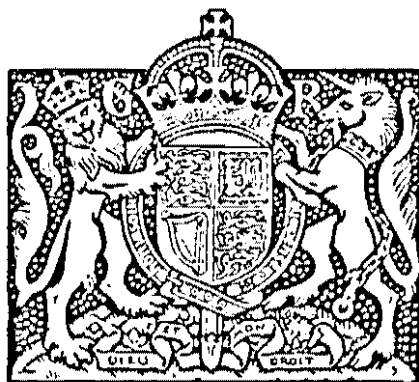


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MEDICAL USES OF RADIUM  
Summary of Reports from Research  
Centres for 1934



LONDON  
HIS MAJESTY'S STATIONERY OFFICE  
1935

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## PREFACE

This report continues the accounts given in the twelve which have preceded it\*, of the research done with radium and radium emanation distributed by the Medical Research Council to selected centres in Great Britain and Ireland. On the clinical side, the report deals mainly with the treatment of various forms of cancer, but it contains also a brief section on the use of radium for some non-malignant conditions. In addition to describing work done during 1934, the report gives statistical data relating to the after-histories of patients treated in previous years. There is, further, a preliminary section dealing with purely experimental studies in the fundamental aspects of irradiation. The whole scheme of work is under the general supervision of the Radiology Committee, to whom the Council are indebted for the preparation of these reports. No account is included here of the research work in the treatment of cancer by "radium beam therapy" which the Council and other bodies are assisting under independent arrangements.

The original stock of radium entrusted to the Council by H.M. Government—and lent by the Council to various centres—is supplemented by further quantities provided by the British Empire Cancer Campaign and by the National Radium Commission. Support has also again been given by the Campaign to the Radon Centre maintained by the Council at the Middlesex Hospital for the supply of radium emanation. For the continued co-operation of these bodies the Council would here again express their thanks.

MEDICAL RESEARCH COUNCIL,  
38 Old Queen Street,  
Westminster, S.W.1.

*1st October, 1935.*

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## CONTENTS

	PAGE
INTRODUCTION .. .. .	5
A. EXPERIMENTAL SECTION .. .. .	8
B. CANCER OF THE BREAST .. .. .	21
C. CANCER OF THE UTERUS :	
(1) Cervix Uteri .. .. .	28
(2) Corpus Uteri .. .. .	31
D. CANCER OF THE MOUTH, NASOPHARYNX, LARYNX AND OESOPHAGUS	33
E. CANCER OF THE RECTUM .. .. .	37
F. SARCOMA .. .. .	39
G. TELERADIUM THERAPY .. .. .	40
H. NON-MALIGNANT CONDITIONS .. .. .	41
APPENDIX : LIST OF RESEARCH CENTRES AND LOCAL COMMITTEES. ..	43

## INTRODUCTION

As was foreshadowed last year, the present report contains a fuller complement of experimental work than any previous one. The results of the experimental researches recorded here are of the most varied description, ranging from experimental findings in pure physics to facts relating to the reactions of the tissues under irradiation. Many readers will be prepared to find a more ready application of some of the purely physical findings to clinical problems than is possible in the case of the newly discovered biological reactions.

The research work which has been continued for several years at the Strangeways Laboratory, Cambridge, has systematically yielded new information year by year, tending to show that biological effects produced by radiation can be repeated over and over again with a measure of accuracy not always attained in purely physical fields, provided that the most rigorous attempt is made to limit the number of variables operating at one and the same time. Dr. Spear's main contribution in the present issue is one relating to a study upon intensity effects. The reaction of the tissue which he and his colleagues have been using is not a simple function of the dose of energy released in it. They find, in fact, that to get a well recognised effect there is an optimum intensity at which the release of energy may occur. That is to say, the effect is observed with a minimum absorption of energy, provided that the energy is absorbed by the tissue at a particular rate. It has long been known that tissues react differently according to the time intervals over which the physical doses are applied, according to the type of radiation that is