had long wished to be relieved of his strenuous duties as Vice-Chairman of the Defence Research Board and to return to his home in the United Kingdom. Accordingly in the autumn of 1954 the Board regretfully agreed to this change and Mr. Davies relinquished his duties as Vice-Chairman on 1 January, 1955. Mr. Adam Hartley Zimmerman, who had been a member of the Defence Research Board for the previous three years, agreed to become Vice-Chairman. During the first few months of 1955 Mr. Davies continued to work with Defence Research Board Headquarters in Ottawa as special assistant to Dr. Solandt and in the summer of that year he went to London, England to assume the post of Defence Research Member at the Canadian Joint Staff on the retirement of Brigadier G. P. Morrison.

Mr. Zimmerman, a native of Hamilton, Ontario, graduated from the Royal Military College in 1922 and then took his degree in Mining Engineering from the University of Toronto. Between the two world wars he practised his profession in the mining industry in Northern Ontario, he worked as a geologist in various parts of North America, and finally he became associated with the Moore Corporation, where he remained for some twenty-five years. In 1941, Mr. Zimmerman was called to Ottawa where he served as Director of Small Arms Production and later as Director General of Signals Production in the Department of Munitions and Supply until the end of the war. When the Cold War flared up into the Korean crisis the Rt. Hon. C. D. Howe again requested Mr. Zimmerman's services. So in March of 1951 Mr. Zimmerman returned to Ottawa, this time to assist in reorganizing the Department of Defence Production. He subsequently served in that organization for nine months as the Director of the Electronics Division.

At the twentieth meeting of the Defence Research Board on 29 September, 1951, it was agreed that a representative of the Department of Defence Production should be invited to attend future Board meetings. Originally it was intended that the Department of Defence Production's representative should merely be present at the meetings without becoming a voting member of the Board, since this procedure would not require an amendment to the Department of National Defence Act. However, when it was learned that Mr. Hartley Zimmerman would be the representative of the Deparment of Defence Production, the Board decided that they required his assistance on a more formal basis. Accordingly the Governor-in-Council approved the appointment of Mr. Zimmerman to the Defence Research Board while he was designated as the representative of the Department of Defence Production. The first meeting Mr. Zimmerman attended in this capacity was on 14 March, 1952. Upon Mr. Davies' resignation from the office of Vice-Chairman, Mr. Zimmerman was persuaded to accept full-time employment with the Board. This decision of Mr. Zimmerman's was

undoubtedly a factor which influenced Dr. Solandt to consider other employment, for he was now aware that with Mr. Zimmerman as Vice-Chairman the problem of succession was happily open to solution. Accordingly on 1 March, 1956, Mr. Zimmerman took over the duties of Chairman of the Defence Research Board and on 7 March, 1956 he presided over his first Board meeting.

With Mr. Zimmerman's appointment to Chairman, the position of Vice-Chairman remained vacant until 1 June, 1957, when Dr. John E. Keyston, who had been Chief Superintendent of the Naval Research Establishment at Dartmouth, Nova Scotia, came to Headquarters to take up this post. Dr. Keyston had originally been loaned to the Defence Research Board in 1950 by the Royal Naval Scientific Service and in 1953 he became a permanent member of DRB's staff. On 1 September, 1957, Dr. Keyston's place at NRE was taken by George O. Langstroth, who for the preceding five years had been Chief Superintendent of Suffield Experimental Station. Mr. A. M. Pennie, a former Superintendent of the Defence Research Northern Laboratory at Fort Churchill, who attended the National Defence College at Kingston, Ontario, during 1957, succeeded Dr. Langstroth as Chief Superintendent at Suffield.

The Control of Development

It is always difficult to draw any hard and fast line between what is research and what is development. By definition development is the application of knowledge gained by research to the creation of new or improved equipment or methods, but in practice it is not always easy to say where research ends and where development begins. As in the distinction between tactics and strategy, there is a considerable borderland area where the choice of label must remain arbitrary. Dr. D. C. Rose, when he was Scientific Adviser to the Chief of the General Staff, listed ten stages between the inception of an original idea and the production of an end item for use.[2] These stages were:

(1) the discovery of a new scientific principle or invention
(2) the measurement of the phenomenon discovered
(3) basic research to obtain complete knowledge of the phenomenon
(4) construction of first laboratory equipment to test applicability
(5) development of prototype
(6) examination to assess value for production
(7) engineering design for production model
(8) tooling and manufacture
(9) inspection and testing
(10) marketing and use.

[2]Rose, D. C., *Scientific Research and Development: A Basic Guide for Planning Committees*, Ottawa, 11 January, 1945.