A PRESENTATION

"THE ANATOMIC DISTRIBUTION AND CHARACTER OF THE LESIONS OF
THE CENTRAL NERVOUS SYSTEM IN POLIOMYELOITIES, WITH SPECIAL
REFERENCE TO THE TYPE OF CELL AFFECTED AND TO THE PORTAL OF
ENTRY OF THE VIRUS."


TOGETHER WITH

THE FOLLOWING UNPUBLISHED PAPERS

ENTITLED,

A."STUDIES IN EXPERIMENTAL POLIOMYELOITIES";

1."THE EFFECT OF THE INOCULATION OF POLIOMYELOITIES VIRUS INTO
DEGENERATED AREAS OF SPINAL AND THE MODE OF PROPAGATION OF
THE VIRUS FROM SUCH AREAS TO THE CENTRAL NERVOUS SYSTEM."

2."THE ALLEGED DEVELOPMENT OF IMMUNITY FOLLOWING INTRANASAL
INOCULATION OF POLIOMYELOITIES VIRUS INTO MONKEYS SUBJECTED
TO PRELIMINARY BILATERAL SECTION OF THE OLFACTORY TRACTS."

3."THE EFFECT OF FARADIC STIMULATION ON THE LOCALISATION OF
PARALYSIS INDUCED BY THE INTRANASAL INOCULATION OF
POLIOMYELOITIES VIRUS."

B."THE METHOD OF TRANSMISSION OF THE VIRUS OF INFECTIOUS
MYXOMATOSIS OF RABBITS TO THE CENTRAL NERVOUS SYSTEM."

(Submitted for the degree of Doctor of Medicine of the University
of Adelaide, February 1, 1941).
THE ANATOMICAL DISTRIBUTION AND CHARACTER OF THE LESIONS
OF THE CENTRAL NERVOUS SYSTEM IN POLIOMYELITIS, WITH
SPECIAL REFERENCE TO THE TYPE OF CELL AFFECTED AND TO
THE PORTAL OF ENTRY OF THE VIRUS.


"The war against disease in all its forms presents a stirring challenge and maintains a keen and never-failing interest. One of its satisfactions is that the battle line never retreats and, while progress may prove slow, each gain is held and forms the base for further advance. The more difficult the objective, the greater is the incentive for attack. Infantile paralysis, and the possibility of its prevention and cure, holds a peculiar appeal, especially to those who love children. Other similar problems, no less difficult, have in the end yielded to persistent and devoted research and the solution has been found."

Jeremiah Milbank.

A. INTRODUCTION.

In recent years no acute infectious disease has been studied with greater intensity than poliomyelitis. The facility with which the disease can be reproduced in monkeys has resulted in many valuable contributions to its pathology, yet despite them, a considerable degree of confusion still exists in regard to the portal of entry of the virus, its method of spread within the organism, and the reason for its predilection for the motor neurones of the anterior horns.

The thesis submitted is based on a pathological examination of eight cases of poliomyelitis, undertaken in the hope of throwing
light on the relative susceptibility of different cells in the central nervous system and on the portal of entry of the virus.

It is intended to trace the development of the pathology and pathogenesis of poliomyelitis up to the present time; to submit the results of the research undertaken; and finally, to indicate wherein it is considered the thesis advances medical knowledge.

B. THE DEVELOPMENT OF THE MODERN CONCEPTION OF THE PATHOLOGY OF POLIOMYELITIS.

(1) HISTORICAL REVIEW.

Heine to Charcot.

One hundred years ago when Heine (1840) published his first monograph, he not only placed the disease on a sound clinical basis, but he also submitted a theory concerning its pathological anatomy, and thus paved the way for all subsequent research. Heine from a logical analysis of the signs and symptoms of the disease postulated a lesion, "of the cord, of an irritative and congestive sort," the congestion leading to an exudate which caused the paralysis. He called attention to the fact that "the gradual reduction of the paralysis, both in extent and in intensity, gives ground for the belief that it is due to the gradual re-absorption of exudate around nervous elements, whereby the latter are partially relieved from pressure." In support of his hypothesis he pointed to the gray matter of the spinal cord as being "the chief channel of motor activity," and with prophetic insight went on to say, "...... knowing that the gray matter is so well supplied with blood vessels that