one is inclined to accept the evidence of Sir Ian Wark and Sir Samuel Wadham that certain of David's worst fears during his fight in 1948-49 have never yet been realised. In the McCarthyist atmosphere of the period such apprehension was probably inevitable in anyone who cared as deeply for keeping science out of straitjackets. One colleague emphasised that the fear was utterly selfless: 'No one in his right mind believed that while Rivett remained head of C.S.I.R. any government—whether headed by Menzies, Chifley or another—would contemplate any interference with C.S.I.R. appointments. Even A.C.D.R. sensed this. His fear was for younger, less established successors. The degree of freedom enjoyed ever since is directly due to the savage—but personally costly—struggle he put up against any shackling of scientists.'

The Society of Chemical Industry of London broke new ground in 1948. For the first time in its history, it went outside Britain for a chairman for its 1949 conference and invited David to Britain to preside. This journey was to be his last overseas although no one suspected it at the time. The weather conspired for him. On only one day in the three months he and Stella were in Britain did it rain. Consequently 1949 has gone down as 'the perfect summer.'

Unlike previous visits, he did occasionally snatch a few hours for the family and spent some of them with his twin grand-

children who were one of the joys of his life from then onwards. The idle moments were again infrequent for the British Society of Chemical Industry had created an immense program for their president, also a score of major scientific issues had been laid on his plate before leaving Australia. His account in his daily diary is as packed with interviews, discussions and consultations as ever. (Just to add spice, a junior member of C.S.I.R. staff indulged in a demonstration linked with a Communist cause outside Australia House.)

David received two more honorary degrees and a fellowship and found time to raise funds and organise a portrait of Nevil Sidgwick by a well-known artist for the Lincoln College hall. It was at this time that the establishment of the Dyason Trust to bring distinguished world figures to Australia was finalised with David as trustee. There were the usual Court presentations and a truly staggering list of dinners and parties at most of which he was called on to speak.

One famous Australian scientist at the great gathering of more than 900 scientists from the English-speaking world at Manchester in July 1949, wrote to a colleague: 'When A.C.D.R. sat down after that inspiring presidential address I felt like coo-eeing as we do at Lord's when we show the Poms . . . he wasn't good, he was bloody magnificent. . . .'

The tributes to his work, speeches and personal charm as President of the Society of Chemical Industry should have done much to heal any scars still left by the political mud-flinging of previous months. In its issue of July 23, 1949, the sober British journal *Chemistry and Industry* was moved to almost unscientific exultation in its first chairman from outside the United Kingdom. . . .

From the very beginning, Sir David Rivett and his gracious lady won the hearts of all who met them. When talking of Burke Dr. Johnson said 'if a man were to go by chance at the same time with Burke under a shed to shun a shower, he would say "this is an extraordinary man"'. In Sir David Rivett we have an 'extraordinary man'. His presidential address was brilliant and gave us much food for thought. On the many occasions on which he was called upon to speak, he was magnificent, taking up every point,

never missing a ball and each time showing the depth of constructive thought which marks true greatness. And withal 'cheerfulness was always breaking in'.

Over the next 20 years there were many gestures of commemoration which would have made David laugh in self-disparagement. They ranged from large laboratories in two cities to a mountain in Antarctica, a medal for outstanding scientific research and a suburb in Canberra. There were even one or two streets. What would have stunned him was the rapidity and ease with which a few of his colleagues proceeded to raise their target of \$40,000 in 1962 to establish a permanent biennial lecture by a world figure in science in his honour.

Already five lectures have been given, the first by the first Australian president of the Royal Society, Sir Howard Florey, in September 1963. This led the *Melbourne Age* to comment that David's 'influence on the maturing of Australian science was profound. Thursday's bracketing of these two names, Florey and Rivett, should give Australians a quiet but legitimate pride in their country's intellectual coming of age.'

David's abiding faith in the value of education is epitomised by the David Rivett Trust administered by the Save The Children Fund (Melb.) for the purpose of assisting Aborigines giving promise during secondary education to continue their studies further. This has already helped several students on their way.

The reference to Antarctica may surprise readers. It has not been possible in this narrative to spend time on ancillary activities in which he played a useful but secondary part. From 1927 until the war he was a member of what was called the Antarctic Expedition Committee usually led by his friend the Adelaide geologist and explorer, Sir Douglas Mawson. Actually few things outside Australia so claimed his interest and enthusiasm. The committee was constantly short of funds because neither photographers nor explorers, however brilliant in their own fields, are much good at assessing the likely gross return on exhibiting expensive Antarctic films in various countries. Immense energy was expended by Mawson in trying to bring to a world audience the films made by Captain Frank Hurley, but they never recouped a fraction of the costs.

Among David's colleagues who fought Mawson's various battles and contributed to the gradual building up of Australian knowledge of the land mass to the south were: Sir David Masson, the Secretary of the Prime Minister's Department, Frank Strahan, Sir Edgeworth David, the explorer and navigator, John King Davis, and Sir Harry Sheehan of the Commonwealth Treasury. Much that is today taken for granted stemmed from the energy and drive of this team in the pre-war years of inadequate funds.

No attempt is made here to deal with David's work after 1949. For a few months he consented to act as chairman of the new advisory council for C.S.I.R. But he had always insisted that the path should be clear for the man doing the job. His resignation freed him from the smallest feeling of passing any judgement on his successors and their colleagues. Although often consulted by C.S.I.R.O. scientists in the years after 1949 on a purely personal basis, his own code kept him from suggestions or promptings that could in any way prove an embarrassment to others.

Before a final stroke smote him at the end of the 1950's, his main work, time and energy, even while his health deteriorated, centred on the new National University at Canberra. Its emergence and success in obtaining some of the foremost Australians was his delight. Its setbacks, and the problems it had to survive in its first decade, were deeply felt by him. But as a scientist and leader he could fairly ask to be judged by his work before 1950. So there, perhaps, this narrative should draw to its end.

David died in the autumn of 1961. Very conscious of failing performance after a stroke, he had resigned from his four boards in the mid-fifties. He had just completed what I.C.I.A.N.Z. personnel described as 'a magnificent job' in devising and implementing a mutually satisfactory superannuation scheme for the company's personnel at all levels. As a company director, he is described by colleagues as 'immensely conscientious' and painstakingly involved in any field where his experience might help. But he had total belief in the wisdom of letting executives go ahead with projects without any hint of interference from the part-timers in the board room.

He had seen the Australian National University ride some stiff storms. Having fought fearlessly for total independence of universities from the politicians who allocated taxpayers' money to them, he had some reason to feel that the universities by the late fifties had a far more secure and relatively free future. David, deeply involved in the whole concept of giving maximum value from university to community ever since he had first gone up as an undergraduate in 1903, had reason to feel that most of his battles for the emerging A.N.U. had not been fought in vain.

What relation has the Australia of 1972-73 to the blueprint for which he worked from the moment that Stanley Melbourne Bruce effectively handed him greater power than had ever before been given to an Australian scientist? Taking stock, it is exhilarating to see how some of the causes which at times seemed unattainably distant have now been fairly won.

A personal statement prepared by David in 1941 at the request of Dr. H. V. Evatt for the Inter-Departmental Advisory Committee on Reconstruction, the forerunner of that Department, spells out the crying needs which have at last been covered in whole or in part in the post-war years. He listed with appropriate suggestions: a topographical and soil survey of the continent; flax production and cotton growing, both now well ahead in Queensland and northern N.S.W.; a vigorous attack on fresh fruit storage and marketing; attention to special almost neglected crops—pyrethrum, tobacco, medicinal herbs.

Then he wanted—what he never ceased working for and building from its smallest beginnings—proper, profitable, scientific exploitation of the wealth of food in the seas around Australia. In 1941 he listed as necessities for this: boat building, right up to long-distance, ocean-going tuna clippers; fresh fish with revolutionised facilities for marketing throughout Australia; canned fish, especially tuna and Australian salmon; manufacture of nets and other gear; fish meal for agricultural purposes.

Other major headings he proposed were nation-wide afforestation with particular emphasis on veneer production, development of papers of all kinds and of the cellulose industries and fibre boards, cellophane and rayon. Of his favorite minerals, he predicted that aluminium 'important enough in wartime is one of

the coming metals for peacetime industries. In the mining, purification and reduction of bauxite there is room for hundreds. . . .'

The whole survey—down through plastics, liquid fuels and aircraft to 'a standardised motor car'—came to fruition within 15 or less years of that personal assessment for the Government made in 1941 when no one knew if Australia would survive the gathering hurricane. Sir Samuel Wadham has said if they wanted to see David Rivett's achievements Australians should just look about them. His own assessment would have been vastly more modest but from Beechworth schooldays in the bush classroom to the great London receptions of science's leaders, he did give all he had.

The Commonwealth Scientific and Industrial Research Organisation is strong and still growing. The senior men are sharply divided as to how much ground has been lost by allowing the Commonwealth Public Service Board powers which enable it to interfere effectively with the immediate grant of salaries to wanted men. Yet the whole contribution of national research to a more productive, better-exploited Australia was accepted by the nation's leaders back in the thirties and has never been challenged. The giant which is C.S.I.R.O. in 1972 has two things in common with the pilot organisation that rode the rapids and murderous snags of the depression years. It has virility, it has a sense of things achieved and of many more still to be achieved. Moreover, it continues to attract and hold a high proportion of the best young scientists Australia puts forth.

Perhaps the thing that would have heartened David most in the past dozen years has been the accelerating wave of successful search for those minerals, metals and other buried treasure which he insisted must be there and should be sought for in the depression years when hundreds of thousands of able-bodied men were left idle by the ineptitudes of economic policy.

ROHAN RIVETT,
Camberwell
May, 1972

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