

The future of the chest services / a report by a Sub-Committee of the Standing Medical Advisory Committee.

Contributors

Great Britain. Standing Medical Advisory Committee. Sub-Committee on Chest Clinics.

Central Health Services Council (Great Britain)

Publication/Creation

London : H.M.S.O., 1968.

Persistent URL

<https://wellcomecollection.org/works/un4wd25n>

License and attribution

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

2nd copy

WELLCOME INSTITUTE LIBRARY	
coll.	wellMomec
all	pam
o.	WF200
	1968
	G78f



MINISTRY OF HEALTH
CENTRAL HEALTH SERVICES COUNCIL

The Future of the Chest Services

*A report by a Sub-Committee of the Standing Medical
Advisory Committee*

LONDON
HER MAJESTY'S STATIONERY OFFICE
PRICE 2s. 6d. NET



22501995035

MINISTRY OF HEALTH
CENTRAL HEALTH SERVICES COUNCIL

THE FUTURE
OF THE
CHEST SERVICES



LONDON
HER MAJESTY'S STATIONERY OFFICE
1968

455520

THE FUTURE
OF THE
CHEST SERVICES

WELLCOME INSTITUTE LIBRARY	
Coll.	welM0mec
Call	pam
No.	WF200
	1968
	G78f

STANDING MEDICAL ADVISORY COMMITTEE

Sub-Committee on Chest Clinics

MEMBERS

Professor J. G. SCADDING, M.D., F.R.C.P. (*Chairman*)
Miss C. B. CRANE, M.B., B.S., D.P.H.
A. B. DAVIES, Esq., B.Sc., M.B., Ch.B., L.R.C.P.
W. J. B. GROVES, Esq., F.H.A.
P. KERLEY, Esq., C.V.O., C.B.E., M.D., F.R.C.P., F.F.R.
E. G. SITA LUMSDEN, Esq., M.D., B.Ch., F.R.C.P.
N. C. OSWALD, Esq., M.D., B.Ch., F.R.C.P.
Professor A. B. SEMPLE, C.B.E., V.R.D., M.D., D.P.H., Q.H.P.
V. H. SPRINGETT, Esq., M.D., F.R.C.P.
D. K. STEVENSON, Esq., M.B., Ch.B., M.R.C.P.
R. H. M. STEWART, Esq., M.D.
O. S. TUBBS, Esq., M.A., M.B., B.Ch., F.R.C.S.
R. P. S. HUGHES, Esq., Ministry of Health (*Secretary*)

IN ATTENDANCE

B. DIDSBURY, Esq., M.B., Ch.B., D.P.H.
A. J. ELEY, Esq., M.A., M.B., B.S., D.M.R.D.
D. H. D. BURBRIDGE, Esq., O.B.E., M.R.C.S., L.R.C.P., D.P.H. } *Ministry
of
Health*

STANDING ETHICAL ADVISORY COMMITTEE

1967-1968

Chairman

Dr. J. G. S. [Name]

Dr. C. A. [Name]

Dr. R. [Name]

Dr. J. [Name]

Dr. [Name]

Dr. [Name]

Dr. [Name]

Dr. [Name]

Dr. [Name]

Dr. [Name]

Dr. [Name]

Dr. [Name]

Dr. [Name]

Secretary

Dr. [Name]

Dr. [Name]

Dr. [Name]

CONTENTS

Table of Members	<i>Page</i> iii
Introduction	1
Background to the Report; Administration of Chest Clinics . .	2
Chest Diseases as Causes of Death	3
Evidence	4
The Specialty of Chest diseases and its future	4
Terminology	5
Siting of Chest Departments	5
Medical Staffing of Chest Departments	6
Training	6
Other Professional Staff	7
Special Facilities required in an Out-Patient Chest Department .	7
Radiological Facilities	8
The Role of the Family Doctor	8
The Role of the Local Health Authority and Responsibility for Preventive and After Care Services	8
Provision of Beds	9
Respiratory Function Laboratories	9
Conclusion	10
Appendix A. Bodies Submitting Evidence	11
Appendix B. Extract of a report by the Royal College of Physicians on Special Training in Chest Diseases	12

CONTENTS

Page	Title of Chapter
1	Introduction
2	Background to the Report: A History of Chest Disease
3	Chest Disease as Cause of Death
4	Exposure
5	The Spectrum of Chest Disease and its Impact
6	Pathogenesis
7	History of Chest Disease
8	Medical History of Chest Disease
9	Training
10	Other Professional Staff
11	Special Facilities required in an Institution Chest Department
12	Prognosis and Therapy
13	The Role of the Family Doctor
14	The Role of the Local Health Authority and Responsibility for Treatment and After Care
15	Prognosis of Death
16	Prognosis: Functional Impairment
17	Conclusion
18	Appendix A: Further Supporting Material
19	Appendix B: Extract of a Report by the Health Council
20	References on Special Training in Chest Disease

CENTRAL HEALTH SERVICES COUNCIL

FUTURE OF THE CHEST SERVICES

Introduction

1. In 1960 the Standing Tuberculosis Advisory Committee considered the future of the chest services, and their advice, endorsed by the Central Health Services Council, was circulated with HM(60)44. Their main recommendations were:—

- (i) The chest physician should be a member of the staff of a general hospital.
- (ii) The management of tuberculosis patients should remain a primary duty of the chest physician.
- (iii) The chest physician should work closely with the Medical Officer of Health on the epidemiological and preventive aspects of tuberculosis, and with the general practitioner, social worker and health visitor in helping the patient himself and his family.
- (iv) Appointments in chest diseases should be to the staff of general hospitals and the chest clinic should be integrated into the general out-patient department of the hospital.
- (v) Provision should be made for a chest unit in the planning of new out-patient departments. In new hospitals beds should be available for diseases of the chest, some of them being set aside for cases of tuberculosis. Similar provision should be made in existing general hospitals where possible; otherwise existing suitable sanatoria and chest hospitals could be used as chest departments of nearby hospitals, or run in close association with them.

2. In 1964 the Ministry of Health tried to assess the extent to which Regional Hospital Boards had implemented these recommendations and the associated report of the Central Health Services Council. Results of the survey showed that the policy was being carried out to varying degrees in different parts of the country, but some uncertainties remained:—

- (a) The recommendation that the clinic should become integrated in the general out-patient department of the hospital and share the general services of that department, had led to differences of interpretation. Chest clinics separate from the hospital had of necessity been self-contained, and had been provided with their own radiological facilities and accommodation for local health authority and clerical staff. Chest clinics would evidently lose some of this autonomy when they were incorporated in a general hospital. To what extent could they share facilities with other clinics in the hospital out-patient department without loss of efficiency? Could the special radiological requirements of a chest clinic be provided effectively by a general radiological department? Was special office accommodation for medical and ancillary, including local health authority, staff required for a chest clinic conducted in a general out-patient department?

- (b) Although HM(60)44 stated that appointments in chest diseases should be to the staff of general hospitals, the question of how far physicians holding such appointments should undertake duties in the field of general medicine was not discussed. Should they continue to confine their activities to chest diseases, or should they undertake also duties in general medicine? The training appropriate for candidates for such appointments would clearly depend upon the answers to these questions.
- (c) The means by which the physician responsible for the care of patients with respiratory disease should collaborate in the epidemiological and preventive aspects of tuberculosis control was left undefined.

3. The Standing Medical Advisory Committee, having considered the future of the chest service in general and these points in particular decided that a Sub-Committee should be set up with the following terms of reference:—

“To consider the general organisation of chest clinics in relation to the rest of the hospital services and to make recommendations”.

Background to the Report

Administration of Chest Clinics

4. At 31st December, 1963, there were in England and Wales the following number of chest clinics:—

(a) situated in and administered with the hospital	...	...	360
(b) in the curtilage of the hospital but administered separately by the Hospital Management Committee	...	...	19
(c) not in the curtilage of the hospital and administered separately by the Hospital Management Committee	...	...	175
			<hr/>
Total	...	554	<hr/>

The 360 chest clinics under (a) are distributed among the various categories of hospitals as follows:—

Acute/mainly acute/partly acute	...	...	...	...	263
Long stay/chronic	...	...	...	...	35
T.B. chest/isolation	...	...	...	...	48
Other	...	...	...	...	14
					<hr/>
Total	...	360			<hr/>

Chest Diseases as Causes of Death

5. Despite the decline in tuberculosis, chest diseases remain the cause of a large number of deaths in England and Wales (see Table below) and in 1964 about 16 per cent of all deaths were attributed to these diseases. There is every reason to suppose that special provision for the treatment of chest diseases will continue to be necessary in the foreseeable future.

TABLE A. NUMBER OF DEATHS FROM CHEST DISEASES, ENGLAND AND WALES

I.C.D. No.	Case of Death	1947	Average 1951-53	1961	1962	1963	1964	1965
001-008	Tuberculosis, respiratory	20,156	9,760	3,002	2,774	2,609	2,209	2,008
010-019	Tuberculosis, other forms	3,394	1,338	332	314	351	275	274
162, 163	Malignant neoplasm of lung and bronchus	9,204	14,148	22,810	23,779	24,434	25,371	26,398
480-483	Influenza	3,310	8,008	7,102	3,309	3,214	1,043	814
490-493	Pneumonia	21,533	21,573	29,979	31,672	36,741	30,092	31,588
763								
500-502	Bronchitis	30,199	31,923	31,263	33,293	35,322	28,740	29,569
	Total ...	87,796	86,750	94,588	95,140	102,681	87,760	90,951
	Deaths from all causes	517,615	516,798	551,752	557,636	572,868	534,737	549,319

TABLE B. NOTIFICATIONS AND DEATHS FROM RESPIRATORY TUBERCULOSIS COMPARED

	1947	Average 1951-53	1961	1962	1963	1964	1965
Notification of respiratory tuberculosis	43,159	41,839	19,051	17,845	16,348	15,019	13,552
Deaths from respiratory tuberculosis	20,156	9,760	3,002	2,774	2,609	2,209	2,008
Percentage of deaths compared with notifications	46.7	23.3	15.07	15.04	15.09	14.07	14.70

TABLE C. NO. OF WORKING DAYS LOST THROUGH BRONCHITIS

Year	53/54	60/61	61/62	62/63	63/64	64/65
Days lost (In millions)	25.62	30.80	No figures Available	39.25	35.78	(Provisional figs.) 36.45

Evidence

6. The Sub-Committee invited evidence by means of a questionnaire which could be amplified if this was wished from interested bodies inside and outside the health service. This evidence was taken into careful consideration before producing this report and a list of bodies who gave evidence is to be found at Appendix A.

The specialty of chest diseases and its future

7. Historically, the specialty of chest diseases has developed by the mingling, not yet complete, of two groups of specialists. The first consisted of those physicians, who, having active interests in the whole of medicine, concerned themselves especially with respiratory disease, and, consequent upon this, with tuberculosis; they inherited a broad clinical tradition going back to Laennec. The second consisted of those who had been concerned principally with the control and treatment of tuberculosis. When the National Health Service was introduced in 1948, most of these were employed by local authorities, upon whom, until that time, responsibility for both treatment and prevention of tuberculosis had rested. This second group, originally called tuberculosis officers, were thus deeply concerned with the preventive and social aspects of medicine. Already by 1948, to a degree varying from area to area, their interests and facilities were extending into the whole field of respiratory disease; and they were beginning to be called "chest physicians" rather than "tuberculosis officers". In many areas, the tuberculosis dispensaries had developed into chest clinics, dealing with a wide range of broncho-pulmonary disease, but usually separate geographically and administratively from general hospitals.

8. Under the National Health Service Act, Local Health Authorities retained responsibility for preventive and after-care measures, while treatment was the concern of Regional Hospital Boards and of general practitioners. The physicians in charge of the chest clinics were now employed primarily by the Regional Hospital Boards, but in most instances, a small proportion of their salaries was paid by the Local Health Authority in recognition of their contribution to preventive and social aspects of tuberculosis work.

9. With the decline in the incidence of tuberculosis, the increase in bronchial carcinoma, and the increasing recognition of the importance of other forms of chronic respiratory disease as causes of morbidity and mortality, the work undertaken in chest clinics has become more varied. The inter-relations between cardiac and pulmonary diseases and the frequency with which general systemic diseases involve the lungs lead to the appearance in chest clinics of patients with a wide range of diseases, more especially since the chest clinic is the usual place of reference for those persons who have been found at routine chest radiographic examinations to have actual or suspected abnormalities.

10. Another trend that must be noted is one that affects, in some degree, all specialties. This is the increasing complexity of the procedures which have entered into current practice, both in investigation and in treatment. Physicians specialising in respiratory disease in the past have looked to radiology and

Unable to display this page

15. For certain purposes, notably in relation to the control of tuberculosis, it may be desirable in some areas, especially those of scattered population, to hold clinic sessions in branch clinics at a distance from the main department of the general hospital. Wherever a branch clinic session is held, radiological facilities must be available, and only when branch clinics in smaller hospitals are both well equipped and meet a local need is it reasonable to retain them. The need for such branch clinics should be assessed critically, but until district general hospitals are established throughout the country some will continue to be necessary.

16. Certain social and preventive work, e.g. B.C.G. vaccination and some of the work of medical social workers and health visitors can be carried out away from the district general hospital, possibly on local authority premises.

17. There is a place for specialised Thoracic units, to which patients presenting special diagnostic problems or requiring specialised treatment including major surgery can be referred. At least one of these will be required in each Region.

Medical Staffing of Chest Departments

18. The medical staffing of the chest department of a general hospital should follow the general pattern of staffing appropriate to other special departments. The consultant should be called "Physician to the Chest Department". Just as physicians in other departments undertake their share of general medical work, so should the Physician to the Chest Department, though the proportion of his time devoted to each of these activities may be expected to vary according to local circumstances. Normally, he should take his share of general emergency admissions. It is to be expected that with the increasing tendency for all physicians to develop some special expertise, there will be the freest consultation on clinical problems between physicians to a district hospital.

19. It must be realised that the implementation of this recommendation in relation to staffing may not be possible or desirable with existing appointments, and in some instances may have to await a new appointment.

20. Although in most instances major thoracic surgery will be performed in specialised centres (para. 17) it is essential that arrangements are made for a thoracic surgeon to be available for consultation in all Chest Departments.

Training

21. The Sub-Committee agree with the recommendations of the report of the Royal College of Physicians (see appendix B). This sets out a schedule of training in "general medicine with special training in chest diseases". We wish to emphasise certain points. Since it is likely that Senior Registrar posts in the future will combine chest disease with general medicine, appointments of this sort, as well as those solely in chest disease, should be recognised as appropriate training. Such appointments may entail concurrent or rotating duties in chest disease and general medicine, or even in another relevant specialty, such as cardiology. We endorse the requirements for at least six months' experience

in tuberculosis including its public health aspects. We must emphasise the desirability of as much flexibility as possible in interpreting the requirements of these schedules. We also wish to emphasise that the training of a physician in respiratory disease must include clinical respiratory physiology and experience of its application both in the investigation of disease and in the management of respiratory insufficiency. In view of the advances that have been made in recent years, courses in this subject should be provided at suitable centres to improve and maintain understanding of it among physicians.

Other Professional Staff

22. Health visitors, and social workers employed by either the Hospital Authority or the Local Health Authority, will continue to play an important part in the work of the chest department. Greater use of their skill can with advantage be made where patients suffer from chest diseases other than tuberculosis. They should attend the out-patient clinic sessions, but they should not be employed on routine out-patient department clinic duties which a nurse is well able to perform.

23. Continuity of secretarial services, desirable in all departments, is essential in a Chest Department in view of its special responsibility for collaboration with the Local Health Authority in preventive and social aspects of disease. Whatever method of providing such services is adopted, this continuity must be ensured.

Special Facilities Required in an Out-Patient Chest Department

24. The special requirements of a Chest Out-Patient Department include the immediate availability of radiographs, facilities for viewing them, and apparatus for simple tests of ventilatory function. Apart from these, the consulting room accommodation presents no special requirements, and where the time-table of clinics permits, can be shared with other clinics. Appropriate accommodation within the department should be provided for the health visitor, the medical social worker and clerical staff, and in all but the smallest departments an office for the sole use of the consultant or consultants. It should be remembered that health visitors and social workers will interview patients and therefore require a certain amount of privacy. The Sub-Committee are in agreement that if these requirements are met the Chest Out-Patient Department can be incorporated in the main Out-Patient Department without loss of efficiency.

25. Unless very exceptional circumstances dictate otherwise, the best method of record keeping will be to keep Chest Department records with other hospital records, which should ideally be situated within very easy access of the Out-Patient Department. No matter how easy such access it might occasionally be desirable in special local circumstances for a skeleton second record for tuberculosis cases to be kept in or near the consultants' office for rapid reference.

26. Provisions should be made for more detailed studies of respiratory function when required for the investigation of selected out-patients. This will generally mean reference to the laboratory mentioned in paragraph 37.

Radiological Facilities

27. The Sub-Committee note that according to the latest available figures only 486 of 554 Chest Out-Patient Departments had X-ray facilities. The 12 per cent without were mainly the isolated chest clinics. It is however essential for radiological facilities to be available to a chest physician during clinic sessions so that he can read the films immediately. This need will be adequately met if priority in the use of conveniently sited apparatus and the services of a radiographer are given to the Chest Out-Patient Department. Facilities will also be required for bronchograms and other special chest investigations. If these arrangements can be made there is no need for the chest department to have its own radiological equipment. The radiologist will retain overall responsibility for all the radiological apparatus.

28. The Sub-Committee note that the agreed policy is to reduce the number of external mass miniature radiography units as radiology departments are built up in district general hospitals. It is important that this should not lead to any reduction in the facilities for chest radiology available to family doctors, for whom direct and ready access to such facilities should be made available in all areas.

The Role of the Family Doctor

29. The family doctor will continue to be the primary source of referral to the chest department. He is responsible for the home care of discharged or chronically ill patients. The total medical care of patients with chronic chest diseases required complementary activities by the family doctor, the Medical Officer of Health and the Physician to the Chest Department, shared as they may agree together, whether the condition is tuberculous or not. Exchange of information between them must be made easy and rapid.

30. Arrangements should be made to facilitate further investigation when abnormalities have been found in a patient referred for chest X-ray by his family doctor. The doctor may indicate in the reference letter that he wishes any abnormality found to be investigated appropriately; if not, a provisional appointment may be made with the chest physician or other appropriate consultant, subject to the agreement of the family doctor; requests for out-patient examination may be checked against the abnormal reports and suitable action taken where no request for examination is received within 7-10 days. It is of over-riding importance in the interests of the patient and the community that known or suspected cases of tuberculosis are followed up.

The Role of the Local Health Authority and Responsibility for Preventive and After Care Services

31. The following should be the main responsibilities of the Local Health Authority: B.C.G. vaccination of children of school age and of any other group found to be at risk, epidemiology, the tracing of contacts, and the provision of health visitors or in some cases social workers to help in the arrangements for patients suffering from either tuberculosis or other chronic incapacitating chest conditions at home.

32. The Physician to the Chest Department should continue to carry the responsibility for the personal aspects of preventive work such as examination of contacts and the provision of advice to them and their families. It will continue to be important for the Medical Officer of Health and the Physician to the Chest Department to work closely together in their area and to make their own arrangements according to local needs. These responsibilities should be recognised in the Physician's contract but, in the Sub-Committee's view, do not constitute a valid reason for payment of part of his salary by the Local Health Authority as is still customary in some areas.

33. Arrangements for the use of the health visiting service must vary according to local circumstances, and special notice must be taken of the rapid development in attachments of health visitors to general practices. More closely integrated schemes are usually possible in urban than in rural areas. An integrated service requires liaison between hospital, local authority, and family doctor; in many urban areas this is facilitated by the whole- or part-time attachment to the chest department of a health visitor. This provides valuable continuity and the Sub-Committee would wish such attachments to continue where they are working well with their scope widened to embrace all chest diseases. In other areas the work must be done by general duty health visitors, in which case one of their number should be given special responsibility for maintaining liaison with the Chest Department.

Provision of Beds

34. An appropriate number of beds should be made available in the district general hospital for patients suffering from respiratory illnesses, including tuberculosis. Infectious tuberculosis patients require to be nursed in isolation. In our view, isolation accommodation for this purpose may appropriately be provided within the general hospital. In some circumstances, however, it may be desirable to provide part of this accommodation elsewhere; and some accommodation outside the general hospital may be needed for long-stay patients.

35. It should be recognised that the demand for beds, especially for chronic non-tuberculosis respiratory disease, is subject to wide seasonal variations and also varies considerably from area to area.

Respiratory Function Laboratories

36. All general hospitals should provide facilities for the tests of respiratory function required for the routine assessment of chronic broncho-pulmonary disease and for the management of respiratory insufficiency and failure. These facilities should include both equipment and technical assistance. The manner in which they will be provided cannot be rigidly prescribed, especially in view of the current changes in the specialty of respiratory disease and of the interrelation of these investigations with others in collateral fields. The apparatus required for the management of acute respiratory failure is at present under the control of the Department of Anaesthetics in some hospitals, while in others the Physician to the Chest Department assumes this responsibility. It seems to

us appropriate that, as more physicians become experienced in this field, they should assume increasing responsibility. The more elaborate tests of respiratory function are needed only in special cases and rarely in acute conditions. There should be at least one centre in each Region to which appropriate cases can be referred for such special study.

Conclusion

37. This report has mainly endorsed and expanded that circulated with HM(60)44. It is the Sub-Committee's considered opinion that the organisation should be on the lines here described. In particular they hope that the evolution of chest clinics into Chest Departments of general hospitals will provide a basis for the best standards of service to the community by improving facilities for clinical work especially in non-tuberculous broncho-pulmonary disease while retaining the advantages which have come from the especially close association which has arisen between the hospital and the local authority services in this specialty.

Acknowledgment;

The Sub-Committee wishes to thank the Royal College of Physicians for authority to reprint their recommendations which appear at Appendix B.

APPENDIX A

**BODIES SUBMITTING EVIDENCE TO SUB-COMMITTEE
ON CHEST CLINICS**

1. Faculty of Radiologists
2. Teaching Hospitals Association
3. Institute of Medical Social Workers
4. British Medical Association
5. Joint Tuberculosis Council
6. Society of Medical Officers of Health
7. Royal College of Physicians
8. College of General Practitioners
9. Association of Hospital Management Committees
10. County Councils Association
11. Association of Municipal Corporations
12. Surrey Chest Physicians
13. Chest and Heart Association
14. Leeds Regional Hospital Board
15. Sheffield Regional Hospital Board
16. North West Metropolitan Regional Hospital Board
17. North East Metropolitan Regional Hospital Board
18. South West Metropolitan Regional Hospital Board
19. South East Metropolitan Regional Hospital Board
20. Wessex Regional Hospital Board
21. Oxford Regional Hospital Board
22. Welsh Hospital Board
23. Birmingham Regional Hospital Board
24. Liverpool Regional Hospital Board
25. Manchester Regional Hospital Board

APPENDIX B

9. GENERAL MEDICINE WITH SPECIAL TRAINING IN CHEST DISEASES

A. The Pre-Registration Year

(At present 12 months: 6 months Medicine, 6 months Surgery)

B. Post Registration

For 12 months

Hospital Posts, that is House Physician, House Surgeon or Resident in a Special Hospital or the Special Department of a General Hospital—
Or Laboratory Posts in Sciences basic to Medicine, or a research post.

For two years

General Clinical Medicine at Registrar or equivalent level.

For three years

At Registrar (or equivalent level) in Medicine or Chest Diseases with at least two years as Senior Registrar (or equivalent appointment) in Chest Diseases. This period should include at least six months' experience in Tuberculosis and its public health aspects.

- C. All appointments after a certain date to be agreed would be in hospitals approved for training in Chest Diseases and General Medicine respectively. In general all "University Hospitals" would be approved, and arrangements would be made for granting approval to other hospitals and institutions. For many consultant posts rotation between "University" and other hospitals at some stage during the training years is an advantage.
- D. A year can with advantage be spent in research or other special experience at home or abroad at some stage, and no strict sequence of posts need be observed before appointment to a Senior Registrarship or equivalent post. Research may be pursued contemporaneously with registrar experience.
- E. Time spent in General Practice or in working overseas or in the medical branch of one of the Services may be recognised as making up part of the training.

Printed in England for Her Majesty's Stationery Office
by McCorquodale Printers (Crewe) Ltd., Frances Street, Crewe.



1. The first part of the book is devoted to a general survey of the subject.

2. The second part is devoted to a detailed study of the various aspects of the subject.

3. The third part is devoted to a study of the various methods of research.

4. The fourth part is devoted to a study of the various results of research.

5. The fifth part is devoted to a study of the various applications of the subject.

6. The sixth part is devoted to a study of the various problems connected with the subject.

7. The seventh part is devoted to a study of the various theories of the subject.

8. The eighth part is devoted to a study of the various facts of the subject.

9. The ninth part is devoted to a study of the various laws of the subject.

10. The tenth part is devoted to a study of the various principles of the subject.

11. The eleventh part is devoted to a study of the various rules of the subject.

12. The twelfth part is devoted to a study of the various maxims of the subject.

13. The thirteenth part is devoted to a study of the various axioms of the subject.

14. The fourteenth part is devoted to a study of the various postulates of the subject.

15. The fifteenth part is devoted to a study of the various hypotheses of the subject.

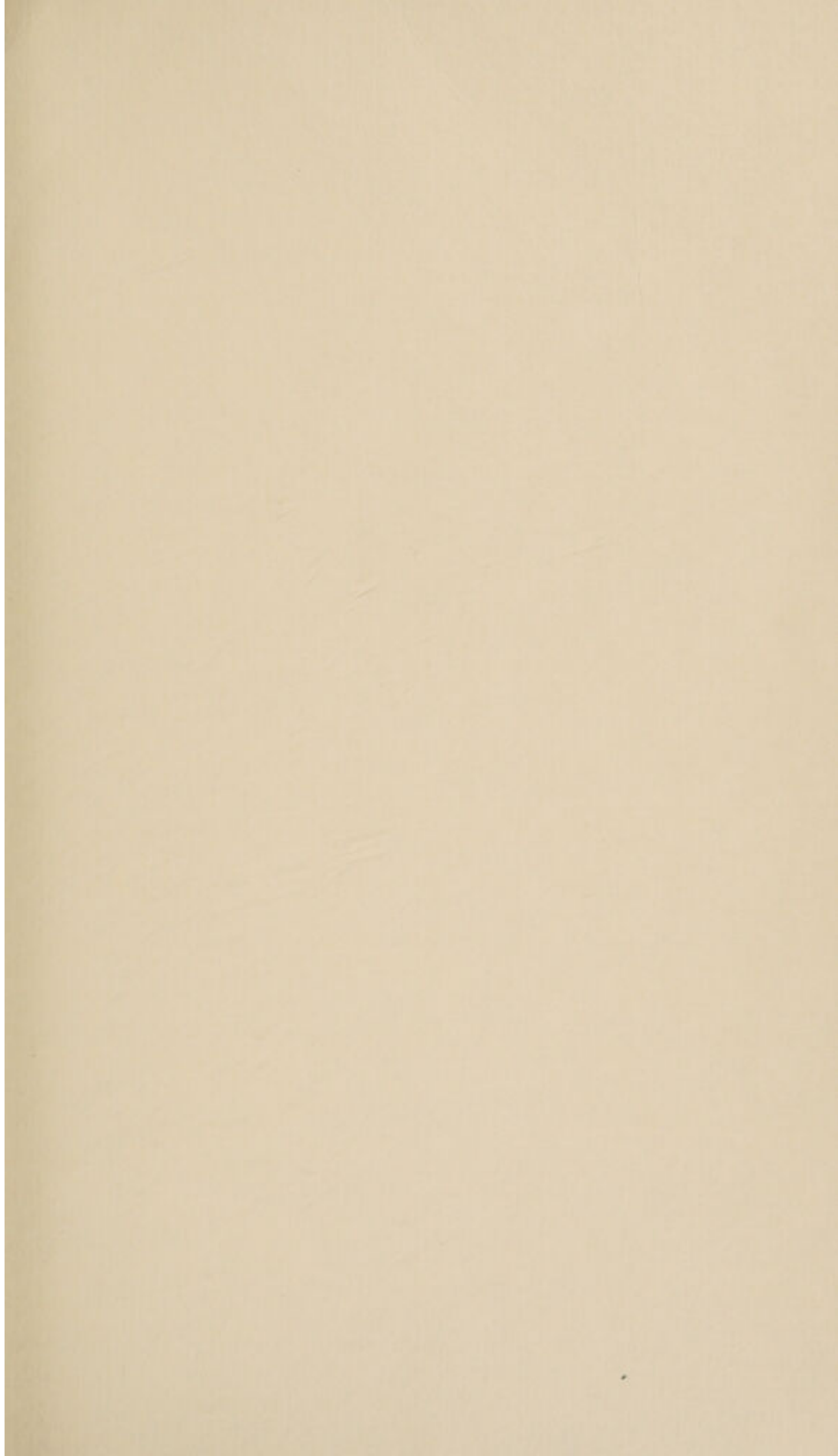
16. The sixteenth part is devoted to a study of the various theories of the subject.

17. The seventeenth part is devoted to a study of the various facts of the subject.

18. The eighteenth part is devoted to a study of the various laws of the subject.

19. The nineteenth part is devoted to a study of the various principles of the subject.

20. The twentieth part is devoted to a study of the various rules of the subject.



© *Crown copyright* 1968

Published by
HER MAJESTY'S STATIONERY OFFICE

To be purchased from
49 High Holborn, London, w.c.1
423 Oxford Street, London, w.1
13A Castle Street, Edinburgh 2
109 St. Mary Street, Cardiff cf1 1JW
Brazennose Street, Manchester 2
50 Fairfax Street, Bristol 1
258-259 Broad Street, Birmingham 1
7-11 Linenhall Street, Belfast BT2 8AY
or through any bookseller