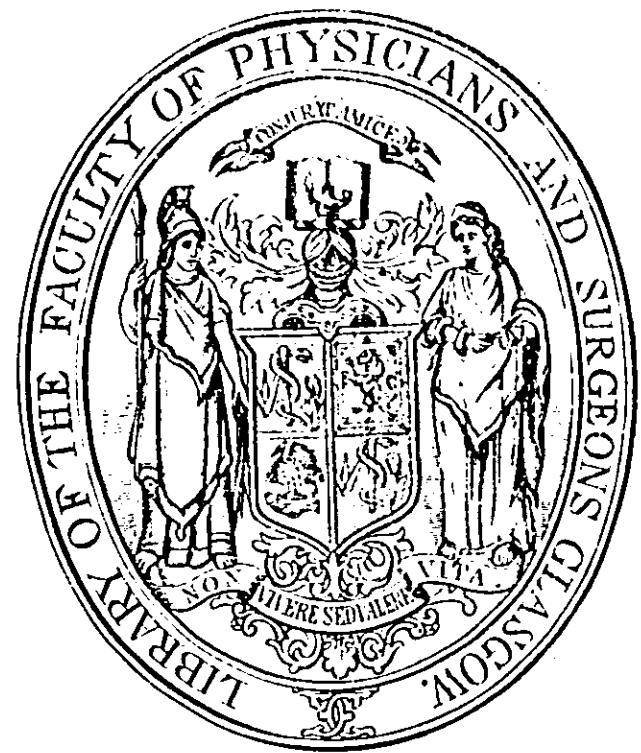
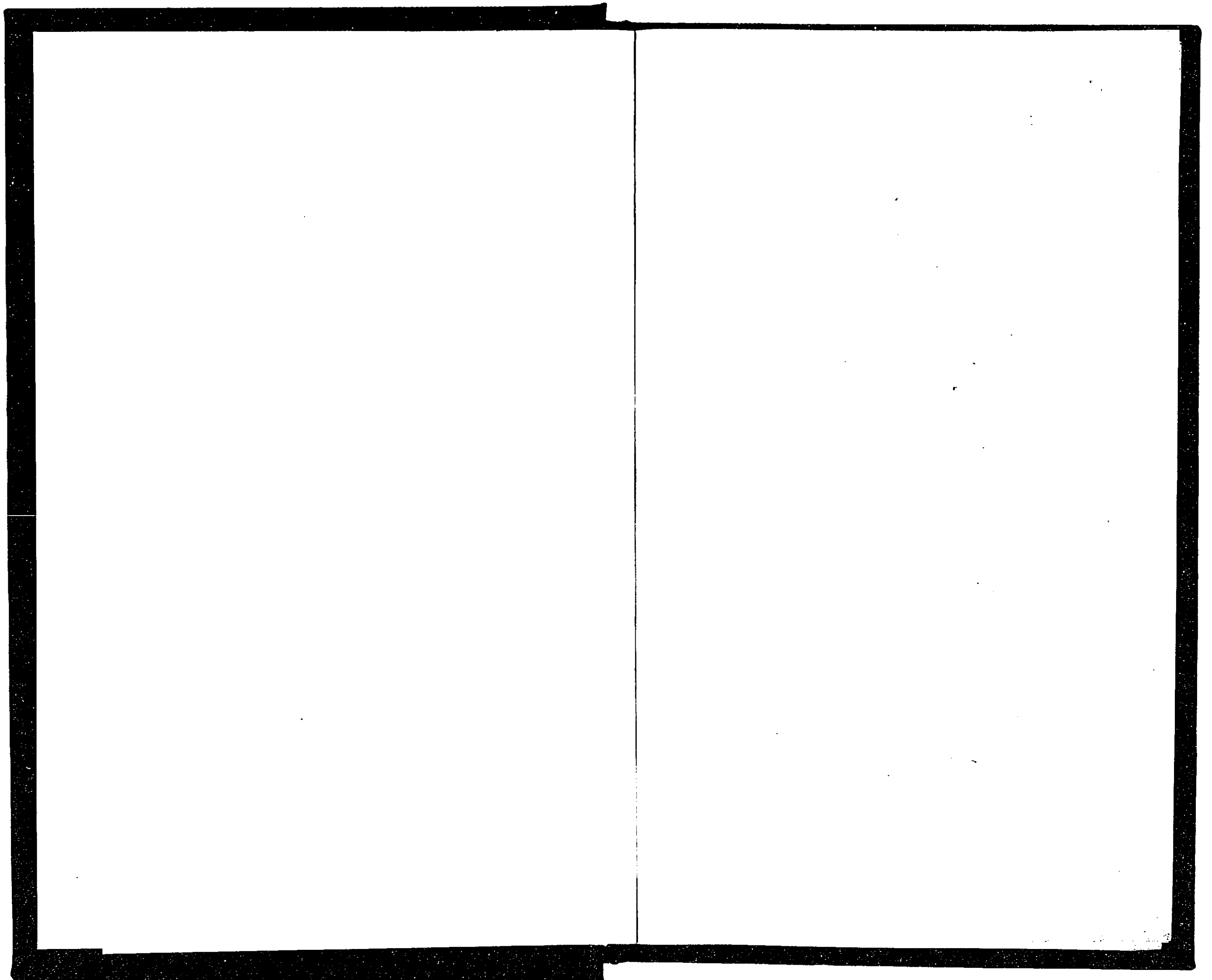


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REPORT
OF THE
FOURTH CONGRESS
OF THE
Sanitary Institute of Great Britain

HELD AT

EXETER, SEPTEMBER 1880

BEING

VOLUME II. OF THE TRANSACTIONS

EDITORS { HENRY C. BURDETT, F.S.S.
 { F. DE CHAUMONT, M.D., F.R.S.

LONDON
OFFICE OF THE INSTITUTE : 9 CONDUIT STREET, W.
1880

LONDON: PRINTED BY
 SPOTTISWOODE AND CO., NEW-STREET SQUARE
 AND PARLIAMENT STREET

EDITORS' PREFACE.

THE publication of this, the second volume of the Transactions of the Sanitary Institute, has been somewhat delayed, owing to the difficulties incidental to the correction of numerous papers by authors who reside, not only in this country, but in America and elsewhere. The present volume contains several papers of interest, and important information will be found in the reports of the discussions which followed many of them. If those who desire to read papers at the next Congress will send their MS. to the Secretary of the Sanitary Institute on or before August 15, 1881, they will secure a juster consideration of the subjects in which they are interested, and will materially promote the success of the different sections.

The fourth congress of the Sanitary Institute was held at Exeter from September 21st to 26th, 1880. It may certainly be justly asserted that it was the most successful of all the meetings held since the foundation of the Institute, the genuine interest which it excited, not only in Exeter itself, but throughout the south-west district of England, was most encouraging. The Right Honourable Earl Fortescue proved a most excellent president. The Lord Bishop of Exeter, the Mayor (W. H. Ellis, Esq.), the High Sheriff, Mr. H. Stafford Northcote, M.P., and the nobility, gentry, and municipalities of Devonshire all combined to promote the success of the Sanitary Congress. The Abattoirs, which had been recently erected in one of the poorest quarters of the city, were specially prepared for the Exhibition, and the approaches to them were planted with trees and evergreens. One of them, an open space in the low

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Library, National Institute of Public Health	

part of the city, was converted into a garden at great expense.* By these means the situation, the character, and the sanitary surroundings of the Exhibition were happily designed to teach a lesson to the poorer inhabitants, and one of the first advantages of the Congress was to benefit directly a crowded district, the inhabitants of which were thus taught how much good could be effected by the transformation of this locality from a condition of filth and disorder to one of cleanliness and comfort. It is to be hoped that this wise action of the Corporation of Exeter will help to arouse the whole of the inhabitants to the importance and the practicability of wholesome sanitary surroundings.

The Members of the Institute were introduced to Exeter at a luncheon in the Guildhall, where the Mayor, supported by the President, the member for the City, the Sheriff and the Members of the Corporation, extended to the Congress a hearty welcome. From the Guildhall a procession, led by the Sergeant-at-Mace and the Sword-bearer, proceeded to the Abattoirs to open the Exhibition. In the evening of the same day the President delivered his address to a crowded audience at the Victoria Hall.

The business of the Congress was arranged in sections, as at Croydon, and addresses were delivered in each by the respective Presidents;—Professor de Chaumont, M.D., F.R.S.; Mr. R. Rawlinson, C.E., C.B.; and Sir Antonio Brady. A *conversazione*, given by the Bishop and Mrs. Temple at the Palace, a dinner by the Mayor, W. H. Ellis, Esq. (whose untiring exertions greatly added to the success of the meeting), and a public dinner, were largely attended, and each and all of them passed off with much *éclat*. On Saturday Dr. H. C. Bartlett delivered an address to the working classes in the Victoria Hall.

At the concluding business meeting, the Right Hon. Sir Stafford Northcote, M.P., made an important speech, in which he laid stress on the relations of the Government and Parliament to sanitary reform and improvements. At this meeting the following resolutions were adopted:

(a.) That it is desirable to move the Privy Council to allow the days of absence from school of children suffering from infectious

* The Council have determined to maintain this garden permanently.

diseases, or in whose family infectious diseases exist, when duly testified by a registered medical practitioner, to be deducted from the statutory number of days required to qualify them for presentation for examination by the Government School Inspectors.

(b.) That in the opinion of this meeting the system of examination in sanitary knowledge introduced by the Sanitary Institute of Great Britain should be further extended and supported.

It was suggested that in future arrangements should be made for holding an examination during the sittings of the Congress in the towns where the meetings were held. It is hoped this idea may be carried out with success.

The sections were divided into:—I. Sanitary Science and Preventive Medicine; II. Engineering and Sanitary Construction; III. Meteorology and Geology. Each section was well attended, the papers were many of them of much practical importance, and the discussions were more animated and better sustained than at any previous meeting.

We cannot with justice withhold an expression of our feeling of indebtedness to all who assisted in making the Exeter Congress so great a success. The hearty thanks of the Institute are due to the Bishop, the Mayor and Corporation, the Sheriff, and the citizens generally for the cordial welcome they extended to their visitors. Nothing could exceed the kindness and hospitality which one and all experienced, and no words can adequately express the general feeling of gratification and pleasure which the remembrance of this visit to Exeter will always recall to the minds of everyone who took part in the Congress.

The Local Honorary Secretaries, Messrs. Domville and Boulnois, deserve high praise for the admirable manner in which their really arduous duties were performed. Finally, the usefulness of the Congress was greatly extended and promoted by the full and excellent reports which the whole of the local and many of the metropolitan papers gave of the proceedings. In this connection we may be allowed to add that the Registrar, Mr. G. J. Symons, F.R.S., rendered material service by his untiring industry, powers of organisation, and ready appreciation of the various matters which called for his unceasing attention throughout the meeting; and to him belongs the credit of much of the success to which we have already referred.

Once again it is necessary that we should state that the fact of a paper being printed does not commit the Council, the Editors, any individual member (except the author), or the Sanitary Institute collectively, to the views therein expressed. For all such opinions the author of each paper is alone responsible.

* * It will be noticed that the Calendar is not included in the present volume. For the future it will be published separately at the commencement of each year.

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CHADWICK, EDWIN.
DE CHAUMONT, DR. FRANCIS S. B. F.
DECROIX, M.
DOMENICHETTI, DR. R.
FORTESCUE, EARL.
FOSTER, GEORGE A.
GRANTHAM, R. B.
JONES, LIEUTENANT-COLONEL ALFRED E.
LAKE, W. C., DR.
LEE, RICHARD, JUNR.
NOURSE, W. E. C.
PERKINS, FRANK P.
RAWLINSON, ROBERT.
RICHARDSON, DR. B. W.
SCOTT, MAJOR-GENERAL H. Y. D.
SLADE-KING, DR. EDWYN.
STEPHENSON, F. C.
SYMONS, G. J.
WARING, COLONEL G. E.
WHITE, WILLIAM.
WOODMAN, JOHN.
WOODMAN, DR. W. R.

THE SANITARY INSTITUTE OF GREAT BRITAIN.

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HIS GRACE THE DUKE OF NORTHUMBERLAND.

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RIGHT HON. THE EARL OF SHAFTESBURY, K.G.
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CAPT. DOUGLAS GALTON, C.B., F.R.S.	G. J. SYMONS, F.R.S., <i>Registrar.</i>
	ERNEST TURNER, F.R.I.B.A.
	GEORGE WILSON, M.A., M.D.

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MESSRS. DRUMMOND, 18, Spring Gardens, S.W.

SECRETARY.

MR. E. WHITE WALLIS, F.M.S.

OFFICES.

9 CONDUIT STREET, REGENT STREET, LONDON, W.

OBJECTS OF THE INSTITUTE.

To devote itself to the advancement of Sanitary Science and the diffusion of knowledge relating thereto.

To examine and to grant Certificates of Competence to Local Surveyors, to Inspectors of Nuisances, and to persons desirous of becoming such or of obtaining the Certificate. The Examinations shall be held at such times and places as the Council may direct.

A Board of Examiners shall be appointed by the Council; such Board shall consist of gentlemen representing Medical, Chemical, and Sanitary Science, Engineering, Architecture, and Sanitary Jurisprudence.

The Examination for Local Surveyors shall include a competent knowledge of the Statutes relating to Sanitary Authorities, of Sanitary Science and Construction, and of Engineering.

The Examination for Inspectors of Nuisances shall comprise the elements of Sanitary Science, together with Sanitary Construction, and the Statutes relating to the prevention of disease and the suppression of nuisances injurious to health.

Fees shall be charged for the Examinations, and a Certificate of Competence, signed by the Examiners, shall be granted to successful candidates, entitling them to be designated as "Certificated by the Sanitary Institute of Great Britain."

The Institute shall take such steps as may be within its power to obtain a complete registration of sickness, especially of preventable diseases.

The Institute shall endeavour to secure the services of medical men and others specially qualified to give lectures on subjects relating to the prevention and spread of disease.

The Institute shall encourage the formation of classes for technical instruction in Sanitary Science in such a way as may seem advisable to the Council.

Exhibitions of Sanitary Apparatus and Appliances shall be held from time to time as the Council may direct.

Fellows, Members, Associates, and Subscribers shall have the

right of Free Admission to the Exhibitions of the Institute whenever they are open. All fees payable by Exhibitors and the Public shall be fixed by the Council and belong to the Institute.

A Catalogue shall be published under the direction of the Council as a permanent record of the Exhibitions.

A Library shall be formed in connection with the Institute.

A Congress shall be held by the Institute for the consideration of subjects relating to Hygiene at such times and places as the Council may direct.

PAPERS AND DISCUSSIONS.

AUTHORS are reminded that the acceptance of Papers, and the days on which they are to be read, are as far as possible determined by the Council before the beginning of each Congress. The Council reserve the right of refusing any Papers sent in; and in the case of those accepted, the reading of them must depend upon the time at the disposal of the Council. No previously published Paper can be read. Papers read at the Congress cannot be published by the Authors, except by permission of the Council. The Council reserve to themselves the privilege of printing any Paper read at the Congress, either wholly or in part; or of refraining from the publication thereof, if they see fit. Papers are limited to twenty minutes in reading, and the discussion upon them to ten minutes for each speaker. In order to give an opportunity to the Council of doing justice to the several communications, and to assist the Editors of the Transactions, each Author should prepare an abstract of his Paper and send it, together with the original manuscript, by book-post, *on or before August 15* in each year, addressed to the Secretary, Sanitary Institute of Great Britain, 9, Conduit Street, Regent Street, London, W.

Authors whose Papers have been received and accepted will be furnished with printed copies before the commencement of the Congress.

CONGRESSES AND OFFICERS.

TABLE showing the places at which the Congresses of the Sanitary Institute of Great Britain have been held; with Presidents, Presidents of Sections, and Local Honorary Secretaries and Treasurers.

PRESIDENTS.	PRESIDENTS OF SECTIONS.	LOCAL HONORARY SECRETARIES AND TREASURERS.
1877.—B. W. RICHARDSON, LL.D., M.D., F.R.S., Leamington, October.	EDWIN CHADWICK, C.D. GEORGE WILSON, M.D., M.A., F.C.S. BRUDENELL CARTER, F.R.C.S.	JAS. THOMPSON, M.D. JOSEPH S. BALY, F.C.S. T. H. THORNE, J.P.
1878.—EDWIN CHADWICK, C.B., Stafford, October.	B. W. RICHARDSON, M.D., LL.D., F.R.S. HENRY DAY, M.D., F.R.C.P.	WM. ELLIS CLENDINEN. H. B. LIVINGSTON. THOMAS WOOD.
1879.—B. W. RICHARDSON, LL.D., M.D., F.R.S., Croydon, October.	ALFRED CARPENTER, M.D., C.S.S. Camb. CAPTAIN DOUGLAS GALTON, R.E., C.B., F.R.S. G. J. SYMONS, F.R.S.	H. J. STRONG, M.D. ROBERT HALL. SAMUEL LEE RYMER.
1880.—THE RIGHT HON. EARL FORTESCUE, Exeter, September.	PROFESSOR DE CHAUMONT, M.D., F.R.S. R. RAWLINSON, Esq., C.E., C.B. SIR ANTONIO BRADY.	E. J. DOMVILLE, M.R.C.S.E. H. P. BOULNOIS, M. INST. C.E. W. G. ROGERS.

EXETER CONGRESS.

VICE-PRESIDENTS.

RIGHT HON. THE EARL OF DEVON.	THE HON. L. A. ADDINGTON, J.P., Sidmouth.
RIGHT REV. THE LORD BISHOP OF EXETER.	W. H. PETERS, J.P., Harefield.
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RIGHT HON. LORD POLTIMORE	JOHN DAW, Exeter.
RIGHT HON. LORD HALDON.	COL. DREWE, C.B., Honiton.
RIGHT HON. SIR STAFFORD NORTHCOTE, BART., G.C.B., M.P.	D. R. SCRATTON, J.P., Ogwell.
SIR BRUCE CHICHESTER, BART.	MARK FARRANT, Chairman of St. Thomas's Local Board.
SIR LYDSTONE NEWMAN, BART.	D. W. R. BUCHANAN, Chairman of Torquay Local Board.
SIR HENRY SEALE, BART. (Mayor of Dartmouth).	JOSHUA DIXON, J.P., Winslade.
SIR GEORGE STUCLEY, BART.	RALPH SANDERS, J.P., Exeter.
SIR HENRY PEEK, BART., M.P.	J. C. BOWRING, J.P., Windsor.
E. JOHNSON, M.P.	LIEUT.-COL. J. TANNER DAVY, J.P., South Molton.
H. STAFFORD NORTHCOTE, M.P.	REV. J. VOWLER TANNER, J.P., Eggesford.
LIEUT.-COL. WALROND, M.P.	T. CAREW, J.P., Tiverton.
THE MAYOR OF BIDEFORD.	J. FLEMING, J.P., Bigadon.
THE MAYOR OF DEVONPORT.	MAJOR-GENERAL PHILLIPPS TREBY, J.P., Plympton.
THE MAYOR OF EXETER.	G. C. DAVIE, J.P., South Tawton.
THE MAYOR OF HONITON.	REV. TREASURER HAWKER, Berryarbor.
THE MAYOR OF OKEHAMPTON.	LIEUT.-COL. WHITE-THOMSON, J.P., Exbourne.
THE MAYOR OF PLYMOUTH.	A. WYATT EDGELL, J.P., F.G.S., Cowley.
THE MAYOR OF TOTNES.	
THE HIGH SHERIFF OF DEVON (REGINALD KELLY, Esq.)	
THE HIGH SHERIFF OF EXETER (SAMUEL JONES, Esq.)	

LOCAL GENERAL COMMITTEE.

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THE MEMBERS OF THE TOWN COUNCIL OF EXETER.

LINNINGTON ASH, M.O.H., Hols- worthy.	DE CASTRO F. LYNE, J.P., Exeter.
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E. A. BRASH, M.O.H., Exeter.	W. MANNING, South Molton.
W. BROCK, J.P.	W. MORTIMER, J.P., Exeter.
M. LEWIS BROWN, J.P., Bishop- steignton.	G. NEUMANN, J.P., Awliscombe.
J. C. BRYCE, J.P., Bystock.	H. E. NORRIS, J.P., Charmouth.
S. BUDD, M.D., Exeter.	W. JUPP PIKE, Chairman Dawlish Local Board.
A. C. CHICHESTER, J.P., Alphing- ton.	J. G. PINNEY, Axminster.
C. R. COLLINS, J.P., Hele.	REV. W. D. PITMAN, Aveton Gif- ford.
W. COTTON, J.P.	T. H. PULLIN, M.D., M.O.H., Sid- mouth.
W. CUTHBERTSON, J.P., Cross- mead.	E. ROUSE, Bideford.
E. ELLIS, C.E., Dawlish.	R. B. RUSSELL, Barnstaple.
G. EVANS, M.O.H., Seaton.	C. SNAPE, M.D., M.O.H., Morchard.
G. FRANKLIN, Exeter.	E. F. STUDD, J.P., Oxtou.
REV. W. GILL, Tavistock.	T. G. TEMPLER, J.P., Teignmouth.
J. D. HARRIS, M.O.H., Exeter.	J. TREHANE, J.P., Exeter.
N. HATHERLEY, M.D., J.P., South Molton.	C. A. W. TROYTE, J.P., Huntsham.
W. H. HEYGATE, M.O.H., Crediton.	G. TURNER, Teignmouth.
P. HOCKIN (Town Clerk), Dart- mouth.	G. T. TWEED (Town Clerk), Honi- ton.
J. L. HODGE, C.E., Plymouth.	E. VIVIAN, J.P., Torquay.
P. Q. KARKEEK, M.O.H., Torquay.	LIEUT.-COL. WISE, J.P., Kings- bridge.
G. C. KINGDON, Exeter.	HENRY WOOLLCOMBE, J.P., Ash- bury.
J. KNAPMAN, J.P., Exeter.	J. WOOD, J.P., Exmouth.

SANITARY INSTITUTE OF GREAT BRITAIN.

FORMATION OF THE INSTITUTE.

THE increasing importance attached to Sanitary Science, and the recognized position it is assuming in the public mind, appeared to the promoters of the Sanitary Institute fully to justify the formation of a National Society, the object of which should be to devote itself *exclusively* to the advancement of all subjects bearing upon Public Health. In furtherance of the object, a meeting was held at St. James's Hall, on the 13th July, 1876, at which His Grace the Duke of Northumberland presided, when it was unanimously resolved:—

First—'That in the opinion of this meeting the Sanitary condition of this country is still very unsatisfactory and that further legislation is necessary with a view to its improvement; and that for the purpose of collecting and imparting information upon all matters connected with the subject of "Public Health," a Society be now formed to be styled "The Sanitary Institute of Great Britain."'

Second—'That the gentlemen whose names are appended be requested to act as a Committee (with power to add to their number) for the purpose of carrying out the previous resolution and of reporting to an adjourned public meeting to be held in the second week in October next.'

An adjourned public meeting was held on the 14th of March, 1877, when the report was unanimously adopted, and a Council subsequently appointed to carry it into effect.

The Committee appointed to report upon the subject considered it would add greatly to the usefulness of the Institute if Mayors of Boroughs, Chairmen of Local Boards, Sanitary Authorities, Medical Officers of Health, and all who have to administer the Public Health Acts, would associate themselves with the Institute, either in their individual or corporate capacity, and take part in its proceedings. By thus bringing their united knowledge and experience to bear upon Sanitary matters, the Laws relating to the same would become better known and be more efficiently administered.

Basis of the Constitution of the Institute.

SECTION I.

CHARTER OF INCORPORATION, MEMBERSHIP, AND GOVERNMENT OF THE INSTITUTE.

As soon as practicable a Charter of Incorporation shall be obtained, as it will facilitate some portions of the work of the Institute, more especially the examinations set forth in Section II. Until a Charter is obtained, the examinations shall be continued as heretofore, and a Register of persons certificated as competent to act as Local Surveyors and Inspectors of Nuisances shall be formed.

The Institute shall consist of Fellows, Members, Associates, and Subscribers.

Fellows shall be elected by ballot by the Council, and shall include scientific men of eminence, persons of distinction as Legislators or Administrators, and others who have done noteworthy Sanitary work.

All Fellows (except those who have already become Life Members) shall pay a fee of Ten Guineas on taking up the Fellowship, and such fee shall entitle the Fellow to all the privileges and advantages of the Institute for life without further payment.

Any person proposed by five Fellows or Members, shall be eligible for election as a member of the Institute.

Members shall be elected by ballot by the Council, and shall be eligible to serve on the Council, and to vote at all elections and Meetings of the Institute. The Admission Fee payable by a Member shall be £3 3s., and the Annual Subscription £2 2s.

Medical Officers of Health and Medical Men holding Certificates in Sanitary Science from any University or Medical Corporation shall be entitled to be enrolled as Members of the Institute without Admission Fee.

Members desirous of becoming Life Members may do so on payment of £10 10s. in lieu of the Annual Subscription.

All persons who have passed the Examination and received the Certificate for Local Surveyor from the Institute, shall, by virtue of having so passed, become Members of the Institute upon the payment of Five Guineas (without Annual Subscription) in addition to the fee paid for the Examination and Certificate.

Any one proposed by two persons, either Fellows, Members, or Associates of the Institute shall be eligible to be elected as an Asso-

ciate of the Institute, the election to be by ballot by the Council. The Admission Fee payable by Associates shall be Two Guineas, and the Annual Subscription One Guinea.

All persons who have passed the Examination and received the Certificate for Inspector of Nuisances from the Institute, shall, by virtue of having so passed, become Associates of the Institute upon payment of Three Guineas (without Annual Subscription) in addition to the fee paid for the Examination and Certificate.

Persons of either sex, interested in the advancement of Sanitary Science, shall be entitled to be enrolled as Subscribers on payment of One Guinea annually. Annual Subscribers shall be entitled to attend and to take part in the discussion at all Meetings and Congresses of the Institute, and shall have free admission to the Conversaciones and Exhibitions of Sanitary appliances held in connection with the Institute, so long as they continue to pay their Subscription.

Donors of Ten Guineas and upwards shall be entitled to be enrolled as 'Life Subscribers,' with all the privileges and advantages of Annual Subscribers without further payment.

Subscribers of Half-a-Guinea to any Congress of the Institute shall be entitled to a card of admission to the Meetings, Addresses, Conversazione, Excursions, and Exhibition held in connection with that Congress.

The Institute shall be governed by a President, Vice-Presidents, and a Council of Twenty-four, consisting of Fellows and Members of the Institute, of whom not less than two-thirds shall be Fellows. The Council shall be chosen by the Fellows and Members. One-fourth of the Council shall retire annually, and shall not be eligible for re-election for one year.

The first President of the Institute shall be His Grace the Duke of Northumberland. Future Presidents and Vice-Presidents shall be elected by the Council. The Council shall have the power of electing Honorary Members of the Institute, Honorary Foreign Associates, and Corresponding Members of the Council.

Examination of Local Surveyors and Inspectors of Nuisances.

THE great and increasing importance of the duties devolving upon Local Surveyors and Inspectors of Nuisances, in connection with the various statutes relating to public health, and the Sale of Food and Drugs Acts, has led the Council of the Institute to establish voluntary examinations for Local Surveyors and Inspectors of Nuisances, and for persons desirous of becoming such or of obtaining the certificate of the Institute.

Each examination occupies a portion of two days. On the first day the examination of surveyors is continued for four hours, viz., from 2 to 4, and 6 to 8 p.m., and consists of written papers only. Inspectors of Nuisances have two hours' written examination on the

first day, viz.: from 4 to 6 p.m. On the second day the examination, for both classes, commences at 11 a.m., and is *viva voce*, with one or more questions to be answered in writing *if deemed necessary*. A Certificate of Competence, signed by the examiners, is granted to successful candidates.

As rural sanitary authorities are able under the Public Health Act, 1875, to obtain almost all the powers of urban sanitary authorities, it is not considered advisable to make any distinction in the examination of the two classes of surveyors.

As one person may, under the Public Health Act, 1875, be both Local Surveyor and Inspector of Nuisances, candidates wishing to obtain the double qualification may enter for both examinations on the same occasion.

Candidates are required to furnish to the Council of the Institute satisfactory testimonials as to personal character, and to give two weeks' notice to the Secretary previous to presenting themselves for examination, stating whether they wish to be examined as Surveyors, as Inspectors of Nuisances, or as both. The fee for the examination must be paid to the Secretary, by Post Office order or otherwise, at least six days before the day of examination. On receipt of the fee, a ticket will be forwarded admitting to the examination.

The fees payable for the examination are as follows:—

For Surveyors	£5 5s.
For Inspectors of Nuisances	£2 2s.

Unsuccessful candidates are allowed to present themselves a second time for one fee. Examinations during the year 1881 are appointed to be held:—

On Tuesday and Wednesday, June 2nd and 3rd.

On Thursday and Friday, November 3rd and 4th.

Forms to be filled up by candidates previous to examination will be supplied on application to the Secretary, 20 Spring Gardens, London.

BOARD OF EXAMINERS.

H. C. BARTLETT, Esq., Ph.D., F.C.S.

ALFRED CARPENTER, M.D., LOND., S.S.CERTIF., CAMB.

PROFESSOR F. S. B. F. DE CHAUMONT, M.D., F.R.S., Army Medical School, Netley.

PROFESSOR W. H. CORFIELD, M.A., M.D., OXON., F.R.C.P., University College.

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SYLLABUS OF SUBJECTS for EXAMINATION.

FOR LOCAL SURVEYORS.

LAWS AND BYE-LAWS—A thorough knowledge of the Acts affecting Sanitary Authorities so far as they relate to the duties of Local Surveyors; also, of the Model Bye-Laws issued by the Local Government Board.

SEWERAGE AND DRAINAGE—The Sanitary principles which should be observed in the preparation of schemes for, and the construction of, Sewerage Works; the ventilating and flushing of Sewers and Drains; the internal Drainage and other Sanitary arrangements of Houses, Privies, Water-closets, Dry-closets, and the removal of refuse; the Sanitary details of Builders' and Plumbers' Work.

WATER SUPPLY OF TOWNS AND HOUSES—The Sanitary principles which should be observed in the preparation of schemes for, and the construction of, Waterworks; the various ways in which water is likely to become polluted, and the best means of ensuring its purity.

REGULATIONS OF CELLAR DWELLINGS AND LODGING HOUSES—General principles of Ventilation; the amount of air and space necessary for men and animals; the means of supplying air, and of ensuring its purity.

HIGHWAYS AND STREETS—The Sanitary principles which should be observed in the construction and cleansing of Streets and Roads.

FOR INSPECTORS OF NUISANCES.

A thorough knowledge of the provisions of the Acts and Model Bye-Laws relating to the duties of Inspectors of Nuisances; also of the working of the Sale of Food and Drugs Act.

A fair knowledge of the Principles of Ventilation, and of simple Methods of Ventilating Rooms—Measurement of Cubic Space.

A knowledge of the Physical Characters of good Drinking Water—the various ways in which it may be polluted, and the means of preventing pollution—Methods of Water Supply.

A knowledge of the proper conditions of good Drainage.

The advantages and disadvantages of various Sanitary Appliances for Houses—Inspection of Builders' and Plumbers' Work.

A knowledge of what constitutes a Nuisance arising from any Trade, Business, and Manufacture.

A fair knowledge of the characteristics of good and bad Food (such as Meat, Fish, Milk, Vegetables), so as to be able to recognise unsoundness.

Some knowledge of Infectious Diseases, and of the Regulations affecting persons suffering or recovering from such diseases.

A knowledge of the best Methods of Disinfection.

Methods of Inspection, not only of Dwellings, Dairies, Milk Shops, but of Markets, Slaughter-houses, Cowsheds, Bakehouses, and Offensive Trades.

Scavenging and Disposal of Sewage.

EXAMINATION PAPERS, 1880.

The following questions were required to be answered in writing.
A *virâ voce* examination took place on the following day.

JUNE 1 AND 2.

QUESTIONS FOR SURVEYORS.

2 TO 4 P.M.; AND

INSPECTORS OF NUISANCES.

4 TO 6 P.M.

Those questions marked 'I.N.' are for Inspectors of Nuisances only.

1. In arranging the water supply for a manufacturing town of 30,000 inhabitants, state what you consider of importance—
 - (a) As to sources of supply.
 - (b) Quantity required.
 - (c) Distribution.
 - (d) Compensation.
2. What dangers are there to be apprehended to a public water supply in a town sewered, and with the water supply intermittent? How should these dangers be provided against and remedied?
 - (a) Within the house.
 - (b) Without the house.
3. What is meant by horse-power?
4. What quantity of water would a steam-engine of 12 horse-power (effective) raise fifty feet high in twelve hours? What would it cost per annum to work such an engine, coals being 12s. per ton, under the above conditions working a week?
- I.N. 5. What are the dangers to be apprehended from a water supply in any district which is supplied by wells?
- I.N. 6. What is required in the way of ventilation to keep a room with an air space of 1,000 cubic feet in a proper sanitary condition, there being a gaslight burning in the room 6 feet from the floor, and consuming 4 feet of gas per hour? Sketch your plan, and reasons for its employment.
- I.N. 7. Explain the difference of the conditions as to warming which prevail in a room heated by an open fire and in a room heated by fresh warm air introduced by flues, the temperature of the air in the room being assumed to be the same in each case.
- I.N. 8. You are appointed to the post of Inspector of Nuisances. What are the duties you would at once undertake in your district?
 - (a) With regard to inspection of common lodging-houses.
 - (b) With regard to nuisances.
 - (c) With respect to wholesome food.

9. Describe the following processes for dealing with water-carried sewage of towns—
 1. By irrigation.
 2. By chemical deposition.
10. Describe the different methods of forming storm overflows in sewers.
11. Describe in detail the arrangements you would adopt to prevent deposit from road drift accumulating in sewers.
12. When junctions occur in sewers, what should be the level of the invert of the junction sewer as compared with that of the main sewer?
- I.N. 13. What is the effect on the air of the room of heating a room by means of an open fire as compared with warming it by means of hot-water pipes at a low temperature?
14. In a square room, with the four walls exposed to the atmosphere, what is the proportionate loss of heat through the walls if built solid, and that through the walls of similar total thickness, but built with a closed air-space in the centre? What is the rule which governs the loss of heat?
- I.N. 15. You are sent for to a house where two children died the day previously of scarlet fever: what steps would you take?
 - (a) Where a house has a drain into the public sewer.
 - (b) When undrained.
 - (c) As to disinfection of clothing.

QUESTIONS FOR SURVEYORS.

6 TO 8 P.M.

1. How is the water supply of a town regulated by existing legislation?
 - (a) Where there is no company existing.
 - (b) Where there is a company without statutory powers.
 - (c) Where there is a company with statutory powers.
2. How does the present general public health legislation affect the metropolis?
3. There is a complaint in a given neighbourhood that a certain sewer smells. What are the steps to be taken (1) to find out the cause if any? (2) to remedy the same? Illustrate your answer by a sketch.
4. Will you explain what is meant by disconnecting a house drain from the sewer, and what adjuncts are necessary, and what in the matter of ventilation? Give a sketch of any two disconnecting arrangements which you are acquainted with.
5. Where a town is situated on a side of a hill, describe the arrangements you would adopt to prevent the lower districts being flooded, or the upper districts being injured by gases generated in the sewers.

6. Describe the following processes for purifying sewage :—

The lime process.

The A B C „

The irrigation of land.

Explain the mode of action in each case.

7. State what is the degree of impurity of the effluent, and what are the conditions under which it may be allowed to flow into a stream.

QUESTIONS FOR EXAMINATION, NOVEMBER 4 and 5, 1880.

SURVEYORS.

First Paper.

1. What difference exists between urban and rural sanitary authorities?
 - (1st) As to roads, streets, and buildings.
 - (2nd) As to sewers.
 - (3rd) As to gas and water supply.
2. What are the chief causes of the formation of foul air in sewers? How can its production be prevented?
 - (a) In new sewers.
 - (b) In old sewers.
3. In laying out a system of sewers for a town, should you lay the sewers in curves or straight lines? Give your reasons, and illustrate your answer by a sketch. Also state under what circumstances you would consider it advisable to make a sewer large enough for a man to pass along it.
4. Describe shortly the different methods of applying sewage to land, and in each case explain the conditions under which you would adopt it.
5. In what way does the size and shape of a sewer affect the velocity of the sewage flowing through it? If a 12-inch pipe sewer, with an inclination of 1 in 200, gives a velocity of $3\frac{1}{2}$ feet per second, what velocity would it give if laid at an inclination of 1 in 800 (the pipe running half full in each case), and would this latter velocity suffice to keep the sewer clear of deposit? To what extent could this velocity be practically increased by flushing?
6. What precautions should be taken, in connecting houses with sewers, in order to prevent foul air from the sewers entering the houses? What kinds of connections would you require for the water closets, sinks, &c.?

SURVEYORS.

Second Paper.

1. What is the essential difference between an artesian and an ordinary well? Describe the ways in which the water in each of these is liable to pollution, and state how such pollution is preventable.
2. In what ways is water liable to be polluted after collection, during its distribution to houses, and in the houses? What means would you adopt to prevent such pollution?
3. Explain the action of the hydraulic ram, and give a sketch. A stream, with a fall of 6 feet, and giving 50 gallons per minute, is used to work a ram; state approximately how much water it will pump in 24 hours to a height of 72 feet.
4. Given two sleeping rooms, one 10 feet by 15 feet and 10 feet high, the other 15 feet by 20 feet and 12 feet high, with three adults in each—how much fresh air would you supply, and in what way, in each case?
5. What are the sanitary advantages and disadvantages of the modern systems of street and road making? Give a brief description of each.

INSPECTORS OF NUISANCES.

1. What is a cellar dwelling? Under what conditions may underground rooms be inhabited?
2. How do you ascertain whether a room is overcrowded or not? What proceedings do you take in case of overcrowding?
3. What is the definition of a nuisance under the Public Health Acts?
4. What are the characteristics of good butcher's meat? How do you recognise the various conditions of meat unfit for human food?
5. How would you disinfect a room and the things in it after a case of scarlet fever? In what cases can you insist on the removal of the infected person to a hospital?
6. In inspecting a house, after a case of typhoid fever, to what points would you particularly direct your attention?

**CANDIDATES WHO HAVE RECEIVED CERTIFICATES AS
LOCAL SURVEYORS.**

- 1880, Nov. 5, BOULNOIS, H. PERCY, M. Inst. C.E., Exeter.
 " BURTON, W. KINNINMOND, John Street, Adelphi.
 1879, June 4, CAMERON, D., Exeter.
 1880, June 2, CLARE, J.
 1878, June 5, GAMBLE, S. G., Grantham.
 1878, Nov. 7, HARGER, R., Skipton.
 1880, Nov. 5, HARLAND, A., High Barnet.
 " INNES, COSMO, M. Inst. C.E., John Street, Adelphi.
 1878, June 5, JENKINS, W. J. P., Bodmin.
 1880, June 2, NICHOLS, H. B., Handsworth.
 1877, Oct. 29, PARKER, J., Bridgewater.
 " ROBINSON, H. W., Ulverston.
 1879, June 4, TROUZEAU, E. R., New Brighton.

**CANDIDATES WHO HAVE RECEIVED CERTIFICATES AS
INSPECTORS OF NUISANCES.**

- 1877, Oct. 29, BLANCHARD, T., Evesham.
 1879, Nov. 7, BOLT, B., Aston, Birmingham.
 1877, Oct. 29, BOOKER, F., Birmingham.
 1878, Nov. 7, CHUBB, T. T., Whitchurch.
 1880, June 2, CLARE, J.
 1879, Nov. 7, CLARKE, A. LENNOX, Bedford.
 1878, June 5, DALE, T. H., Hastings.
 1878, Nov. 7, DAVIES, H., Wrexham.
 1878, Feb. 7, GANDER, C., Alcester.
 1880, Nov. 5, HARLAND, A., High Barnet.
 1878, Nov. 7, HARRIS, W., Solihull, Warwick.
 1878, June 5, HAWKES, C., Yeovil.
 1879, Nov. 7, LAPWORTH, J., Bethnal Green.
 " OSBORNE, J., Carlisle.
 1877, Oct. 29, PREBBLE, W. S., Blackburn.
 1878, Feb. 7, ROBINSON, J., Birmingham.
 " WATTS, W. F., Amersham.
 " WETHERILL, W., Selby.
 " WILKINSON, W., Salford.

PRESIDENT'S ADDRESS.

ADDRESS

BY

EARL FORTESCUE,

President of the Congress.

I CONCLUDE that my election to the honourable post to which the favour of the Sanitary Institute has called me is due to my being the only Devonshire man very long publicly identified with the great sanitary cause, though I have been so by the efforts and sacrifices which I have made for it, rather than by any signal services which I have been ever able to render to it. My connection, however, with that cause is now of old date. After reading that most remarkable report made by my valued friend Mr. Chadwick, in 1842 (which, as was well observed by my old schoolfellow, Dr. Acland, in his Address to the British Medical Association the other day, 'may be taken as the foundation of all complete modern sanitary work in this country'), I selected the Health of Towns as my subject for the lecture which I had promised to deliver to my constituents at Plymouth in 1845; and from that time to this my interest in that great cause has remained unabated.

On looking back at those days after the lapse of a whole generation, I must allow that, relying on the soundness of our views and the accumulated evidence on which they were based, we early sanitary reformers somewhat underrated the strength of the opposition we had to encounter. Ignorance, prejudice, vague alarm, and real or imagined self-interest arrayed against us a formidable body, comprising not only the mass of the wage class, for whose benefit, as the

greatest sufferers from the then general violation of the plainest laws of hygiene, the efforts made for their enforcement were more especially directed, but comprising also too many who ought to have known better. I remember when 'the poor man's pig' was a most potent election cry in various borough contests, and it was difficult to say whether the pigkeepers themselves or their non-pigkeeping next-door neighbours suffered most from the close proximity of the animal, or were most indignant at the idea of his compulsory removal. I recollect, at the same time, that Mr. Bright, and many other well-known politicians of both parties, opposed sanitary reform; as did pretty generally the municipal authorities throughout the country, and also, most vehemently, the vestrymen of the metropolis. Still the facts and arguments adduced in Mr. Chadwick's report—fully confirmed afterwards in every particular, and only expanded in the series of able reports from the Health of Towns Commissioners, under the presidency of the Duke of Buccleuch—appealed so powerfully to sound economy as well as to humanity, that though the subject was not a congenial one for mob oratory, they quickly produced a deep impression upon the more enlightened and benevolent part of the community, and upon none a deeper impression than upon my two truly noble friends, Lord Carlisle and Lord Shaftesbury. Lord Carlisle—now long since removed to a better world—became, as Lord Morpeth, a member of the Government formed by Lord John Russell on Sir Robert Peel's resignation in 1846. Lord Shaftesbury, who is happily still spared to labour for the benefit of his fellow creatures, had been then already engaged for years in endeavouring to get the health and lives of workers in factories generally protected from the dangers of unguarded machinery, and the children especially from destructive overwork. He therefore readily joined the band of early sanitary reformers in their kindred task. Among these, Dr. Southwood Smith, as a scientific man, had taken a prominent part. Bishop Blomfield, also clearly discerning the important bearing of sanitary reform upon decency and morality, and consequently upon religion, gave it the benefit of his influential support in the House of Lords and elsewhere.

I intend treating sanitary reform in this country, both as regards the past and the future, rather in its administrative and legislative than in its various other aspects, because very many here assembled are much more competent to treat it in all of them than myself; while

I have now sat for nearly forty years in Parliament, during a few of which I had experience both of salaried and unsalaried office.

I have said that the official reports mentioned had produced a deep impression on the more enlightened and benevolent members of the community. This impression was greatly increased and widely diffused by the circulation of their substance through the country, sometimes by speeches and lectures, sometimes in tracts issued by the Metropolitan Sanitary Association, whose foundation, under most influential auspices about that time, was itself a proof of the growing importance attached to sanitary reform. But no distinct sanitary legislation or administration had as yet been even definitely proposed. For the quarantine regulations, which had long been established by us as well as all other civilised nations, practically much more to the detriment of commerce and the inconvenience of travellers than to the efficient protection of the people from epidemics, hardly deserve to be considered an exception to this statement; nor even (though it was a decided step in advance) does the passing of the first Vaccination Act in 1840.

It was Lord Morpeth to whom belongs the honour, as a member of Lord John Russell's Government, of making the first great move in sanitary reform, by superseding and consolidating into one the seven metropolitan Commissions of Sewers, which had hitherto managed, or rather, with the honourable exception of the Holborn Commission, grossly mismanaged the sewerage of the metropolis. In estimating the importance of this great move it should be remembered that London surpassed the whole of Scotland in population, and probably both Scotland and Ireland together in wealth; that, besides being the wealthiest and most populous city on the face of the globe, it was the seat of government and the centre of business of an empire on which the sun never sets; and that the consequent influence of its example for good or evil, not only in the United Kingdom, but throughout the Empire and indeed the civilised world, must be immense.

The seven Commissions of Sewers comprised hundreds of members headed by most illustrious names, such as the Duke of Wellington's and the Lord Chief Justice's, who, it is needless to say, never attended, if, indeed, they were ever aware of their adile dignity. But the Commissions included also builders and plumbers, and too many others, very diligent in their attendance, whose ignorance of the first prin-

principles of sanitary engineering was only equalled by their complete mastery of the art of jobbing. A few public-spirited vestrymen had latterly been exposing the incompetence and jobbery of the Westminster Commission, and had thus helped to prepare the public mind for Lord Morpeth's stroke. He in one day revoked all the seven Commissions and issued seven identical fresh ones to a limited number of persons, either already to a certain degree conversant with the subject, or ready to take a practical interest in it, including himself, Mr. Chadwick, and your humble servant. He thus virtually established, under the old statutes, a consolidated Commission of Sewers for the whole metropolis, which at once gave the inhabitants the benefit of a far more efficient consolidated staff than the seven separate ones under the seven Commissions, at less cost even in salaries, and very much less if perquisites were taken into account. The next year he carried a new Metropolitan Sewers Act, cumbrous indeed to work, but providing unity of administration under a new and still smaller body of Commissioners, equally Crown-appointed and equally unpaid, who did me the honour of electing me their Chairman. It comprised various eminent civil and military engineers, such as, for instance, Mr. Robert Stephenson and Mr. Rendel, Sir J. Burgoyne and Sir H. De la Beche, and others from other professions, including two or three from the City of London. We worked very hard for several years; but we could not do much, for we had found no reliable map even of the surface, much less any reliable plan of the sewers underground. However, by getting maps and plans made, we prepared the materials for dealing comprehensively with the sewerage of the whole metropolis; and we meanwhile greatly improved the sanitary condition of many of the slums and several of the streets, wherever we were able to do so with works capable of adaptation to any scheme of main drainage hereafter to be undertaken. These works comprised a constant supply of clean water under pressure, by arrangement with the Water Companies, and a constant removal of the fouled water or sewage by self-cleansing house-drains and sewers generally carried by the backs instead of the fronts of the houses; and they on trial fully verified the soundness of our principles and their general applicability on any scale, large or small. These works, moreover, were actually completed for less than one-third of the cost of such works under the previous system of sewers

and drains of deposit, where any were provided at all, which in the poorer neighbourhoods was the rare exception instead of the rule; for we substituted 4-inch glazed pipes for the former nearly flat-bottomed man-size brick house-drains, with corresponding reductions of dimensions and cost in the alley and street sewers. We were latterly, indeed, ill-supported by the Government, which was more and more pressed by our opponents in the Metropolitan vestries and their representatives. Many of us in consequence resigned, and a new Commission was appointed; but that, not long afterwards, was superseded by the Board elected under the Metropolitan Local Management Act of 1854, brought in by Sir B. Hall, the especial representative in Parliament of the Marylebone and St. Pancras Vestries, both notoriously most hostile to the Commission.

Of that important, but in my opinion, most defective statute, and its operation, and of the Metropolitan Board of Works which it established, I shall have something to say hereafter. I must now return to the general sanitary legislation for the whole country.

In 1848, Lord Morpeth, chiefly by his intense earnestness combined with almost unmatched sweetness of temper, carried, with little alteration, the Public Health Act, the first, and I think in some respects, the best sanitary statute ever passed for the whole kingdom; a measure in the introduction of which he did me the great honour of associating my name with his own and Sir G. Grey's. That Act established the first General Board of Health, whose official publications have been of inestimable service to the cause of sanitary reform throughout the world. It also embodied certain provisions, a subsequent departure from which has been in my view mistaken and retrograde.

The constitution of that Board of Health gave every promise of utility. The three working members of it—and they were emphatically workers—were Lord Shaftesbury (then Lord Ashley), Mr. Chadwick, and Dr. Southwood Smith. Lord Ashley gave it as much time and attention as his various other religious and philanthropic labours would allow. Indeed, I know that he considered his work there of primary importance. Mr. Chadwick for years devoted almost the whole of his indefatigable energy and great ability to the work of the office; not merely to the duty of administration, but also to the collection of sanitary information from all quarters, and its re-issue to the public, tested, digested, and prepared for practical application. These

two were efficiently aided by Dr. Southwood Smith, who to high professional qualifications added the gift of singularly clear and pleasing exposition; and these efforts were well seconded by several zealous and able subordinates. The first Superintending Engineer Inspectors appointed under the Public Health Act of 1848 were—Mr. Crosey, Mr. Clark, Mr. Rawlinson, and Mr. Ranger, who were severally selected and appointed for their known practical knowledge. The first town reported upon was Dover, Mr. Rawlinson having made there the first inquiry and report.

The Board's official publications embraced, not merely detailed separate reports on many provincial towns, with separate schemes for their drainage and water supply, but also reports on various important Metropolitan questions and the best and most economical modes of dealing with them; such as interments, water supply, and sewerage. And the adoption of these reports, if it had not unfortunately been prevented by the ignorance and apathy of successive Governments and Parliaments and the active opposition of interested parties, would not only have saved millions to the inhabitants of London, since pocketed by trading Water and Cemetery Companies, but would also have added immensely to the wealth, comfort, and security of all classes, and especially the most numerous of all, the wage class; who are, at least, equally exposed with the rest to danger from fire, and, far more than any other, to the ravages of infection. How cheap would it have been to have bought the Water Companies' works, as recommended by the Board thirty-nine years ago, even if they had been paid ten per cent., instead of the average five per cent. which they were then receiving on their capital expended of about 6,000,000*l.* How many lives, to say nothing of property, would have been saved in London if there had been, as at Manchester, hydrants everywhere, enabling water to be thrown on each fire as it broke out, in one-third less time on the average than by the best managed and speediest fire-engines! How much more of temperance might there not have been if, instead of water from a foul cistern, often with an iridescent scum repulsive to the thirstiest, every inhabitant could at any hour have drawn, from a tap in the house, water clear and pure straight from the main!

The Metropolitan Local Management Act established a representative body to deal with the large but urgent question of the sewerage of the metropolis. It did so on the basis of the old Vestry Act;

and the result was exactly what I predicted in the House of Commons during the discussion of the Bill.

The new Board, for the chairmanship of which I was vainly pressed by Lord Palmerston's Cabinet to become a candidate, proceeded to construct as soon as their engineer, Mr. Bazalgette, had completed the designs for them, the gigantic intercepting sewers for rainfall as well as sewage, with pumping engines and outfalls near Barking; enormously costly, and as unsatisfactory as costly, in their construction and working. The frequent occurrence of disastrous floods in London south of the Thames since their completion, and the fouling of that noble river for miles below London, in compensation, I suppose, for some purification effected above by these colossal works, would alone be conclusive as to the erroneous principle on which they were planned. My late gifted friend, distinguished both in literature and science, Mr. F. O. Ward, an active but too little heeded member of the last Commission of Sewers, when protesting against the idea of intercepting, along with the sewage proper, all the rainfall descending on the surface of the metropolis, and at great cost pumping much of it into the Thames below London, tersely set forth the right principle in words which deserve to become proverbial: 'The rainfall to the river, the sewage to the soil.'

The governing body at Paris has recognised this truth, and, in accordance with a most able and exhaustive report from M. Millet, their chief engineer, has been for some little time acting on it in the plains of Genevilliers; so as not only, as I have seen on the spot, to purify the great volume of sewer water already conducted thither as the precursor of much more, but also at the same time to fertilise with it a large tract of market garden, which filters the sewer water on its way to its final discharge, clear and bright into the Seine. Though at my first visit in 1834 Paris had the roughest granite paved roadways, with hardly any separate footways in the streets, and scarcely a single sewer or house-drain, Paris will, I expect, before long be as superior to London in its subterranean as it has for some time been in its surface arrangements. The sewers and house-drains will be as much better managed there as its streets and roads in respect of smoothness, cleansing and watering have for some time been. I have been told that Berlin also, profiting, as the Board of Works has not, by the publications of the first Board of Health, will before very long surpass

London in its sanitary arrangements, in its water supply at constant pressure, in its hydrants, in its house drainage and street sewerage, and in the profitable use, instead of the noxious deposit, of the sewage.

The undiminished—indeed, for more than a decade, the slightly increased—mortality of the metropolis, after the great sums expended in it upon house-drains and sewers since 1854, affords melancholy proof, apart from the testimony of our noses, that many of these new house-drains and sewers have not been constructed upon the self-cleansing principle successfully adopted years ago, at very moderate cost, in many provincial towns, with large reductions, when their water supply was good also, in their previous mortality and sickness. The mortality in Dover, for instance, was brought down to 14 per 1,000, more than a third below that of London; in Croydon, Salisbury, and Bedford it has been brought down to two-thirds of their previous rate; in all much below London, and in all with corresponding reduction in the amount of sickness.

But what was to be expected from a Board elected by such bodies as too many of the metropolitan vestries? I have some recollection still of the curious administrative acts of the vestries of Marylebone and St. Pancras, of which I became cognisant as secretary to the Metropolitan Board and chairman of the Metropolitan Commission of Sewers before representing that borough. I well remember the interest at that time taken by them in Imperial politics, and their constant discussions upon the foreign and domestic policy of the Ministry; and also their contemporaneous—I suppose I must not say consequent—costly mismanagement of their parochial workhouses, burying-grounds, and schools. Some of these facts may probably have been in Mr. Charles Dickens's mind when he so happily described the Metropolitan Local Management Act as 'an Act for the more complete vestralisation of the Metropolis.'

I have mentioned the costly mismanagement of the sewers of the Metropolitan Board of Works under that Act. But all experience has confirmed the truth of the principle laid down as long ago as 1842 by Mr. Chadwick, that the best-planned sewers and house-drains of the most approved form and best materials, without an adequate and constant supply of water, would become in dry weather merely elongated retorts for the generation and diffusion of noxious gases; that on the other hand, a large water supply without good drains and

sewers would render the site of most towns unwholesomely damp, and of some quite marshy; that in the case of the poorer dwellings, intermittent water supply, from however pure a source, means contaminated supply, owing to its stagnation in foul cisterns and decaying waterbutts, rendering it hopelessly unpalatable to drink; that therefore both good sewers and good water supply are alike requisite; that each is indispensable to the other's satisfactory action; and that no town could be considered in a proper sanitary state while either was grossly defective. This point I must presently recur to. I will now shortly review the general course of sanitary legislation and administration in the last quarter of a century, and describe the statutory powers and departmental arrangements under which the Government prepared to act.

After the supersession of the first Board of Health, the Board completely changed its character, which could hardly be otherwise than retrograde, when Sir B. Hall, one of the most persistent and formidable of the first Board's opponents, was placed at its head. In 1858 the Board was completely abolished, and most of what sanitary work the Government still undertook was made over to the Home Office, which had a new special Local Government Department established in it; certain duties being assigned, however, to the Privy Council, to which Mr. Simon, the medical officer of the last Board of Health, was transferred when it expired.

A variety of Acts, more or less comprehensive, dealing with sanitary matters, were passed at intervals, unconnected, and with provisions sometimes almost, if not quite, conflicting here and there, never having had their mutual relation carefully considered. These Acts left action under them a matter of extreme difficulty and complication; as I know from having with varied success sometimes tried, and much oftener wished, to act under them. For the execution of sanitary works, however pressingly needed, was hampered with many legal difficulties, and involved often considerable risk to the authorities who undertook the responsibility of ordering them. I remember on one occasion being, with the Vice-Chairman of my Board of Guardians, surcharged, I believe rightfully, by the auditor 200*l.*, the cost of some undeniably urgent works, which we got executed in a village when cholera had actually broken out in a not very distant market town in our Union. Most complicated points of various kinds arose out of this case, and it was a long while before the surcharge was

finally remitted by the Board above, and the question decided whether the parish or union should pay the money instead of us. The paralysing influence of such a surcharge upon all sanitary efforts, wherever it became known, may easily be imagined.

In 1869 the Royal Sanitary Commission of inquiry was appointed; and, after taking much evidence, made most valuable reports, upon the practical recommendations in which, and especially upon the most important of them, subsequent sanitary legislation was mainly, though unfortunately not quite without exception, based: that recommendation being, that there should be one Local Authority for all public health purposes in every place, so that no local area should be without such a one, or have more than one.

'In 1871 the Local Government Board,' as it stated in its eighth Annual Report (1878, cxxviii.), 'was established, and the powers and duties of the Poor Law Board under the Poor Law Acts, of the Secretary of State under the Registration Acts, the various Sanitary Acts, and the Local Taxation Return Act, and of the Privy Council under the Prevention of Diseases and the Vaccination Acts, were transferred to the new Board thus created, while in the following years the powers and duties of the Board of Trade under the Alkali Acts and the Metropolis Water Acts, and of the Secretary of State under the Highways and Turnpike Acts, were in like manner transferred to the Department.

'In 1872 the whole country was, by an Act passed at the instance of the then President of the Board, divided into urban and rural Sanitary Districts, and each district was placed under the jurisdiction of one Sanitary Authority and one only, and provision made for the establishment of a Port Sanitary Authority for every port in England and Wales.

'In 1875 a measure prepared by us was passed for consolidating the whole of the sanitary laws into a single Statute, thus reducing into a methodical and complete whole provisions which hitherto had been scattered over no less than twenty-two separate Acts of Parliament.

'In 1877 we issued complete sets of model by-laws, relating to almost all the various matters which local authorities are empowered to regulate by by-laws under the provisions of the sanitary law.

'Thus it will be seen that during the last seven years a single cen-

tral authority has been established and organised for superintending the administration of the laws relating to the public health, poor relief, local government, and local taxation.

'Secondly, that the entire country has been divided into Sanitary Districts, and a local authority for sanitary purposes established for every district, so that no area is now without such an authority, or has more than one.

'Thirdly, that the sanitary law has been amended and reduced into methodical form for the guidance of the several Sanitary Authorities referred to; and

'Fourthly, that they have been supplied with a code of subsidiary regulations, which, when adopted, will enable them to give full effect to the more general provisions of the law.'

The value of the service thus rendered to sanitary reform by the consolidation of statutes and unification of authority can only be adequately appreciated by those who, like myself, had been for years practically engaged in trying to promote and enforce it in a district under some of the twenty-two sanitary statutes above mentioned, mostly passed in the previous quarter of a century, with some of their clauses left still valid, some half, some wholly, repealed or superseded. Still to this valuable consolidation and unification there have been, even quite recently, several unfortunate and decidedly retrograde exceptions, which would be unaccountable, but for the tendency in every Government department always eagerly to grasp at fresh powers and reluctantly to relinquish any once possessed. Thus we find that while according to obvious analogy, and in conformity with the recommendations of the Royal Sanitary Commission, all the control of dairies ought to have been vested in the Local Government Board, by the Contagious Diseases (Animals) Act of 1878 it was given to the Privy Council. As I most earnestly pressed the necessity of such a measure upon the Government on behalf of the Central Chamber of Agriculture of which I was chairman, and on behalf of almost every provincial chamber besides, it was not for me to place additional difficulties in the way of a measure in conformity with the sound principles of political economy and of physiological science, by objecting to the authority proposed by Government, however ill selected, when the Bill was vehemently opposed on the calumnious plea of its being protectionist legislation. As I said at the time, having been a consistent free trader

from my youth, all we wanted for the British farmer was protection from foreign contagion, not foreign competition, which the free admission of dead meat already secured for the consumer. As stated above, the assignment of any jurisdiction over dairies to the Privy Council is contrary to sound principle. And for this the late Government was responsible. But under the present Government we find that by the Merchant Seamen's Act just passed, the by-laws for lodging-houses for sailors are to be approved by the Board of Trade, while the regulation of all other lodging-houses, whether in ports or inland towns, comes, like other sanitary matters, under the Local Government Board. So much for retrograde sanitary legislation up to the present day.

I now come to retrograde administration, of which signal instances are afforded by both the late and present Governments in their treatment of the water supply of the metropolis.

As the recently established Local Government Board had stated in their eighth report already mentioned, they had a sanitary division in that department with sanitary duties and officers—medical, engineering, and others—transferred to it from other Government departments. This sanitary staff was costly indeed in salaries, but cheap in proportion to the high qualifications of its members for dealing with all kinds of sanitary questions. It comprised a chief engineer, Mr. R. Rawlinson, C.B., who is a member of the Council of the Institute of Civil Engineers, and had distinguished himself as a specialist in dealing with water supplies. He had in 1847 proposed to take the water from Bala Lake to Liverpool, and had afterwards been a member of a Commission of Enquiry into the London Water Companies. He had, moreover, taken a leading part in advising the authorities of several towns about the purchase of works from trading companies so as to make them public instead of private concerns, which had been accomplished to the general satisfaction of the inhabitants. The Department had further the advantage of comprising an able water examiner, and also an auditor of the Water Companies' expenditure, both specially for the metropolis. At the head of the Local Government Board there was a gentleman not originally known for any special sanitary work, but who had while there so much of it passing under his general superintendence, that with his businesslike qualities he could not have helped becoming tolerably conversant with sanitary questions.

Moreover, the question of protection from fire in London, necessarily involving that of the water supply, had been recently carefully examined and considered by a Committee of the Society of Arts, to which several of the officers of his department had, with leave from the President, given valuable information. On the report of that Committee a Bill had been drawn and proposed by some private members, which had been seen and in its main principles approved by him. He and his Department were, therefore, to a certain degree prepared to deal with the question. It was not, however, to the Local Government Board and Mr. Selater-Booth, but to the Home Office and Sir Richard Cross, that the question was to be confided—a minister, indeed, of remarkable industry and unquestionable ability, of which he had recently given signal proof in his measure satisfactorily adjusting the legal relations between employers and servants. But he had neither the special knowledge himself requisite for dealing with the very special question which he unfortunately undertook, nor could he any longer find, in the Home Office, officials practically conversant with such matters to help him. But before describing or discussing his (as it proved) very unsuccessful course of proceeding, I must be allowed to give a further illustration, without at all disparaging the high qualities of our statesmen, of the way in which the public service often suffers, both from departments being assigned to the wrong men and from business being allotted to the wrong departments. There was a right honourable gentleman in Mr. Gladstone's last Government, a man of science, and indeed a specialist in sanitary knowledge. For as a member of the Commission for Enquiry into the Health of Towns, he had written a most able report on the Sanitary Condition of Lancashire; and on account of his special knowledge he had been placed in the chair of the Select Committee on the great scheme for supplying Manchester with water from Thirlmere. The Local Government Board required an able man conversant with sanitary matters, as several sanitary questions were urgently demanding solution. The Foreign Secretary had while in opposition called the attention of the House of Lords to the state of the water supply of the metropolis, and the late Prime Minister had a few years before eloquently and justly dwelt on the great national importance of sanitary reform; indeed, its powerful influence, direct and indirect, on the pauperism alone of the country, not to mention anything else, is undeniable. Here, one should have

thought, was obviously the right man for the place. But no, Professor Playfair, who had had no special training for the Chairmanship of Committees, was put there; and Mr. Dodson, conversant with its duties, having held the post before, but whose name is, I believe, unknown in connection with sanitary work, was placed in the department where, with very slight exceptions, all the Central Government's sanitary work has recently been concentrated. Still, being so able a man as to be put into the Cabinet, with the aid of a permanent staff under him so thoroughly conversant with the water question, he would probably have dealt satisfactorily with it. But no, the new Home Secretary, an undeniably very powerful speaker, though destitute I believe of any special sanitary knowledge, and certainly of any previously administrative experience, for he was only a law officer of the Crown under Mr. Gladstone's last Government, followed his predecessor's example, and took the question into his own hands.

As great general principles are involved in the case of the Metropolitan Water Supply, which are also involved on a less extensive scale in the cases of many much smaller towns in connexion with public services of that or analogous kinds—those, that is, where the particular service or supply rendered has only a local as distinguished from a general value—I may, perhaps, be allowed to state the views which I have long entertained upon them.

I said, in my lecture at Plymouth in 1845, 'In cases where, for the supply of a limited because merely local demand, the fixed capital invested bears a very large proportion to what is called reproductive or circulating capital, no effectual competition can take place. Unless the exorbitant charges provoke, or the exorbitant profits tempt, some other party to contend with the original one for the occupation of the whole or a part of a field not large enough for two, the monopoly is complete, limited only by the willingness of the public to consume at the rate charged, and by the dread of the establishment of a rival party. As the probability of this latter occurrence varies, so will the prices; they will fall when the danger is imminent, and be slowly raised as it subsides. If another capital is invested, for a time competition is sharp; but before long the two parties find it their interest to coalesce, and to charge the public for a supply produced by the application of two fixed capitals, where one would have sufficed for the work, as high a price, on the same principle and subject to

the same limitations only, as those which affected the returns upon the original capital.'

Therefore, as I said in my address to the Statistical Section of the British Association in 1877, 'The gas and water works of the smallest town or village, with a plant of less than 1,000*l.*, would have, and ought to be treated as having, a monopoly; because the whole value of the water and the greater part of that of the gas supplied depends upon its position, and the greater part of the cost of supplying it consists in the interest on the capital invested in the fixed and permanent works. The water, which is to be had for nothing but the trouble of dipping for it in the brook below, derives its whole value from the convenience of its position in the waterpipe, which brings it into the house from the reservoir or forcing-pump. The value of the service of a coach or omnibus depends equally on its localisation; it, like a railway, takes people who want to go from some particular place to some other. But then the cost of its service consists chiefly in circulating or easily transferable capital in the shape of the vehicle, horses, and harness, equally available at a slight expense to render similar service elsewhere; whereas the materials of the reservoirs and the pumping engines and pipes in the case of waterworks would only, if transferable elsewhere at all, be so at an expense very heavy in proportion to the concern.'

I further said, in my lecture in 1845, speaking of the abstract principles on which, in cases where the field was quite open and the gas or water company had under legal sanction occupied the ground, 'On the whole, it seems to me that the necessary works for similar purposes are best constructed by individuals or companies—for the action of self-interest will induce them to do it better and more watchfully—with a monopoly granted to them for a certain time on certain terms; after which the works themselves should revert to the town, or become purchasable by the town for a certain amount: that afterwards they should either be managed by the corporation, or, better still, be let by public auction by the corporation to parties, either with certain fixed conditions attached to them at an annual rent to be decided by competition, or else be let at a fixed rent to whatever party will undertake to guarantee the cheapest and best supply to the town. These systems seem to me to combine, to the greatest degree practicable, the energy and economy observable in undertakings

carried on by interested parties as compared with public bodies, with due security from the unreasonable charges or ruinous and wasteful competition of companies or individuals undertaking for profit works which are too important to the public, and at the same time too much monopolies in their nature to be advantageously entrusted unreservedly and for ever to interested parties.'

Such were and are my abstract opinions upon the question. I said at Plymouth, three years ago, that practically 'The sound view with regard to these questions of local public service and supply would seem to be that long ago indicated by Mr. Chadwick—namely, that they should be recognised as, in their nature, monopolies, but, as such, considered to be the property of the public, to be alienated in part for a time, or retained in their own hands by the State or local authorities, as may seem most for the public advantage. That this view is gaining more and more acceptance is evident from the number of municipalities which have already either set up for themselves, or have bought from their original proprietors, the waterworks and the gasworks of their towns, and are working them for the benefit of the inhabitants. Some have already done this with one or both for many years; many more are taking steps to do so; and the Metropolitan Board of Works have now for some time been wisely contemplating buying up both the water and gas works of the metropolis, and consolidating under one management what now occupies the staffs of a number of companies. The very able report presented to the House of Commons by the Committee under the efficient chairmanship of Sir H. Selwin-Ibbetson, after taking evidence for two sessions on the subject of the fire brigade of the metropolis, gives, in my opinion, conclusive reasons in favour of its various recommendations—the most material of them being that the Metropolitan Board of Works should purchase all the waterworks within its district, establish a constant supply at high pressure, and place hydrants all over London, putting the duty of extinguishing fires in the hands of the police, with a special superintendent and a special staff to attend particularly to this new branch of police work.'

This general view the late Government seems to have adopted, and the present one also, to a certain extent, judging by the report carried by the Home Secretary in the Select Committee the other day: though the two Governments seem to have differed considerably as to

the principles on which the compensation (if any) to the companies should be based, and as to the composition of the body or trust to whom the making of the arrangement should be confided.

The former Home Secretary had intimated that a great amount of capital would have to be raised for the purchase, from which it was naturally inferred that there would be an augmentation of charges on the ratepayers. But the evidence of poor Mr. Edmund Smith, his own valuer, a man of remarkable integrity and ability, much esteemed and much regretted by the department which he had served, showed that this view was quite wrong, and that the view stated by the Committee of the Society of Arts was quite right; that not one shilling of capital would be required for the purpose; but that, on the contrary, the ratepayers would secure from the unification of administration, and from discontinuing the use of the less advantageously circumstanced of the existing companies' works, an annual gain of at least 170,000*l.*, or far more according to the Committee of the Society of Arts. I may add that much of this, after paying the companies compensation for their prospective advantages, would be applicable at once to hydranting the streets and other much needed improvements. The other great error, equally maintained by the present Home Secretary, was that the sale price of the companies' shares on the Stock Exchange should be a basis of the purchase, which spread abroad the idea that as they went up in the market the increased price would somehow or other come out of the ratepayers' pockets. But in the purchases which had given satisfaction to the provincial authorities no such basis was adopted; and for the reason that the sale price in the market is that which the few who are obliged to sell must take, not the price which the great majority, who were permanent investors, would accept—as Sir E. Beckett, in his most able speech, conclusively showed. Besides, the sale price on the Stock Exchange may be dexterously rigged, as it is called, for a purpose. The sale price of an undertaking, such as that of the water companies, is determined in practice, after adding the compensation for prospective advantages, forced sale, &c., by their average net income or dividend, which, in this case could not be falsified, being subjected to the strictest scrutiny by a Government auditor. No doubt the shares rose at the probable prospect of obtaining a public security. But this did not come out of the ratepayers

pockets. If, instead of the two Home Secretaries, quite unaccustomed to such transactions, the question had been put into the hands of the late or the present head of the Local Government Board, he would of course have consulted the chief officers of his department as to the usual practice, and the matter would have been probably settled before now, and an increased chargeability, which Mr. Smith showed was accruing at the rate of full a million a year, or near 3,000*l.* a day, would have been arrested. I am not defending the exact arrangement proposed by Sir R. Cross and Mr. E. J. Smith. I do not know enough of the details to give any positive opinion upon the subject. I am only contending that though, as I think I have shown, it was undertaken by the wrong minister at the head of the wrong department, it did not deserve the outcry raised against it. And I contend, further, that it is most desirable for some reasonable arrangement to be speedily come to, far more in the interest of the inhabitants of London than of the companies, whose gains will increase largely with delay; unless, indeed, a new principle of dealing with property generally is adopted by the Legislature. The language of the report carried by the present Home Secretary in the Select Committee of the House of Commons, has already inspired some holders of shares in undertakings embarked in on the faith of Parliament with much of the distrust, with which more than one measure proposed by the Government during last session has notoriously inspired many landowners in Great Britain as well as Ireland; discouraging the further investment of capital either in the improvement or in the purchase of land. Capital, it has been well observed, is one of the shyest and most timid of creatures, and at the same time so subtle that there is no restraining its flight when once alarmed.

On the principles laid down by the first Board of Health, various water and gas works have been purchased by the local authorities of various towns, and usually to the general satisfaction of the inhabitant; the better security thus permanently obtained by the companies for their income helping to render them willing to accept reasonable terms.

The Home Secretary opposed a resolution for any declaration of terms of purchase, and declines altogether, on the part of the Government, to undertake the task of settling the question. And to whom

does he propose to entrust it? To a trust composed of representatives (1) of the Metropolitan Board of Works, (2) of the Corporation of the City of London, and (3) of other local representatives of the metropolitan area. Let us take them seriatim: (1) the Metropolitan Board of Works, of whose 'costly mismanagement' I spoke at Plymouth three years ago, and have given some instances to-day; whose proposals with regard to water supply had been rejected by the Select Committee on the Fire Brigade as wasteful and ineffective; whose finance, as displayed before this very Water Committee, had been proved to be unsound, and their leading witness absurd; (2) the City Corporation, whose views also were shown by Sir E. Beckett to be unsound; and (3) lastly the metropolitan parish vestries, of whose incapacity for such a task I have already spoken.

The body proposed is unfit itself to make the bargain, in the first instance, and to complete the arrangements for the constant supply and hydranting, from its confessed want of the very special knowledge required in this difficult and important task; and such a body would be very unlikely, judging from experience in analogous cases, to be influenced in the choice of its professional guides in the matter by sound judgment and public spirit alone. These are obvious reasons for the devolution of this merely temporary duty to some one, two, or three persons appointed by the Crown, and selected *ad hoc* on the responsibility of the Government. The appointment of a practical dictator for a short time to act in a particular crisis has not been unknown under republican governments, ancient and modern. Of course it is very easy and popular to profess implicit reliance on local self-government, the principles of which I have of late years constantly found myself pleading in vain against the centralising action of successive bureaucratic ministries. It is easy and popular to devolve upon the particular representatives who happen to be chosen in a particular year by different representative bodies, themselves elected by the ratepayers of the metropolis, the responsibility of making arrangements deeply affecting for better or for worse the permanent interests of the inhabitants; of concluding a bargain permanently pledging rates amounting to hundreds of thousands of pounds a year, and consequently equivalent to many millions of capital. But this seems to me to be only shabbily shirking a difficult and ungrateful task to the probable detriment of the metropolis for

many generations to come. I have always contended, along with those who have given most attention to such administrative and economical questions, that some control on the part of a central authority over the acts of the elected authority for the time being in any locality (a control generally undesirable, when only the expenditure of the year's income is concerned), becomes not merely justifiable but desirable when the liabilities contracted are to burden the rate-payers of the future. Waste of the year's rates brings its punishment on those who have incurred it. Permanent obligations improvidently contracted punish unborn generations for the mistakes made in the choice of representatives in a single unlucky year. This is unavoidable in the case of Parliamentary elections. But there seems no adequate reason for extending the risk unchecked further than can be helped, especially in a case like the present, when it is neither called for nor expected by the inhabitants of London generally.

The other question is whether it can be right in principle, or probably successful in operation, that such a body as has been proposed should be charged with the permanent management of the water supply of London; or that this duty should be kept quite separate from the management either of the sewers and gas-pipes underground, or of the roadways and pavements on the surface?

The fact is sanitary science may be said to have done its work, and the reward of conformity to its dictates has been reaped wherever they have been faithfully followed. It is legislation, or rather the administration of bodies acting under legislative authority, that is really in default.

To begin with the management of the metropolis. Notwithstanding the considerable amendments some of us got made in the Metropolitan Local Management Bill, I said on the third reading that I had no hope of its affording a wise, efficient, and economical system of local administration. In saying this I had particular regard to its reversal of Lord Carlisle's enlightened policy of consolidation by the establishment of thirty-six new district authorities—all placed under the new Metropolitan Board indeed, which was charged with the main drainage of the metropolis, but each having the separate control of the street and house drains in its own district. I had previously urged that this great multiplication of separate engineering staffs was a most retrograde step, and would at once add

largely to aggregate cost while diminishing efficiency; that the officers under these numerous authorities would probably be overpaid for the work they did, underpaid for the work they had to do—work requiring a skill and high character in those charged with its superintendence, to secure which, in its chief officers, adequate salaries could scarcely be afforded by each of the thirty-six separate authorities. I had urged that, salaries apart, the inconvenience of more than ever subdividing the area of administration, and placing each subdivision under separate authority, would be much aggravated by their boundaries following the ancient parochial lines drawn without reference to the lay of the ground; much difficulty and delay in the co-operation desirable within the same natural drainage area being unavoidable, even when mutual jealousy accorded any at all. Instances were known in the case of the seven old Commissions, where large sewers belonging to one Commission above were made to discharge into small ones belonging to another below, and even where the sewage was invited (it could not be persuaded) to flow up hill.

I earnestly pressed, therefore, that if the work, which the late Crown-appointed Commissioners had not at all despaired of carrying on successfully with the aid of a competent staff, was thought too much for the new Representative Board to undertake, the right course was to divide London into two independent divisions, north and south of the Thames, each complete in itself with its unity of action unimpaired. But no heed was given to my representations in Parliament or to those of the sanitary reformers outside, though founded on years of practical experience: for they were unacceptable to the vestries, whose influence, joined to that of other interested parties, was then paramount. The measure was passed accordingly, unaltered in its main features, with the consequences which we have witnessed. Several greatly improved communications, indeed, and a grand work, the Thames Embankment, have been completed, at great, and I am informed undue, expense by the Metropolitan Board. But they found an ordnance map, and subterranean survey, finished with the lines of existing sewers and the levels of the streets marked upon it, and trial-works established for testing the best sizes for house-drains and sewers, the best mode of utilising sewage for agriculture, &c., so as to enable them to carry on vigorously the system inaugurated by their predecessors. Neither the Metropolitan Board nor the thirty-

six vestry boards have turned what they found prepared to much account. I have already spoken of the former's enormously costly mistake of the gigantic outfall sewers and their huge pumping engines. They have further made some 150 miles of main sewers, reported to be mostly sewers of deposit, only relieved by costly flushing which a self-cleansing system would have rendered unnecessary. After nearly a quarter of a century's experience of that Board, and of the thirty-six district authorities or vestries, we do not find the mortality diminished at all as it ought to be; we do not find the streets as much sweeter as they ought to be; we do not find their surface either as smooth or as clean as it ought to be, and as it is at Paris; we do not find the house-drainage as much improved as it ought to be. Not only do we hear of many private houses of the rich and very many more of the poor, but latterly of several public offices, as being much tainted with sewer gas. Not only the long notoriously pestiferous War-office, but even the stately new offices, are in disgracefully bad sanitary condition. At the Institute of Civil Engineers the chief engineer of the Local Government Board recently stated that no new public building in Great Britain could be in worse sanitary condition than was the office of his department; that the stench in some parts of it was sometimes horrible; that according to a report in his possession the sewers of Whitehall, Downing Street, Great George Street, and Victoria Street were flat-bottomed, never flushed, had a deposit of more than fifteen inches in them, and yet were unventilated. An excess of some seventeen thousand preventable deaths annually, about a hundred fires allowed to become serious and some twenty persons burnt alive for want of a system of hydrants under constant-pressure, are the penalties of this mismanagement. And yet, as we householders know too well, the rates have much increased and keep increasing, being swelled by the interest yearly payable upon the large debt of the Metropolitan Board, which, already, before last year, exceeded ten millions. I do not say that they have done no good with all this money: but I affirm none nearly commensurate with the cost, though the present Home Secretary, with his usual self-confidence, recently pronounced the works of the Metropolitan Board to be "dirt cheap."

In 1854, little more than half a year before my triumphant return for Marylebone, beating another Liberal who had the enthusiastic

support of the vestries, I published a pamphlet on 'Representative Local Self-government for the Metropolis,' which was freely quoted against me during the contest. I believe, however, it gained me more votes than it lost me. As subsequent experience and reflection have only confirmed me in the main views therein set forth, I think it not irrelevant to repeat them here, feeling satisfied that the bad sanitary example set by London is a serious impediment to the advance of sound sanitary principles and practice, not only in this country, but throughout the civilised world; and further, that London will not be much sanitarily improved until it has a better form of government.

I wrote in 1854, 'My present business is not with temporary palliatives, but with the redress of permanent grievances; for which, in other capitals, redress may be obtained by means of duly empowered local authorities; but which, in London, even when of the most trifling natures' (witness the Cab Act), 'can only be dealt with at the cost of legislative and administrative time and thought required for the interests of an empire upon which the sun never sets. No wonder that the inhabitants of the metropolis are dissatisfied with its present state and management.

'Hence the various schemes propounded for the purpose, of which the most prominent are—

'a. The creation of a vast Metropolitan Corporation, a seat in which, it is said, would be an honour not less worthy the ambition of our greatest merchant now-a-days than was a seat in the Corporation of the City in the days when all London was comprised within its walls.

'b. The erection of the several Metropolitan Boroughs into so many corporate towns, each with its own separate government, as if they were divided from each other by miles of intervening country, instead of by mere street-crossings.

'It seems to me that, as permanent systems, these are open to unanswerable objections.

'The two first would be representative, and so far *prima facie* would have the advantage of giving the inhabitants a government of their own choosing. But the first would establish at the very seat of the Imperial Government a representative assembly deliberating on the affairs of two millions and a half of inhabitants, all living within ten miles of the sovereign's palace and of the Houses of Parliament.

How far would it be safe to create a corporation representing a constituency like that of the Marylebone Vestry, only ten times as large, and administering an income, as I have shown, of some million and a half sterling per annum? How far would it be safe to establish an elective chief magistrate, governing a population about equal to that of the kingdom of Denmark, but concentrated on some 120 square miles, instead of being spread over upwards of 16,000? Both the income and population have largely increased since. 'Let the experience of foreign capitals be some warning upon this point.' The success of the mob when they destroyed the railings of Hyde Park has since proved that we need not look abroad for warnings.

'The second proposal, that of dividing London into several separate towns, each with its separate corporation, certainly looks plausible enough. Some idea of its operation, however, if applied to the present parochial or parliamentary divisions, may be obtained by looking at the management of the sewerage of London, when under seven separate commissions.' Having already described this, I need not repeat it.

'What I have exemplified by the instance of the sewers, holds equally good of all structural arrangements. I need not point out how large a proportion of metropolitan expenditure will relate to structural arrangements of various kinds, the improvement of thoroughfares, &c.; while the results of the separate action of the City police force tend to show that the evil of divided management is not confined to structural arrangements alone.'

'I think we may therefore conclude that the second plan would work neither conveniently nor economically, while it would be open, though in a lesser degree of course, to the objection of exposing the Government and the Legislature to the action of formidably powerful corporate bodies concentrated round their head-quarters.'

'The question, therefore, still remains to be solved, what kind of representative Government ought to be given to the inhabitants of London for the management of their local affairs?'

I then, after going at some length into the whole subject, summarized my conclusions as follows:—

1. That imperial interests render it undesirable for any one body to be invested with full municipal powers over the whole metropolis.
2. That unity of municipal government being thus repudiated, the

division ought, for the sake of vigour and unity of action, to be one of functions and powers, rather than of areas of jurisdiction; in other words, that the different independent governing bodies should resemble different committees of one municipality for the whole metropolis, rather than be separate corporations, each with full municipal powers over sections of the metropolis.

3. That, in the case of London, the two classes into which, as distinguished from other business not requiring unity of administration, municipal business naturally divides itself are, (1) the Regulation of Works, as of buildings, drainage, the supply of water and gas, paving, the maintenance and improvement of thoroughfares, bridges, &c.; and (2) the Government of Persons, including the administration of civil and criminal justice, the pursuit and punishment of criminals, the management of prisons, the direction of the police force, and the maintenance of order and decorum.

4. That these different sets of functions should be performed by three separate administrative bodies, each of such bodies comprising, in the first place, a certain proportion of popular representatives, frequently elected; and, in the second place, a certain proportion also of more permanent and independent elements.

5. That these bodies should be differently constituted from each other, with (1) different representative members, elected by differently qualified constituencies from different areas of representation; and with (2) different permanent members, differently chosen, and from different classes.

6. That, in the body having control over Works, the popular constituencies returning the first class of members should be divided according to the natural lay of the site of the metropolis, and should consist of the ratepayers; that the constituency returning the second class of members should be the ground landlords and long leaseholders; and that, in consideration of the small proportion of the administrative business to be transacted by the Board not immediately involving expenditure and taxation, the second class of members should be much less numerous than the first.

7. That the proportion of voters to the inhabitants ought, in the case of the body charged with the government of Persons, to be much larger; but that the proportion borne by the members returned by this constituency to the whole Board should be much smaller than in

the last instance; the proportion of business involving expenditure and taxation being in this case much less, the proportion of purely administrative and judicial business much greater: and that, for the same reason, the more permanent element, forming a majority of the Board, ought to be directly or indirectly appointed by the State.

8. That it would be easy, and probably expedient also, under the actual circumstances of the metropolis, not to place the management of the Police force and the administration of the criminal and civil justice under the proposed Board, but to leave them, as now, under the control of the Imperial Government. That, notwithstanding the reserve of these large functions, quite enough of business for the employment of the Board would remain in the regulation of prisons, lodging-houses, public conveyances, the house-to-house visitation of the poor, and the financial business connected with the government of persons: but that in this case a larger proportion of the representative element should be introduced into the Board, in consideration of this change in its duties.

And now, having, I fear, exhausted your patience and spent nearly all my time on London, I have not much left for speaking about sanitary matters in provincial towns and country parishes. With regard to the towns, I must repeat that all the best results have been obtained only where the works both of sewerage and of water supply were complete, and this is far from being general. We find Manchester, for instance, with its admirable system of water supply on a public footing, has a high mortality, because, I am told, its house supply is extensively deficient, and that it is in great measure a city of 'middens' and cesspits. The tub, happily abolished there as a receptacle for clean water, yet as a receptacle for stagnant filth frequently, but not frequently enough carted away, takes the place far too often, both unwholesomely and expensively, of the self-cleansing house-drain through which the sewage begins to flow off as soon as it enters.

In 1875 I moved for a Return of the sums spent on drainage and water supply in certain towns in Lancashire, and of the deaths from all causes, and specially from zymotic diseases, in the same years, and also of the duration of life of different classes in them, and in the county of Rutland. I will read them shortly to you, with regard to Manchester only.

In the ten years from 1864-1873:

	On drainage and sewerage	On water supply
Manchester spent	105,789 <i>l.</i>	863,544 <i>l.</i>
Rutland county spent	1,864 <i>l.</i>	certainly nothing

But the return in Rutland is incomplete as to drainage, though the amount is stated to be very small.

And there died:

	Manchester	Rutland
From all causes	82,424	20,329
Of zymotic diseases (more than $\frac{1}{8}$ th) 4,406 (less than $\frac{1}{10}$ th) 675		

The average ages at death in the thirteen years from 1861-1873:

	Manchester	Rutland
Of the gentry and professional persons and their families	44.6	48.1
Of tradesmen, &c., and their families	28.9	44.4
Of labourers, mechanics, and servants, and their families	24.4	36.0

I selected Rutland for comparison, knowing nothing about it except that it was an agricultural county so small that the information would, I thought, be easily obtainable.

To take another town. Those who know Birmingham and its fine site, declare that there can be no other reason why, instead of 24 in 1,000 according to the last returns, its deaths should not be 16 in 1,000, or even as low as they were several years at Dover, 14 in 1,000, except the inhabitants' ignorance of the duties of self-government: no reason why they should have an excess of 2,600 deaths above a healthy standard, except their neglect to profit by the sanitary lesson afforded, according to the statement of the Medical Officer of Health, by two institutions close to Birmingham. One of these is for destitute children, where the death-rate was only 3 per 1,000; less than a quarter, probably, of that to be found among the ill-cared-for population of that city, for whom the application of the same principles with the same results would save 1,600 children a year. The other excellent example is the prison, where the officer in charge stated that the death-rate among those who came in without already developed disease was not more than 2 in 1,000. A similar rate in that unfortunate city would imply the saving of more than 2,000 deaths annually. The wage-class there have had much said to

them by their leaders about the privilege of the franchise for themselves and others, a privilege justly dear to the citizens of a free country. But I cannot help thinking that it would be better for them to seek not less eagerly the privilege of living to their natural term of life, with a corresponding extension of the duration of their working ability. The highest eloquence of one of their two right honourable members, and the best administrative skill of the other, might be profitably directed among other objects to such an application of sanitary principles as would bring the condition of their independent constituents' children up to the level of that of pauper children in a well-regulated institution, and afford their honest constituents of the wage-class the same prospect of health and life as thieves have in a well-managed prison, or vagrants in a beggars' lodging-house under Lord Shaftesbury's Act.

Reminding you that the mortality of children under five affords the best and most delicate test of the healthiness of a place, I must give you a few figures about the three towns of which I have been speaking—London, Manchester, and Birmingham.

	London	Manchester	Birmingham
Estimated population in the middle of the year 1877	3,533,484	359,213	377,436
Deaths at all ages :			
Mortality per 1,000 living	21·9	27·4	24·2
Number registered	77,449	9,810	9,104
Number if mortality had not exceeded 17 in 1,000 living	60,069	6,107	6,416
<i>Number above the healthy standard of 17 in 1,000 living</i>	17,380	3,703	2,688
Deaths of children under five years of age :			
Deaths registered :			
Number	31,891	4,025	4,461
Proportion per 1,000 living	69·7	83·1	84·1
Proportion to 100 deaths at all ages	41	41	49
Number if general mortality were 17 in 1,000 living, and the proportion to total deaths were 25 per cent.	15,017	1,527	1,604
<i>Excess of deaths registered over number in preceding line</i>	16,972	2,498	2,857

We have had eloquent declamation enough about the horrors of war. Still, along with the terrible amount of suffering and crime incident to it, no one can deny that war also calls forth in the nobler natures engaged in it some of the finest qualities of man—patriotism, courage, endurance, self-denial, self-sacrifice—not to speak of the lofty Christian heroism of men like Havelock. If peace has its victories no less than war, peace has its victims far more numerous than war. For instance, the needless waste of life in the United Kingdom during the Crimean War, was many times greater than the loss of life in that war—a waste accompanied by the long train of physical, intellectual, moral, and spiritual evils involved in general degradation. All experience shows that, as a rule, dirt, disease, and vice are concurrent; that, with rare exceptions, families cannot lodge like pigs and live like Christians.

With regard to fresh legislation, the first Consolidated Sanitary Act of 1875 seems to embody most, though not quite all, that is wanted. The principle of distributing the cost of works, and especially of the smaller kind, over a series of years by the Improvement Rate, first sanctioned in the Metropolitan Sewers Act of 1848, has been far too little encouraged or adopted. It may seem rather complicated at first, but we found by the aid of tables it was easily worked, and it practically averted, to a great extent, difficult and intricate questions of ownership as regarded chargeability for such works, since the occupiers were generally satisfied that they received benefits from them well worth the extra rate to be paid for them. The principle, also, of engaging an officer's whole time for the public service, and employing it in any public duties not practically incompatible, seems worthy of much more extensive adoption; not only because of the great saving in trouble and correspondence, to which it conduces when co-operation between different authorities of any kind is required, but also because it removes the temptations to sacrifice public duty when it conflicts with private interest, which must sometimes arise in the case of a public officer having also private practice. Unfortunately the boundaries of the unions which must, now that the parish has been almost wholly superseded in that respect, be regarded as the unit of local administration in England, are in so many cases incongruous with those of the county as to present great, though I hope not insurmountable, difficulties in the way of what I have long wished for—the establish

ment of representative county boards as general intermediate authorities between the union and Downing Street. Administration is now much more in default than legislation. As the Sanitary Commissioners say in their Report:—

‘The system of self-government, of which the English nation is so justly proud, can hardly be applied with success to any subject, unless the governing bodies comprise a fair proportion of enlightened and well-informed minds; and if this be true as a general proposition, it is especially true in regard to matters affecting public health.

‘In the next place, many sanitary questions of vital importance are from their very nature incapable of being completely provided for by any amount of legal enactment, however minute and explicit. So large a discretion must of necessity be left to local authorities as to details, that in practice much will always depend on the energy and wisdom of those who compose such authorities. Moreover there are limits to the power of any central authority to remedy the evils produced by local inefficiency. It may control, stimulate, and in some cases supplement the efforts of local bodies, but it cannot be a substitute for them.’

This has been practically recognised by the Legislature, and as Dr. Acland truly observes in his recent address:—

‘On the education and voluntary action of the people depends now before all things their sanitary condition. They have the means of obtaining knowledge, they have the means of obtaining power. If they have the will they can obtain both. There are good books now and to spare on every branch of the question—legal, engineering, chemical, medical, &c.’

I further agree with him when he says:—

‘Compulsory powers should only be exercised by the central authority in the most extreme cases, and this should be clearly understood to be the principle of action; but, as a corollary, the central authority should with the utmost freedom collect the best information, and disseminate it in the freest way. If the Treasury should not sanction the gift of Reports, every local official should receive notice of all Government Health publications, with the statement of the contents, cost, and where to obtain them, immediately on their issue. This would promote progress of education—

and would, quite certainly, be done, and is the least that would be done, *mutatis mutandis*, by any large private company dealing with the subject. It is being done to some extent by the model bye-laws recently issued, but should be done much more extensively.’

This constant diffusion of sound principles and of practical information by the wide distribution of these official Reports, as well as by their general circulars and separate letters to the unions, was largely practised by the early Poor Law Commissioners. But I found, when I became secretary to the Poor Law Board, that very little more than the mere necessary formal sanctions and orders had been for some time issued from the office. The same remark applies to the change of policy in sanitary matters on this point ever since the suppression of the first General Board of Health.

When the Treasury were stopping the former wide circulation of Reports, &c., on the plea of expense, I hardly ever recollect any member of any Government throwing any impediment in the way of the granting and printing of masses of useless papers moved for in either House, however useless he knew printing them to be. The mere adoption of the system of printing large numbers long adopted by the Statistical Society, of omitting the hundreds or thousands in all cases of tables of figures where minute accuracy is not required (and to how vast a proportion of them does this not apply?), would have saved over and over again the cost of continuing freely to diffuse information tending the weal and wealth, because the health, of the community. It was economising the means of economy. *Magnum vectigal parsimonia*. But refusing the useful expenditure pleased many of the same class of members that refusing the useless expenditure would have offended.

Ministers may declaim grandly about sanitation, yet we have always found honours and encouragements markedly withheld from every sanitary reformer—*laudatur et alget*. The Local Government Board has for some time had the double charge of supervising the poor relief and the sanitary administration of the country. I am sure I am not at all disparaging the valuable public services rendered by my friend Sir John Lambert, when I compare his in both departments with those of my valued and honoured old friend Mr. Chadwick, who took the chief part in preparing the great Poor Law Reform Act of 1834, as well as the convincing and exhaustive Report

of the Commission of Enquiry, which paved the way for it; and who, after years of able and energetic work as secretary to the Poor Law Commissioners under that Act, equally prepared the way, by his masterly Sanitary Report of 1842, for the Public Health Act of 1848, and afterwards, as member of the General Board of Health under that Act, rendered such valuable services (nowhere so little appreciated as in his own country) to the cause of sanitary reform throughout the world. Not only have foreign sovereigns recognised this on various occasions, but the illustrious Institute of France years ago paid him the rare compliment of electing him into their body. Yet, while Sir J. Lambert has deservedly been made a Knight Commander, his far greater predecessor is only a Companion, of the Bath. To take another striking example, Mr. Rawlinson, sanitary engineer to the same department, of whom I have already spoken, received the same honour as Mr. Chadwick; but it was for service in Lancashire during the cotton famine, not as any acknowledgment of his successful sanitary work already described. Sir J. Bazalgette has also received the same distinction, and was knighted, if I am not mistaken, on the completion of his largest and most costly failure. I must add one more signal instance of long official neglect—the name of Dr. Farr, known and honoured by every zealous statistician and sanitary reformer throughout the civilised world.

But, generally, when I compare the rewards given for the intentional destruction of life in war, a process alas! dating very early indeed in the history of our race, with those given for the intentional saving of life by prevention, as distinguished from the cure, of disease, a process never systematised on any scale—indeed, hardly thought of, I may say—before the nineteenth century, I am painfully struck by the contrast. Not that I desire at all to detract from the praise or rewards bestowed on patriotic and effective service rendered to the country in war; but I think such victories of peace, conducing hardly less to the moral than to the physical well-being of man, ought also to have their fair share of national recognition and national gratitude. For example, the most brilliant sanitary service probably ever rendered was that performed by the First General Board of Health in repressing epidemics. This was remarkably attested by one of the Czar's physicians at the last Congress of Hygiene at Brussels. He there stated that in each successive outbreak of cholera at St. Peters-

burg treated on the old system, the loss of life had been from 23,000 to 25,000. He said it was to England they owed the effective prophylactic measures which had enabled them successfully to meet the next attack. It was the adoption of the practice elaborated by the First Board of Health of dealing with the premonitory symptoms that had reduced the mortality in that attack to $\frac{1}{4}$ th of that in the previous ones. It was estimated at the time, on comparing the mortality in other places (and thus Russian evidence fully justifies the estimate), that 60,000 lives had been saved in England by the way in which cholera was there encountered. What would have been the reward if a similar loss of life had been inflicted on an invading army when repulsed with equal success from our shores? But what public acknowledgment was made of this signal, though peaceful service? What reward was given to those who had anxiously and laboriously rendered it? None! Again, when preventable sickness had done in the Crimea what the enemy's sword had failed to do, had destroyed our first army there, and the War Minister declared publicly that the application of sanitary science and the skill of the officers applying it had saved our second army there, and sent it back in better health than our army had ever had at home, what reward was given either to the devising heads or the executive hands that had wrought this change? Again, we must answer, None.

We are compelled to ask, after this experience of various successive ministries, Is saving life by preventive measures to be recognised as any service or not? Is it to have, as in the professions for destroying life, that acknowledgment of service rendered, which gives position and precedence at once to facilitate and to encourage men in rendering like service in future?

As it seems clear that sanitary reform, though commended in general terms, has not enjoyed, nor is likely to enjoy much official sympathy, and though praised in the abstract is always liable to incur Parliamentary and municipal opposition in practice, we must endeavour, now that pretty sound legislation upon it has been obtained, to influence as far as possible public opinion on behalf not only of its principles, but its details, co-operating heartily with the many societies and associations, to say nothing of the many private individuals, who have done so much to elucidate and stimulate an interest in the subject under its various aspects. We must try to enlist general ad-

ministrative action in conformity with them; and in this term I would comprehend all administrative bodies from the Cabinet down to the school managers of the country parish: and not administrative action alone, but family action and personal action, and that not of the men only, but also—I may almost say mainly—of the women, and especially of the mothers. Not only is there nothing unfeminine in the action we ask of them, but it is pre-eminently in their own province, and essentially womanly.

And now let me commend to your sympathy and support a most valuable but unobtrusive Association, though enjoying the patronage of some of the highest in the land—the Ladies' Sanitary Association, which has enlisted among its helpers and counsellors various able and benevolent men, and among them the scientific, eloquent, and genial President of this Institute, but has never quitted its own modest sphere of work for one more ambitious or conspicuous. It is ready to co-operate with all engaged in the good cause, but its particular object is to diffuse sanitary knowledge and promote sanitary reform, especially among the poor; and it tries to do this very much, among other ways, by distributing plain little sanitary tracts among them; instituting mothers' meetings and classes of adult girls, and giving them sanitary and domestic instruction, and establishing nurseries for motherless babes, which may serve as schools for mothers of all classes, schoolmistresses, and nurses. It seeks to form branch associations. I trust that it will before long be able to count many.

I have trespassed already much too long on your attention. But I must remind you in conclusion that the cause of Sanitary Reform appeals not only to enlightened self-interest, but to our feelings of humanity and sense of religious duty. The law given by God to Moses comprised regulations recognised to this day as of great practical sanitary value, and our Divine Master and Great Example not only spake as never man spake, but showed His tender regard for the bodies as well as souls of men by going about doing good while upon earth, healing the sick, making the blind to see, and the lame to walk, and ministering to bodily wants and bodily suffering.

ADDENDUM.

THE question of the establishment of some complete representative local government for the metropolis has latterly attracted so much attention, and, thanks to the late Government's proposal for buying up the Water Companies, and the present Home Secretary's course in the Select Committee on that proposal, seems likely to attract so much more, that I have thought it worth while to reprint a few pages which I wrote upon the subject more than a quarter of a century ago, after several years' experience of local administration in the chair of the Metropolitan Commission of Sewers, as well as in the secretaryship of Poor Law Board, to say nothing of what I had gained as one of the chairmen of Quarter Sessions in Devonshire, and as chairman or vice-chairman for many years of the South Molton Board of Guardians.

'I find the necessity of special legislation, or rather of state regulation, for capitals as distinguished from mere provincial towns, to have been distinctly recognised when Constantinople became the seat of the Eastern Empire. For, as such, that city had many of its local concerns regulated by the Emperors Theodosius, Justinian, and others, in a series of laws hardly less exceptional and metropolitan in their character than those settled within the memory of men yet living, by the founders of the federal government for their new capital, Washington. Indeed, if it were my present purpose to establish the principle, I should feel bound to dwell at length upon the concurrent testimony of so many countries and so many ages.' 'But assuming the general principle to be admitted, keeping the political danger in view, and having regard to the necessity which it implies of so dividing and balancing municipal powers as to ensure their due subordination to the State, we will proceed to inquire how, in the organisation of our own capital, the vigour belonging to unity of administration may be combined with the constitutional advantages of local self-government.

'It seems to me that this can be done, but done only on one principle—viz., that of dividing the several functions or departments of government among separate and independent bodies, by extending the action of each over the whole area of the metropolis; instead of combining, as is the usual practice, all these functions under one body, and giving to that body, within a limited area of jurisdiction, supreme authority over all such matters. In each case, you will observe, there would be several governing bodies; but in the one case, each body would exercise *all* municipal functions within a *partial* area; while in the other case, each body would exercise only *one* class of functions

over the *whole* area. In short, I propose that the Legislature should, for the management of the vast local affairs of the metropolis, establish in the shape of separate and independent bodies, that very division of labour which the municipalities of even the smallest boroughs have, in the shape of their separate Watch, Works, &c. Committees, everywhere long established for themselves.

'The categories under which municipal functions naturally fall seem to be the following:—

'1. Those relating to the regulation of works—such as water supply, sewerage, gas supply; the improvement and maintenance of thoroughfares, roads, pavement, &c., of the banks of the river, quays, and bridges; scavenging and the removal of nuisances, including the prevention of smoke.

'2. Those relating to the government of persons, including the administration of justice, civil and criminal, and the maintenance of public order and decorum; in other words, the direction of the police force; the protection of life and property, the detection, apprehension, trial and punishment of offenders; the management of prisons, to which I should add the relief of the casual poor, and the correction of professional vagrants; the control of lodging-houses; house-to-house visitation of the poor; the regulation of markets; the regulation of river steamers, cabs and public carriages, and of theatres and places of public amusement.'

'In each of these departments, inconsistencies of jurisdictions, incongruity of operations, and pecuniary waste would, obviously, result from any division of the area of administration.'

'Classing the above mentioned bodies (which we have assumed to be more or less representative in their character) as being respectively charged, the first with regulation of works, the second with the government of persons, it would seem desirable to create different constituencies, with different electoral divisions and different qualifications for each, in order to prevent their identity; the object being to weaken their influence if they sought to enter upon political questions, or to touch subjects beyond their own proper sphere.

'My experience, while guardian in Devonshire, for nearly fifteen'—now nearly forty—'years, and as secretary to the Poor Law Board for nearly three, convinces me that the presence in each body of certain permanent and more independent elements, analogous to the ex-officio Guardians, would much conduce to stability and continuity of policy, as well as to fairness of administration in many instances where, as in the case of the poor law, other interests besides those of the immediate ratepayers are concerned. While the experience of the poor law unions in general demonstrates that such a combination of different classes in one Board, far from realising the predictions of its opponents as to its probable aggravation of existing class antagonism, works well and harmoniously, and has tended to the promotion of mutual good feeling and confidence.'

'The obvious electoral divisions for the first body or board would be thus indicated by the natural drainage areas, irrespectively of political or other arbitrary limits. The separate areas for election would

thus correspond, to a certain extent, with separate local interests, and with separate rates of payment, for general and district works, as under the Metropolitan Sewers Act, according to the different amounts of benefit received in each locality.'

'It would appear reasonable to include all ratepayers in this constituency; since all such are, as occupiers of houses, sufficiently interested in the proper drainage and water supply of their homes, and in the proper paving, cleansing, and lighting of their streets, to be willing to pay something for these advantages. At the same time, these settled but temporary occupiers of houses, being a decided minority of the population, are not by any means the only parties thus interested; nor are their interests in all respects identified either with those of the landlords on the one hand, or of the inhabitants at large on the other.

'The interest of the owner of the freehold (a class of which there are singularly few in London) is obviously that the structural arrangements on and about his property should be as lasting and good as possible; and it would in so far coincide with the interest of the population at large. But the interest, real or apparent, of the ratepayer, or temporary occupier, is, that the minimum of expense should be incurred during the period in which he pays rates, the permanent efficiency of the work being to him a secondary object.' 'And it has always appeared to me that, under the Municipal Reform Act, too large a share of power has been given to the ratepaying class, with too little protection both to the large and unrepresented majority below, and to the small and equally defenceless minority of owners above them in the social scale; and that much of the backwardness of our municipal Corporations in promoting sanitary improvement is attributable to this cause.'

'I should, therefore, propose that of the permanent members of the body entrusted with the structural concerns of the metropolis, a certain number, not exceeding one-third of the whole body at the utmost, should consist of the representatives of landlords, elected out of the landlord class independently of the ratepayers. One-third is, as your lordship will remember, the proportion of landlords admitted under the Irish Poor Law as ex-officio members in the somewhat analogous case of Boards of Guardians.' The representation of owners given in the Public Health Act of 1848 has long seemed to me one of its points of superiority to subsequent Acts. I have always contended that in England the ratepayers are over-taxed and over-represented.

'With regard to the next body, that charged with the duties relating to the police and internal management of the metropolis, it seems obvious that, as these functions concern less the natural features of the site than the artificial arrangements of man, the electoral districts should be formed in accordance with some pre-existing and well-known boundaries, such as those of the metropolitan parliamentary boroughs, or if they be thought too large, of the London unions, and large parishes under local Acts.

'The permanent members of such a Board would, from its connexion with judicial and quasi-judicial functions, obviously consist of

magistrates appointed either directly or indirectly (through the Lord-Lieutenant) by the Crown; with the addition of some few other specially qualified persons, chosen by the Executive to watch over the imperial interests involved in the proper discharge of such duties, in regard to so vast a population concentrated round the seat of government. It is easy to see that, in the case of a body entrusted with functions already performed throughout London (except in the small jurisdiction of the City) by commissioners of police or magistrates under the direct authority of the Crown, the proportion of the representative element should, on every account, be much smaller than in the case of the Board last discussed. For, whereas there the popular element would preponderate greatly, here it should be considered rather as a modifying and harmonising element admissible only to the extent of one-third, or at the utmost, one-half of the whole body.

But it is more difficult to say upon principle what ought to be the qualification of the constituency for the election of this representative element. That it should be such as to give a broad and popular basis to the elections, may, I think, be safely affirmed, seeing that not only the house renters, but even the lodgers in the metropolis are deeply interested in the due discharge of these duties. Indeed, it should not be forgotten that the aggregate payments of the lodgers constitute a large portion of the aggregate rental paid by the householders of the metropolis, and in a multitude of individual instances very far exceed it. My own impression would be that (excluding of course the usual disqualified classes of paupers and criminals) something like household or "pot-walloping" suffrage would be the most expedient, with the addition of all single lodgers qualified, either by paying a certain amount of taxes, or by receiving a certain amount of annual salary or wages, or by having passed certain educational or professional tests; or by having made a certain provision for themselves or for their families hereafter in the shape of so much deposit in the savings bank, or of membership for so long of a friendly society or provident association. This class of lodgers comprises many young single men of intelligence, prudence, and respectability,—many who form quite the *élite* of the labouring classes, and whose exclusion from a vote at these elections, supposing the householders admitted, would in my opinion not only cause just discontent, but also render the choice of fit men less probable.

It is still more obvious with regard to the second body than the first, that very considerable powers both of superintendence and control ought to be reserved to the ministers of the Imperial Government; and that the paid officials should be all appointed, either directly by them, or at least with their concurrence. The chief appointments connected with the police, if the management of that force should be given to this Board, should be subject in like manner to imperial control. In short, the final and absolute authority of the representative body should be very much limited to the grant or refusal of the supplies demanded for particular purposes. Nor could this amount of restriction upon the popular will, in such matters, be reasonably objected to, when it is remembered that all the police rates, and the county rates for the maintenance of prisons, &c., are levied at present without consulting the ratepayers in any way whatever.

It is obvious that, if considered desirable, several of the functions proposed to be included under the management of this one body might be taken off and given to some other authority, and the constitution of the Board might be modified accordingly. A much larger proportion of popular representatives ought, for instance, to be admitted into the Board, if, as might possibly [I should now say almost certainly] be thought expedient, the control and management of the police force (amounting to a small army in the metropolis), and the administration of justice, were still left, as now, to Crown-appointed commissioners and magistrates under the authority of the Secretary of State, instead of being, as in the City, vested in popularly elected authorities. But it would seem hardly possible for both these opposite systems of magisterial appointment and police management to be right, and the application of each to neighbouring parts of the same town expedient. Indeed, popular witnesses on the City inquiry, such as Mr. Travers, Mr. Elliott, Mr. Dillon, and Mr. Thomas Hankey confirm this view. And the testimony they bear to the superior working of the paid magistracy and of the general metropolitan police under the commissioners, as compared with that of the aldermen on the bench and the isolated City police, leave us no doubt which of the two systems ought to give way and be assimilated to the other.

I further said that the house-to-house collection of voting papers 'has more than doubled the number of votes given, by affording opportunities of expressing their opinions, not only to many sensible and honest men, who otherwise would not have been able to vote at all, but also to many men not unfit for the franchise, who would not have been willing to make the sacrifice of time and trouble, or to undergo the publicity of polling in the ordinary way.'

It has been shrewdly observed that, especially in the middle and lower ranks, those who occupy themselves most about elections and politics are either the best or the worst citizens. The best take part in public affairs from a sense of duty, religious or patriotic; from a generous spirit of attachment to the person or the cause they espouse. The worst busy themselves in party contests, either from a love of the excitement, the conviviality, and gossip attending an election; or from the expectation of deriving advantages, in the shape of patronage or jobs, which more high-minded men would scorn. There is, however, a large intermediate class of men of average industry and character, who, caring much for their own interest and their families, and comparatively little for public measures or public men, can with difficulty be prevailed upon, however decided their preference, to support either one side or the other at the sacrifice of any of that time and trouble they value so highly, and know so well how to turn to account. So comparatively few of them go to the poll.'

The MAYOR, in proposing a vote of thanks to Earl Fortescue, said he was sure all felt deeply indebted to his Lordship, and personally he felt that the Institute had done Exeter honour in selecting it for a visit at so early a stage of its existence. Although some little difficulty had been raised to a proposal made that some members of the Institute should make a tour of inspection and report, yet he hoped that it

would be found possible to meet the proposal, so as to give the city the advantage of their views.

The BISHOP OF EXETER, in seconding the motion, remarked that he could hardly conceive an address more suited to the purpose than that to which they had just listened. Personally, he had watched with the greatest interest the progress of sanitary legislation in this country, and he confessed that he had felt the greatest indignation when he had seen that something had prevailed other than true science, and that retrograde steps had been often taken which, when worked out, showed that the worst policy had been adopted. Nevertheless, it was undeniable that in the long run they generally learnt by mistakes, and the great value of Lord Fortescue's address would be in arousing them to consider what should be done in the future rather than in recalling the mistakes of the past. It was not possible to undo a great deal that had been done, but it was possible to follow better principles, to make them more generally understood, and to exercise an intelligent interest in people so as to make them see on which side they ought to throw their weight. His lordship advocated the throwing aside of mere crotchets, and he pointed out that the work was of especial interest to his own profession, inasmuch as soul and body were bound together, and if one was degraded, degradation must be caused to the other. Man rose in the scale of being as he was able to purify not only his soul but his body also, and to make it such as the Creator intended it to be.

The vote having been acknowledged by EARL FORTESCUE—who remarked that the best thanks of the citizens would be in their going through the town, seeing what was required, and getting it done—a vote of thanks was, on the motion of

Mr. CHADWICK, C.B., proposed to the Mayor, and it was explained that the inspection of the town in a single morning—as had been suggested—would be impossible so far as obtaining sufficient information upon which to base a really valuable report was concerned. The way to get at defects would be for the members of the governing body to themselves visit a district immediately fever broke out, and then they would see the evil and be able to devise steps to meet it.

Mr. ROBERT RAWLINSON, C.B., in seconding the motion, said that the members of the Institute came there not to glorify themselves, but to teach the citizens of Exeter anything in their power. This was the first time he had visited Exeter, and as one who had had perhaps as wide experience as anyone as an engineer, he might tell them that this was a city that could be easily and cheaply sewered, although in ignorant hands it might be very difficult and costly to sewer, and at the end they might be worse off than at the beginning. He understood that they had not yet begun the work, and he counselled them to get the very best advice before they did begin. Exeter was a town of 45,000 inhabitants; but if any engineer told them that the work would cost three times 45,000*l.*, they should not believe him, and should not accept his plans, because it was possible to carry out an efficient system of sewers cheaply,—sewers that would answer much better than those built at the sum he had indicated. Enormous amounts had been wasted in extravagant works, and enormous mis-

chief had been done by works executed in a wrong manner. There were steep gradients in Exeter, and a man who sewered them must have a practical knowledge of what to do, or the rush of water would soon cut them up. It must be remembered, too, that gas flowed one way and water the other. Whilst the steep gradients would carry the floods rapidly down, gases would accumulate, and be forced rapidly up. There were towns in England which spent large sums of money in sewers, but the ignorant execution of the works simply raised the death rate of the towns possessing sewers of that character. He therefore, on the threshold, counselled Exeter to be cautious. They should get the best advice, and then set to work earnestly to carry out a proper system of sewers which would form the basis of house drainage. Here, again, it should be remembered that immense mischief was caused by the improper drainage of houses. Many houses were connected directly with sewers, were actually, indeed, the ventilators of these sewers, and the fact that more mischief was not caused than at present was due to the fact that every house was a ventilator, and so the poison was to a certain extent diluted. A house should be drained distinctly from the sewers—the house drains should be cut off effectually from the sewers, and there should be no possibility of sewer gas entering the walls of any human dwelling. If this principle was not adhered to, they would do mischief by sewerage where they expected to do good.

The vote was carried *nem. con.*, and the MAYOR, in response, said he had no taste for visiting the fever dens of the city or anywhere else, as he had had a most painful experience of the evil caused by these diseases.