

## REPORT OF THE JUDGES OF THE EXHIBITION, BOLTON, 1887.

We, the undersigned, the Judges appointed by the Council, beg leave to recommend to the Council the following distribution of Medals and Special Certificates, and of Certificates of Merit.

Exhibits which have already received Medals at the previous Exhibitions of the Institute are excluded from awards of Medals, but those Exhibits to which a second Medal would otherwise be awarded receive Special Certificates, and these are distinguished in the following list by asterisks.

### MEDALS AND SPECIAL CERTIFICATES.

#### CLASS I.—CONSTRUCTION AND MACHINERY.

- \* DOULTON & Co., *Lambeth*, for Peto Fireproof Flooring.
- FOX, W., *Leeds*, for Corrugated Steel Tyre.
- \* GREENALL & Co., *Manchester*, for Steam Washer.
- MANLOVE, ALLIOTT, FRYER & Co., *Nottingham*, for Johnston's Dryer.
- ROTHWELL, W., *Bolton*, for Power Knitting Machinery.

#### CLASS II.—SEWERAGE AND WATER SUPPLY.

- \* DOULTON & Co., *Lambeth*, for Self-adjusting Joint for Stoneware Pipes.
- \* HEAP'S DRY CLOSET Co., *Manchester*, for Dry Earth Closet without Separator.

INTERNATIONAL WATER AND SEWAGE PURIFICATION Co., *London*, for Material for Filtering Water.

- \* MORRELL'S SANITARY COMPANY, *Manchester*, for Morrell's Cinder Sifting Ash Closet.
- \* WHITE, W. P., & Co., *London*, for Nicholls's Soot and Salt Closet.

#### CLASS III.—HEATING, LIGHTING, AND VENTILATING.

BENNIS, E., *Bolton*, for Smoke Preventing Mechanical Stoker and Camel Furnace.

ELLIOTT, EDMINSON & OLNEY, *Manchester*, for Welsbach's Incandescent Gas Burner.

- \* KIRKHAM, J. & W., *Bolton*, for the Blackman Air Propeller.
- VICARS, T. & T., *Liverpool and London*, for Mechanical Smoke Preventing Stoker and Furnace.

#### CLASS IV.—PERSONAL HYGIENE, FOODS, FILTERS, AND DISINFECTANTS.

BURROUGHS, WELLCOME & Co., *London*, for Digestive Ferments and Invalid Food Preparations.

- \* CONSTANTINE BROS., *Bolton*, for Jaeger's Sanitary Clothing.
- GALLOWAY, J., *Bolton*, for Plant for Aërating Mineral Waters.
- HASLAM, LEWIS, *Bolton*, for Kershaw's Cellular Cotton Fabric.
- A MAGNETIC FILTER COMPANY, *London*, for Spencer's Magnetic Filter.
- \* MANLOVE, ALLIOTT, FRYER & Co., *Nottingham*, for Washington Lyon's Steam Disinfectant.
- TAYLOR'S CABINET MAKING AND UPHOLSTERY WAREHOUSE, *Bolton*, for Chorlton's Invalid Iron Bedstead with Wire Mattress.

#### CLASS V.—MISCELLANEOUS ARTICLES OF SANITARY INTEREST NOT INCLUDED IN THE ABOVE CLASSES.

- GALLOWAY, J., *Bolton*, for "Lightning" Fire Extincteur.
- HASLAM, J., *Bolton*, for "Reality" Hand Fire Extincteur.
- LOVIBOND, J. W., *Salisbury*, for Tintometer.

### CERTIFICATES OF MERIT.

#### CLASS I.—CONSTRUCTION AND MACHINERY.

- GALLOWAY, J., *Bolton*, for Gun Metal Boiler Fittings.
- GALLOWAY, J., *Bolton*, for Sight Feed Lubricator.
- GREGSON, J., *Bolton*, for Removable Rain-water Pipe.
- HEMBRY & Co., *Manchester and London*, for "Through-colour" Linoleum.
- HINDLE, NORTON & Co., *Oldham*, for "Acme" Door-Check and Spring.
- A SANITARY DRY LIME Co., *Bootle*, for Sanitary Dry Lime.
- B THOMPSON, H., & Co., *London*, for Magnetic Oxide Paint.
- WRIGHT & Co., *London*, for Fireproof Fixing Blocks.

#### CLASS II.—SEWERAGE AND WATER SUPPLY.

- CUERDEN, R., *Bolton*, for Morrison's Spray Lavatory.
- CUERDEN, R., *Bolton*, for Shanks's "Imperial" Lavatory.
- CUERDEN, R., *Bolton*, for Shanks's "Reliable" Water-waste Preventer.
- CUERDEN, R., *Bolton*, for Shanks's "Tubal" Wash-out Closet.
- DOULTON & Co., *Lambeth*, for Stoneware Safety Pipes, in Long Lengths.

A These were exhibited at York, but the testing was not completed in time for the last report.

B This was exhibited at Leicester, but the testing was not completed in time for the last report.

DOULTON & Co., *Lambeth*, for Improved Siphon Flush Tank.  
 PARKINSON, SWEANEY & Co., *Manchester*, for Air-tight Soil Pail,  
 with Slide Catch.  
 PARKINSON, SWEANEY & Co., *Manchester*, for Laws' Pathway  
 Rubbish Receiver.  
 VAUSE, J., & SON, *Bolton*, for Cast-iron Smooth Bore Drain Pipes  
 and Fittings.  
 VAUSE, J., & SON, *Bolton*, for Craig's White Enamelled Sinks.  
 VAUSE, J., & SON, *Bolton*, for Ruffard's Enamelled Fire-clay Bath.  
 VAUSE, J., & SON, *Bolton*, for Shanks's "Imperial" Lavatory.  
 VAUSE, J., & SON, *Bolton*, for Shanks's "Reliable" Water-waste  
 Preventer.  
 VAUSE, J., & SON, *Bolton*, for Shanks's "Tubal" Wash-out Closet.  
 VAUSE, J., & SON, *Bolton*, for Shanks's Urinal with Tilting Flusher.  
 VAUSE, J., & SON, *Bolton*, for Shanks's Wash-out Closet and  
 Cistern combined, for Country Use.  
 WHITE, W. P., & Co., *London*, for Nicholls's Soot and Salt Urinal.

#### CLASS III.—HEATING, LIGHTING, AND VENTILATING.

CONTROL AIR PROPELLER COMPANY, *Bolton*, for Humidifier and Air  
 Inlet.  
 ELLIOTT, EDMINSON & OLNEY, *Manchester*, for "National" Kitchen  
 Range.  
 HANCOCK, F. & C., *Dudley*, for New Cooker and Steamer.  
 HARGREAVES & BARDSLEY, *Oldham*, for "Eclipse" Gas Governor.  
 MARITIME AND GENERAL IMPROVEMENT COMPANY, *London*, for  
 Portable Electric Glow Lamp.  
 STOTT & Co., *Manchester*, for Combined Gas Governor and Cut-off  
 Valve.  
 WILSON, CHARLES, & SONS, *Leeds*, for Open Gas Fire.  
 WILSON, CHARLES, & SONS, *Leeds*, for Gas Kettle.

#### CLASS IV.—PERSONAL HYGIENE, FOODS, FILTERS, AND DISINFECTANTS.

BARLOW, W., *Bolton*, for "Souple" Boots.  
 CALVERT, F. C., & Co., *Manchester*, for Soluble 70 per cent. Car-  
 bolic Acid.  
 CLEWORTH, ISAAC, *Bolton*, for Cadbury's Chocolate and Cocoa  
 Essence.  
 HUMPHREYS & THOMAS, *Narberth*, for All-Wool Flannels (Undyed).  
 LYTHGOE, W. R., *Bolton*, for Confectionery with harmless colouring  
 matter.  
 MORRELL'S SANITARY COMPANY, *Manchester*, for Cinder Sifting  
 Dust Bin.  
 ROTHWELL, W., *Bolton*, for Woollen Fabrics

#### CLASS V.—MISCELLANEOUS ARTICLES OF SANITARY INTEREST NOT INCLUDED IN THE ABOVE CLASSES.

MARITIME AND GENERAL IMPROVEMENT COMPANY, *London*, for  
 Loeb's Respirators.  
 PECK, J. H., & Co., *Wigan*, for Ambulance Stretcher for Use in  
 Mines.

The following, which have gained awards at previous Exhibitions,  
 are now so well known and their merits are so fully appreciated,  
 that the Judges do not think it necessary to make any further award  
 to them:—

Moule's Earth-Closet.  
 Calvert's Pure Carbolic Acid.  
 Potts' Edinburgh Sewer Trap.  
 Buchan's Disconnecting Trap.  
 Buchan's Access Pipe.  
 Stott's Mercury Gas Governor.

In conclusion, the Judges would call attention to a resolution of  
 the Committee with reference to the deferred Exhibits. Hitherto it  
 has been the rule to charge Exhibitors a small fee towards the ex-  
 penses of the necessary arrangements for testing the deferred Exhibits  
 in London. These fees have been only nominal, and in many cases  
 the expenses have been largely in excess of the fees received, some-  
 times six or eight times as much. The burden on the Exhibitors has,  
 therefore, been very slight. This year, however, the Committee has  
 decided to relieve the Exhibitors from even this nominal charge, and  
 to meet the expenses of testing the deferred Exhibits out of the funds  
 of the Institute.

We regret that we are unable to recommend the award of the  
 Richardson Medal.

(Signed) ROGERS FIELD, B.A., M.Inst.C.E., *Chairman*.  
 A. WYNTER BLYTH, M.R.C.S.  
 W. H. CORFIELD, M.A., M.D.  
 W. EASSIE, C.E., F.L.S., F.G.S.  
 BALDWIN LATHAM, M.Inst.C.E.  
 HENRY LAW, M.Inst.C.E.  
 T. HAYTER LEWIS, F.S.A., F.R.I.B.A.  
 LOUIS PARKES, M.D.  
 J. WALLACE PEGGS, A.M.Inst.C.E.  
 ERNEST TURNER, F.R.I.B.A.

## ANNUAL REPORT OF THE COUNCIL FOR 1887-8.

THE Eleventh Annual Report, which the Council now submit, has this special feature of interest; that on account of the anticipated amalgamation with the Parkes Museum it will probably be the last report of the Council of the Sanitary Institute as at present constituted.

The Anniversary Meeting was held in the Parkes Museum on July 14th, 1887. The chair was taken by Sir Douglas Galton, K.C.B., F.R.S., who presented the Medals and Certificates which had been awarded to the successful Exhibitors at the Exhibition at York in 1886, and an address was given by Dr. G. V. Poore, on "The Shortcomings of some Modern Sanitary Methods."

The Congress was held in the town of Bolton, under the presidency of the Right Hon. Lord Basing, F.R.S. Unfortunately an important strike which prevailed in the town at the time considerably interfered with the pecuniary success of the meeting. There were present seventy-five Members of the Institute; and one hundred and seventy tickets were taken by Associates of the Congress.

The Sanitary Authorities of Manchester, Salford and other towns, appointed deputations or representatives to attend the Congress.

Many interesting subjects were brought forward in the various Sections, a full report of which, with the papers read and the discussions upon them, will be found in the forthcoming ninth volume of the Transactions.

The Conference of Medical Officers of Health, which was held in connection with the Congress for the first time at York, was repeated and further developed at Bolton, a whole day being devoted to the papers and discussions. These Conferences have been well attended, and have proved to be a very satisfactory addition to the work of the Congress.

The Exhibition was held in the new Drill Hall, to which a special Annexe was added.

Cookery Lectures were given each day in the Exhibition, and also demonstrations of Butter making and other Dairy work.

The Exhibition was open twenty-nine days, and was visited by about twenty-seven thousand persons. There were one hundred and

twelve Exhibitors. The Judges awarded six Medals, eight Special Certificates, and thirty Certificates; the Special Certificates being awarded to exhibits which had received medals at previous Exhibitions of the Institute. Fifty-six Exhibits were deferred for further practical trial and testing. The results of these trials will be reported at the Anniversary Meeting in July, when the Medals and Certificates will be presented.

Two Examinations of persons desirous of qualifying for the appointments respectively of Local Surveyor and Inspector of Nuisances were held in June and November. In June seventy-seven Candidates presented themselves, nine for the former and sixty-eight for the latter Examination. The Examination extended over two days, being partly written and partly oral. Four Candidates were certified to be competent, as regards their Sanitary knowledge, to discharge the duties of Local Surveyor, and forty-four to discharge those of Inspector of Nuisances. In November sixty-two Candidates presented themselves, eight as Local Surveyor and fifty-four as Inspector of Nuisances. Three Candidates were certified to be competent, as regards their Sanitary knowledge, to discharge the duties of Local Surveyor, and thirty-one to discharge those of Inspector of Nuisances. The total number of Candidates—one hundred and thirty-nine—is a larger number than that recorded in any previous year.

Many of the Candidates have derived much benefit from the courses of Lectures arranged by the Parkes Museum, which are always well attended.

Since the Institute was first established twenty-two Examinations have been held, and four hundred and eighty-four Candidates have been examined. Forty-nine have passed the Examination for Local Surveyor, and two hundred and seventy that for Inspector of Nuisances.

During the year the two volumes of "Public Health Reports," by Sir John Simon, K.C.B., were published by the Institute.\* Six hundred and twelve persons entered their names as Subscribers to the work, which, however, has not at present paid the cost of publication, the expenses having been unexpectedly heavy and a large number of copies being still on hand.

\* NOTE.—The Council wish to acknowledge the fact that the Editor, Dr. Seaton, sacrificed a valuable set of reports in the preparation of this work.

There is a continuous demand for the volume of "Vital Statistics," by Dr. Farr, which was published more than two years ago: and during the year forty copies of the work have been sold. A profit of nearly £90 has at present resulted from this publication, heavy as the expenses have been, and there still remain over two hundred copies on hand.

A Special Committee was appointed by the Council to consider Bills relating to sanitary matters introduced into Parliament, and on their recommendation the Council decided to take the following action with regard to Bills introduced last Session: to petition against the Bill for the better Sanitation of Houses in the Metropolis, and against the Sanitary Registration of Buildings Bill, which were withdrawn or rejected; to petition in favour of the Water Companies' (Regulation of Powers) Bill; and of the Bill to Regulate the importation, manufacture, and sale of Butter Substitutes, which were both passed; and to take no action with regard to the Rivers' Pollution Prevention Act, 1876, Amendment Bill and the Bill for the better Prevention of the Fraudulent Sale of Oleomargarine, which were withdrawn. With regard to the Bills introduced this Session, the Council decided, on the recommendation of the Committee, to petition against the Architects and Engineers Registration Bill, which has been withdrawn, and also against the Sanitary Registration of Buildings Bill.

The Council having been informed in October last, that the Kensington Vestry had requested the President of the Local Government Board to bring in a Bill to provide for compulsory notification of infectious diseases, addressed a communication to the Board, forwarding copies of the resolution of the Council in support of this request. The Council also wrote to the Metropolitan Asylums Board, and to the several Vestries and District Boards in the Metropolis, requesting that they would be pleased to support the Kensington Vestry's application to the Local Government Board. In response to this communication, several of the Vestries and District Boards reported that they had taken or were about to take action in the matter, as suggested.

The Council sent at the same time copies of a resolution to the Local Government Board, the Metropolitan Asylums Board, and the several Vestries and District Boards of Works, expressive of their

satisfaction in observing the efforts recently made by the Asylums Board to facilitate the admission of infectious cases to their hospitals by removing patients upon the application, not only of Sanitary Officials, but also of duly qualified Medical Practitioners, without the intervention of the Poor Law officials.

Subsequently a Bill entitled Public Health (Prevention of Infectious Diseases, &c.), was brought in by Mr. Hastings and other private members, and was ordered by the House of Commons to be printed on 20th March last. It is drawn in the terms of the Model Clauses of the Select Committee on Sanitary Regulations, and is described as a Bill to amend the Public Health Act, 1875, so as to make further provision for the Prevention of Infectious Diseases, and for other purposes. Essentially it is a Bill to provide for Compulsory Notification of Infectious Diseases, but as drawn will not apply to the Metropolis. The Council have decided to petition Parliament in favour of the principle of the measure.

A deputation was appointed by the Council to attend the International Sanitary Congress at Vienna, and in conjunction with the Parkes Museum and the Society of Medical Officers of Health an invitation was given to the Congress to hold its next meeting in London. The invitation was accepted, but the meeting will not take place until 1891, on account of a somewhat similar Congress and Exhibition proposed to be held in Paris in 1889.

The Council have had under consideration the question of the Federation of the various Sanitary Societies of the United Kingdom, which was suggested by the Manchester and Salford Sanitary Association. In view however of the anticipated amalgamation with the Parkes Museum, the Council consider that it is not desirable to take any action in the matter at present.

A loyal address of congratulation was forwarded to Her Majesty on the occasion of her Jubilee, and was graciously acknowledged.

It is with much regret that the Council have to report the deaths of Dr. Lory Marsh, who rendered valuable assistance in the formation of the Institute and acted as its Registrar for several years, and of Prof. de Chaumont, who had been a highly-valued member of the Council since the foundation of the Institute, and for a period acted as its Chairman. The Council feel that the death of so able a teacher of Sanitary Science is a serious loss, not only to the Institute, which

will greatly miss his services as an Examiner and a Judge of the Exhibitions, but also to the whole of the sanitary world, in which he was so well known and respected. The Council also record with regret the deaths of Prof. Gaetano Pini (Hon. Foreign Associate), of A. Denison (Fellow), and of Sir R. N. C. Hamilton, K.C.B., Sir William McArthur, K.C.M.G., and A. Harland (Members).

During the year 1887 there were elected: one Fellow, twenty-six Members, and twenty-two Associates, being the largest number elected in any year since 1880. The roll of the Institute comprised, at the close of 1887: ninety Fellows, one hundred and ninety-nine Members, eighty-one Associates, nine Subscribers, and twenty-eight Honorary Foreign Associates; making a total of four hundred and seven.

The retiring Members of Council are: Charles E. Cassal, F.C.S., F.I.C., Prof. F. De Chaumont, M.D., F.R.S. (deceased), T. Orme Dudfield, M.D., W. Eassie, C.E., F.O.S. (resigned), W. Horton Ellis, F.R.MET.SOC., and Edward Pritchard, M.INST.C.E.

The following gentlemen have been nominated by the Council for election at the Annual Meeting to fill the vacancies thus created: R. W. Peregrine Birch, M.INST.C.E., Henry C. Burdett, F.S.S., R. Brudenell Carter, F.R.C.S., Director-General Sir Thos. Crawford, K.C.B., M.D., James Mansergh, M.INST.C.E., and the Hon. F. A. R. Russell.

The Right Hon. Lord Bray, who has held the office of Treasurer of the Institute since 1879, has expressed a wish to resign, as he lives so far from London that he is unable to take any active part in the work of the Institute. The Council have nominated Inspector-General R. Lawson for election as Treasurer.

During the year Lectures and special Demonstrations were given in the Parkes Museum. Members of the Institute had the privilege of attending them and of using the Library.

With reference to the proposed amalgamation of the Institute with the Parkes Museum, the Council regret that the application to the Privy Council for the grant of a Charter was not acceded to; but arrangements are now nearly completed for incorporating the combined societies under the regulations of the Board of Trade.

By Order,

74A, Margaret Street,  
16th May, 1888.

E. WHITE WALLIS,  
Secretary.

### SANITARY INSTITUTE OF GREAT BRITAIN.

*Abstract of Cash Receipts and Payments for the Year ending December 31st, 1887.*

	£	s.	d.	£	s.	d.
To Balance at Bank, January 1st ...	...	...	...	40	12	6
" Fellowship Fees ...	...	...	...	295	19	7
" Admission Fees ...	...	...	...	41	6	1
" Life Compositions ...	...	...	...	33	3	11
Annual Subscriptions ...	...	...	...	80	8	9
Transactions and other Publications ...	...	...	...	15	1	3
Congress—Sale of Tickets ...	...	...	...	2	5	6
Examination Fees ...	...	...	...	253	18	3
Dr. Farr's Works... ..	...	...	...	161	6	11
Mr. Simons' Works ... ..	...	...	...	241	19	8
Transfer from Exhibition Account	...	...	...	508	17	9
				637	4	10
				26	5	0
				203	3	0
				28	12	6
				421	7	2
				£1915	10	3
				483	4	7
				100	0	0
				12	3	3
				£595	7	10

### EXHIBITION ACCOUNT.

	£	s.	d.	£	s.	d.
To Balance January 1st...	...	...	...	95	1	7
" Receipts ... ..	...	...	...	500	6	3
				£595	7	10
By Expenditure ... ..	...	...	...	...	...	...
" Transfer to General Account ... ..	...	...	...	...	...	...
" Balance December 31st ... ..	...	...	...	...	...	...

23rd April, 1888.

Audited and Confirmed.

MAGNUS OHREN, }  
EDWARD C. ROBINS, } Auditors.

## ADDRESS

BY PROFESSOR W. H. CORFIELD, M.A., M.D., OXON.

CHAIRMAN OF COUNCIL.

*Read at the Annual Meeting, May 16th, 1888.*

As the Institute is now about to be incorporated with the Parkes Museum and to begin a new phase of its existence, I think that it may not be inopportune if I place before you a short *résumé* of the work it has achieved. The Sanitary Institute was founded in the year 1876, because, as stated in the Report published in the Journal of the Leamington Exhibition, "The increasing importance attached to Sanitary Science, and the recognised 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."

The Meeting for the foundation of the Institute was held at St. James's Hall on the 13th July, 1876, under the Presidency of His Grace the Duke of Northumberland, who has thus been the President of the Institute from its very commencement. At this meeting the two following resolutions were passed:—

1. "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.'"

2. "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 of October next."

The Committee appointed under the second resolution prepared an important report on the proposed functions of the new Institute, dividing their report into five Sections.

Section I. provided for "The examination of, and granting certificates of competence to, Local Surveyors and Inspectors of Nuisances." Under this heading the Committee advised that at first the examinations should be held in London only, but suggested "the desirability of instituting local examinations as soon as suitable arrangements could be made."

Section II. comprised "Matters relating to Medicine in connection with Public Health." Under this heading the Committee suggested that the Institute should "take such steps as may be within its power, through its branches or otherwise, to obtain a complete registration of sickness, especially of zymotic disease"; they also advised that the Institute "should endeavour to secure the services of Medical men especially qualified to give lectures on subjects relating to the prevention and spread of disease"; also that relations should be established with Medical Officers of Health with the view of assisting them in the discharge of their duties.

Section III. referred to "Matters relating to Chemistry in connection with Public Health," and provided that the Institute should be prepared to investigate the chemical aspects of processes for the treatment of sewage or of nuisances from factories, &c., and to furnish reports on such processes for fees to be fixed by the Council. This section moreover provided that "The Institute should not undertake any analysis or other work which may interfere with the private practice of Chemists, Engineers, or other professional men, but should confine itself to giving information and advice on questions of public interest submitted to the Council and approved of by them."

Section IV. treated of "The form of Constitution most desirable for the Institute." The Committee considered that it was not desirable at the time to apply for a Charter of Incorporation, as the work of the Institute could go on for a time very well without it, as the examinations, if successful, would add considerable weight to the application for a Charter at some future time, and as the Committee considered "that as the Institute progresses the points which the Charter should embrace will be better understood than at present." The Institute was to consist of Annual Members paying one guinea and Life Members paying ten guineas, and to be governed by a President, Vice-Presidents, and a Council of twenty-four Members, one-third of whom were to retire annually but to be eligible for re-election. Country and District Associations and Societies of Medical Officers of Health were to be invited to

affiliate themselves to the Institute. A Library of reference was to be formed, and donations of books, &c., were invited.

Section V. provided for "The establishment in London of an Exhibition of Sanitary Apparatus and Appliances." This Exhibition was to be of a permanent character, the contents to be carefully arranged, classified, and labelled. It was proposed to charge rent to the Exhibitors for the space occupied, and a catalogue was to be published as soon as possible. This report was unanimously adopted at a public meeting held on the 14th March, 1877, and the first Council, with Dr. B. W. Richardson as Chairman, was subsequently appointed to carry it into effect.

It will be noticed that the holding of Congresses was not mentioned in the report as one of the objects of the Institute; nevertheless, one of the first things done by the new Institute was to hold a Congress in Leamington in 1877 under the presidency of the Chairman of Council; this Congress was a success, and a number of valuable communications were brought before it. Unfortunately no official arrangement was made by the Institute to publish the transactions of the Congress, of which the only record is the Journal of the Leamington Congress and Exhibition, edited by Dr. Lory Marsh, the Registrar of the Institute, a volume which it is now almost impossible to procure.

A Congress has been held every year since, with the exception of 1881, in which, on account of the Medical and Sanitary Exhibition in connection with the International Medical Congress in London, it was not considered desirable to hold a Congress of the Institute. An Exhibition of Sanitary Appliances has been held in connection with each Congress, and the greatest possible pains have been taken by the Judges to ascertain by practical testing the value of the exhibits, so as to make the awards of Medals and Certificates a trustworthy guide to the public. A list of these Congresses will be found on pages 31 and 32 of the last volume of the Transactions (Vol. VIII). There can be no doubt that these Congresses, and the Exhibitions connected with them, have been an important means of stimulating, and of interesting the public in, sanitary work throughout the Kingdom.

The Examinations for Surveyors and Inspectors of Nuisances recommended by the original Committee, were commenced in October, 1877, at which Examination there were eight candidates, five of whom obtained Certificates. At the second examination in February, 1878, there were seven candidates, five of whom obtained Certificates. Three Examinations were held in 1878, and two in each subsequent year. The numbers of the candidates applying continued small until 1884, when

they suddenly jumped to fifty, having been only twenty in 1883. From that time they have rapidly increased, until in 1887, as stated in the report which has just been read, no less than one hundred and thirty-nine candidates presented themselves, of whom eighty-two satisfied the examiners. These Examinations have supplied an important want, and the Certificates of the Institute are becoming highly valued by candidates for the posts of Local Surveyor and of Inspector of Nuisances.

It has not been found practicable to carry out the idea of holding the Examinations elsewhere than in London, chiefly on account of the impossibility of getting a sufficient number of the examiners to attend elsewhere.

At the Extraordinary General Meeting of the Institute held on December 12th, 1878, the "Basis of the Constitution of the Institute," and the "Objects of the Institute" were defined (see Transactions, Vol. VIII., pp. 13 to 16). By the Basis of Constitution, the Institute was defined as consisting of Fellows, Members, Associates, and Subscribers; the Method of Election, and all Fees payable, and a variety of other details were settled. It was provided that "Medical Officers of Health and medical men holding certificates in Sanitary Science from any University or Medical Corporation, shall be entitled to be nominated as Members of the Institute without admission fee," and that "all persons who have passed the Examination and received a 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 that "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 the payment of three guineas (without annual subscription) in addition to the fee paid for the Examination." It was provided also that "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": thus ensuring the admission of "new blood" to the Council. Power to elect Honorary Members, Honorary Foreign Associates, and Corresponding Members, was given to the Council. The objects of the Institute were to be the "advancement of Sanitary Science, and the diffusion of knowledge relating thereto"; the Examining, and granting Certificates of competency in Sanitary knowledge to Local

Surveyors and Inspectors of Nuisances; the holding of Congresses, and Exhibitions of Sanitary apparatus and appliances; the taking of steps "to obtain a complete registration of sickness, especially of preventible disease;" and "the formation of Classes for Technical Instruction in Sanitary Science, and the formation of a Library." Subsequently the present Bye-Laws were prepared, and unanimously approved and adopted at the Annual Meeting on May 29th, 1879.

Ordinary meetings in London were organised by the Council in 1881, and at these several important papers were read and interesting discussions resulted, but for various reasons these meetings have for some time past been abandoned; at no distant date, however, it will probably be found advantageous to hold such meetings again.

At the ordinary meeting on July 24th, 1883, the subject of "The Compulsory Notification of Infectious Disease" was discussed, the Council having thought it desirable to ascertain the facts on this subject and having requested me to prepare a paper on it. A series of questions was sent to the Medical Officers of Health of each of the towns in which compulsory notification was in force, and the result was that the evidence was very strongly in favour of such compulsory notification. The Council has recently, as mentioned in the report, decided to petition in favour of the principle of the bill now before Parliament for this purpose. In connection with this subject I may mention that, in January, 1882, at the request of the Royal Commission appointed to enquire into the Small-Pox and Fever Hospital Accommodation, the Council drew up a number of recommendations, including "Suggestions as to the size and arrangements of the wards, the general construction, size and isolation of Small-Pox and Fever Hospitals, arrangements for ambulance conveyance of Patients, and the establishment of Convalescent Buildings." These recommendations were laid before the Royal Commission by the Chairman of Council (the late Professor de Chaumont), who explained at length the views of the Council on the matter.

I must not omit to mention the munificent prize of £200 given by the Rev. Wyatt Edgell, for an essay on "The Range of Hereditary Tendencies in Health and Disease"; this valuable prize was awarded by the adjudicators, the late Dr. W. Farr and Dr. B. W. Richardson, to Mr. George Gaskoin, M.R.C.S.; nor the special medal offered by Dr. B. W. Richardson each year for an exhibit selected out of the entire Exhibition, and to be awarded in case of pre-eminent merit only. This medal has been awarded on several occasions.

At each of the Anniversary Meetings addresses on important

matters connected with the Public Health have been given, and will be found in the Transactions.

By the approaching amalgamation of the Parkes Museum with the Sanitary Institute, the latter will be provided with a permanent museum of sanitary apparatus and appliances, as contemplated by the founders of the Institute; and the combined Libraries will form the finest Library of sanitary works in the kingdom.

I feel that this short summary gives but a faint idea of the amount of work performed by the Institute during its short period of existence; but those who wish for a more intimate acquaintance with the matter, can obtain it by studying the volumes of Transactions which have been published during the last nine years.



## THE STORAGE OF LIFE AS A SANITARY STUDY.

ADDRESS BY BENJAMIN WARD RICHARDSON,  
M.A., M.D., LL.D., F.R.S.

*Anniversary Meeting, July 12th, 1888.*

MR. PRESIDENT, LADIES, AND GENTLEMEN,

In one of the most charming books of natural science, "The Select Works of Antony van Leeuwenhoek," the Immortal Beadle of the little town of Delft, and the first and, in some respects, the greatest of all the microscopists, there is an essay in which the philosophic writer enters into a speculation on the duration of life of different classes of animals. With that singular foresight which marks the work of this original investigator, he indicates that certain animals which present the shortest term of life produce the greatest number of young. He adduces the shrimp as a case in point. The shrimp propagates by eggs, and in such numbers that once, he says, when he began to count the eggs in one shrimp, he had not got through the mass of them before he was tired and gave up the attempt. He then proceeds to compare these small and prolific animals with mighty monsters like the whale, and points out that such monsters bring forth their young perfectly formed and only a single one at one time; for, if these larger animals were as prolific as the smaller, the smaller would all be devoured by them, the sources of food would be stopped, and the feeder and the fed would soon become extinct.

From the contemplation thus started Leeuwenhoek proceeds to speculate on the length of life of the largest creatures, like the whale. Reflecting on the enormous bulk of these creatures, and on those huge bones of theirs which are in many places fixed up for public view, he conjectures that some of them might be of the age of a thousand years and upwards. For he says, "I am persuaded that fishes never die of old age, forasmuch as their bones, being always of a soft texture which never grows hard, may always be extended, so that the fish themselves are always growing larger. But terrestrial animals are exposed

to the changes of atmosphere, whereby their bones grow hard, and when the bones are hardened, the body cannot be extended to a large size."

If this argument of the illustrious first microscopist were true, we sanitarians who have for our special business the art of prolonging life—human life especially—ought to set to work at once to find out a plan by which the bones of human beings could be kept in such a state of softness that they could continue to expand and extend, so that giants should be re-established like the race of giants of antiquity. And pray observe that the idea is not really absurd because it is at this time impossible. *Cæteris paribus*, it is probable that symmetrical and healthy size does largely determine the question of age, and that in the history of the natural life of man there may have been conditions in which human beings of immense build and prodigious strength did inhabit the earth, and did live to an extraordinary age, according to our present idea of human longevity, because they were giants. To this observation let it also be added that in the life-history of other animals there are, apart from size, other examples of remarkable length of life. There are instances of fish—the pike as the best known instance—in which life has been maintained for a period of over 200 years. There is, I believe, at the present time in the island of Mauritius a tortoise, a photograph of which I have here, which has lived between 100 and 200 years. An elephant has been known to live 150 years, and I myself have seen a parrot which, on evidence that was unmistakeable, had turned its 100th year.

There seem, indeed, to be amongst certain animals natural periods of life, which, by comparison with the common period of the life of man, are extremely prolonged. The animals, by some peculiar process, as yet but little investigated, hold life as a long possession, and to this faculty I apply the term, "The Storage of Life," applying it to-day to human life, because up to current date the sanitary question is confined mainly to the interests of members of the human family, and because the storage of life by the aid of sanitation in that family opens up for us, as sanitarians, a new idea of investigation and labour.

Some sanitarians think that a general death-rate is an indication of the storage of life in a community. They who think so are right and wrong. They are right when their view is applied to the storage of life throughout all the members of a community. They are wrong when it is applied to the individual members of it; and it is to this part of the question that our study of the moment belongs.

In a community where the average rate of death is extremely high there may be found individuals of great longevity. In a

community where the death-rate is, and has been for a long time, exceedingly low there may be found individuals of remarkable age, and this is how the matter stands in regard to death-rate and storage of life.

I content myself to-day with the consideration of the storage of life in the individual, as apart from the community, because the individual question is the greater one, and, in fact, includes the whole question; for if the means could be successfully applied of extending the life of the unit on a systematic plan, the discovery would have been made of the method of extending the life of the masses altogether, if the masses wished for the extension.

Looking at the subject before us from the facts that lie at our command, there is good evidence in hand to show the individual storage of life may be far greater than the vast majority of people either expect or hope for. The mean duration of life in this country may be taken at forty-one years. But we have instances upon instances in which this storage of life is doubled, and some in which it is trebled. Quite recently I had, at the same time, in the consulting room three gentlemen whose united ages reached the total of 262 years, or over 87 years each, and each with a fair promise of from four to five years more of life at least. I also, within the present quarter, saw on the same day two gentlemen whose united ages gave 186 years, or an average of 93 years each. I have seen, and carefully examined physically, a woman who had attained the age of 105 years, and who lived afterwards for three or four years; and, at the request of the individual himself, I once made an examination, after death, of the body of a man who had passed his ninety-third year.

In all these examples, and in many others which in the course of a long professional career have come under my observation, there was nothing in the social condition of the individuals concerned that could of itself account for such an unusual storage of life as that which they presented. Two of those specially referred to were men of the highest class of mental power; the other has come down from one of the oldest of the noble families of Europe, and in the course of a most chequered and active career has been exposed to singular pressures, mental and bodily; a fourth has fought his own way from the lowest position to one of affluence and power; whilst the oldest of all was, from first to last, in abject poverty, and at the time when I visited her was in a workhouse, in which she had lived for several years, and in which she remained until her death.

When we have before us a series of *bonâ fide* facts like these, which we can multiply to almost any extent by looking for them,

and which are, indeed, so common that the narrative of a few of them soon becomes commonplace, we feel that the sanitary problem, how to increase the power of storage of life in the individual, must after all be a very simple one indeed. I am bold to say that it is very simple, the simplest of the simple, when the elements of it are understood and the conditions leading to it are properly appreciated.

To break ground on this question, and to show that the question belongs to us as sanitarians, is the object of the present discourse. It is a sort of study, which at the present moment we especially want to cultivate. To the great public the details we are apt to put forward about drainage, ventilation, baths, disposal of sewage, house construction, and the like, are becoming, by constant repetition, utterly wearisome; here we have a subject which is new for study, which opens up some of the most important researches affecting the history of mankind, past and present, and which will be practically useful for the future.

#### THE PROBLEM STATED.

The problem that lies before us may be briefly stated as follows. Certain proofs of the power of the human body to lay or store up life to a prolonged period are admitted. What are the conditions which favour such storage, and how can we promote such conditions?

The conditions are the following, and in the order stated:—

1. Hereditary qualification.
2. The virtue of continency.
3. Maintenance of balance of bodily function.
4. Perfect temperance.
5. Purity from implanted or acquired disease.

#### HEREDITARY QUALIFICATION.

I put the question of hereditary qualification in the first place because I feel sure, from observation and collection of data, that this is its true position. The fact is one of the most singular in the whole inquiry, and perhaps the most instructive. When the hereditary faculty for the storage of life is implanted in an individual body for a few generations it becomes, so to speak, an established principle, and the representatives of it, having once arrived past the period of life in which accidental deaths of various kinds are causes of mortality, continue to live, often in opposition to the most adverse influences to the

continuance of life, beyond the average term of life. The person gifted with this faculty of storage may be of fragile and delicate build of body, may even be deformed of body, may be of dull or of bright intellect, may be of cleanly or of uncleanly habit, may be placed in what would seem the most unfavourable position in life, or may be literally in want, and will yet continue to live on so as to see the whole of his or her more fortunate neighbours fall; nay, may even be so tired of the continuance of the monotony of the everlasting recurring phenomena of life, as to be envious of the fate of the dead who have found their rest. Such a person may also be what is commonly called an "ailing body," not from the existence of any well-marked organic disease, for that is incompatible with the condition requisite for vital storage, but from a general feebleness and want of tone which affects alike unfavourably the mental as well as the physical powers. It is not necessary to convey by this statement that feebleness of the kind here described is a part of the required condition for storage, since they who are of the very opposite condition, the very strong, may possess the selfsame faculty; but the existence of the faculty in the weak as well as in the strong must be affirmed. It is right also at this point to state that the storage of life in those who possess it in the most marked degree is and belongs to continuance of the process of life, not to the power of resisting interruptions to it in and during periods of strength and youthfulness. I can find no shadow of proof that those who have attained the oldest life have done so by virtue of any special physical ability inherent in them to resist the most fatal diseases. They have pulled through diseases, but they have not evaded them, and there is no evident proof that their special quality for a long life has materially aided them in the pulling through. The evidence is rather in favour of the view that, after having passed through the ordinary battles of disease, they have continued to hold on and enjoy the inborn capacity to live longer than their contemporaries in the race of life.

We have seen that peculiarities of body which do not seem to be favourable to the storage of life are, notwithstanding, compatible with it. Are there, on the other hand, any conditions or peculiarities of body which are signs of its existence in the individual?

Whatever peculiarities of this kind exist are strictly of the hereditary character, and are conveyed to the observer in the story of temperaments, rather than in any striking characteristics of strength or beauty. Thus, with whatever general appearances of body they may be combined, there are two temperaments which are incompatible with life-storage, and

two which are so compatible with it that either in their single or their combined form they are, as I think, essential to its manifestation.

The two hereditary temperaments which, either singly or in combination, are incompatible with storage of life are the nervous and the lymphatic; the two which are compatible, and perhaps necessary, are the sanguine and the bilious. If we divide life into seven periods: (1) from birth to fifteen years—completed childhood; (2) from fifteen years to thirty—completed adolescence; (3) from thirty years to forty-five—completed manhood or womanhood; (4) from forty-five to sixty—ripened manhood or womanhood; (5) from sixty to seventy-five—first period of decline; (6) from seventy-five to ninety—second period of decline; (7) from ninety to one hundred or upwards—period of senile maturity,—if we divide life into these seven parts, according to age, we may fairly apportion the life-value of the temperaments as follows, supposing the representatives of each temperament to run their natural course.

The storage of life in the sanguine temperament would be extended to the sixth stage, with an inclination to the seventh.

The storage in the nervous temperament would be to the fifth stage, running into the sixth.

The storage in the bilious temperament would be to the sixth stage at most.

The storage in the lymphatic temperament would be to the fifth stage.

Better, perhaps, than any of the single temperaments would be a mixture of the sanguine and the bilious, and, indeed, all the examples of special life-storage which I have met with have been of this hereditary admixture.

The organism which is best constituted for storage is therefore capable of being identified, and stands out, so to speak, in its own colours. The colour of the iris or curtain of the eyeball, always an excellent test, is a light hazel; the hair is dark brown; the colour of the skin is inclined to be florid, and the lips and eyelids are of good natural red—never pale, as in the pure nervous temperament, and never of dark bluish tint, as in the lymphatic or lymphatic bilious. In this mixed temperament of the sanguine and bilious a preponderance of the sanguine is, I believe, always an advantage.

The qualities here enumerated as represented in an organism well fitted for the storage of life are absolutely of hereditary character. They spring from combinations of parentage, and when the combinations are unalloyed by the introduction of any disturbing elements of disease, the conditions for long storage are fortunately combined.

But what is the precise difference physically of a human body so constituted by heredity, as distinct from a body less favoured, and that can give the capacity of storing up life, it is impossible to say. To declare that it is something derived from birth is to declare nothing more than a fact which, if we try to trace it back in its ancestral sense, is lost in the inquiry; that is to say, though it may be traced back for generations, it is lost at last historically, in regard to the cause of its origin.

As tending to throw an indirect light on this vital puzzle there are, however, a few facts which are worthy of regard. I have noticed that when the tendency to long storage of life is present, by heredity, it need not be so from both parents. The tendency may descend strongly in one line, although it is always most pronounced, and is most certain, when it descends through both. When, again, it descends on one side only, it is strongest on the male side.

If a good number of facts are collected in which the ages of parents, paternal and maternal, are discovered, the readings of the storage of life are so regular that a sufficient number would, I believe, yield an absolute record. I once had the opportunity of reading a series of histories of families whose paternal and maternal life-pedigrees were traceable with reliable accuracy. They were derived from insurance records, and if not always so complete as was wished, were good of their kind, and gave results that were more than approximate in their quality, and may indeed be accepted as indicative of the natural truth. From these readings it was elicited that whenever the life-pedigree can be traced through the parental lines for two complete generations, the value of the life of the third generation—accidents being of course excluded—is predicated with a certainty that is rather alarming to timorous minds. There need be no risk, commercially at any rate, in accepting the conclusion which the facts declare. If, for example, the age at death of the father and mother can be obtained accurately: if the age at death of the paternal grandfather and grandmother can be obtained: and if, finally, the age at death of the maternal grandmother and grandfather can be obtained, there will be at hand for calculation the life-storage of six persons. Presuming, then, that the said six persons all reached their full age, the simple sum of dividing the mean result by six will give the average length of each of the lines of descent, and that result, whatever it may be, will, with certain exceptions to be named later on, be the commercial value of the age of the third generation to which it refers. Thus, if the sum total of the ages of father and mother, father's father and mother, and mother's father and mother be, say, 360 years, the natural life-

storage of a person descended from them may safely be taken as sixty years.

The exceptions seem to run as follows: Sixty years is a turning point or point of equality, at which point the indications of the final stage of storage are all but absolutely represented. In other words, sixty means sixty all round. But if the combined term of years equalises out at something under sixty—say fifty, then the term belonging to the surviving representative would not be fifty, but something under it—say forty-eight. If the term should be still lower—forty, for example—the reduction of the last living representatives would be proportionately reduced. On the other side, if the mean value of life of the six standards exceeded the equal point of sixty, then the value of life-storage would be improved. I should estimate that a mean of eighty years, based on the standard of six antecedent lives, would yield a product that might be taken at ninety years at least; a mean of ninety, a product of a hundred years, and a mean of a hundred a product of a hundred and twenty, or even a hundred and thirty years.

In the *St. James's Gazette* of June 25th last a record is given of a man and his wife whose ages at death were respectively eighty-seven and sixty-six, a mean of seventy-six years. They had ten children, four sons and six daughters, dying at these ages: 78, 80, 80, 82, 84, 92, 92, 95, 96, and 96, making an average of over 88 years. The details are important, as are some others in the same essay, but they are defective in that they merely supply the average of one preceding generation as indicative of the life-value of the latest generation.

It may reasonably be asked why and where there should be any change on either side. With a steadily decreasing storage of life why should not families die out altogether, and with an increasing value of life why should families not go on living continuously after the course of a few generations? To the first of these questions the answer is that failing families do die out. To the second it must be admitted that there has been no sufficient time in the history of mankind during historical dates to allow of an answer being given to the inquiry. For my part, I do not see, theoretically, any reason why, in a perfectly constituted human organism, there should be any necessity for the cessation of the storage of life. I see a very obvious necessity for death in a world which is always eating up its vital energy by the prodigal method of over-multiplying the organic forms which need the vital energy for their own existence, because the organic forms must destroy one another in order that the living may continue to live, and this no doubt is the cause, wholesale, of death. But take this cause away, and in place

of excessive reproduction of new forms put reconstruction of existing forms, and there does not appear to be the least reason why the individual storage of life should cease. I should accept that the view of the illustrious Van Leeuwenhoek is theoretically correct, and that some animals, like fish, do not die from old age. They die from accident, from disease, and from being devoured by their fellow-residents of river and sea, but not from old age; that is to say, not from loss of ability to store up life in their bodies.

If this should be true of one species, it should be equally true of another, and should include man in its reading. In other words, it should indicate that there is no such thing, necessarily, as death, but that if life, which has very properly been defined as a forced state, is so, death also is so, and is the bare and pure result of accident, violence, disease, or ignorance of the means for sustaining the natural function of vital reconstruction.

Taking into account all the evidences we possess up to the present time as to the cause or reason why certain members of the human family should possess an unusual faculty for the storage of life, there is but one sign which assists us in the way of explanation—namely, the efficacy of congenital qualification or predisposition obtained from ancestry; in other words, the existence of a faculty that is born, not acquired, and which resembles other personal attributes derived by gradual evolution.

When I say that the faculty is born in order to be transmitted, I mean that this must be so according to our present position in regard to it, a point of very considerable and, in fact, of vital moment from a practical outlook. For were it to be admitted on unassailable grounds that hereditary descent of faculty is absolute, and absolutely necessary, then all efforts to make general what is now exceptional would be so much time lost in ignorance of principles. The argument, however, would not be just, because there must have been some period in the lives of families when the gift of long life became a family characteristic. We need not suppose that the gift commenced all at once, for that would not be probable. We must rather suppose that it was the work of a gradual evolution, and it is quite just to suppose that it is going on even now in some favoured families, or in some localities, or even in some countries. I have not had time to look the matter up so as to show from strict details that the storage of life is improving in our modern England, but I have not the shadow of a doubt that it is, and that the number of persons who reach the classical three score years and ten at this moment is much above what it has ever been in the history of our country. This tendency is one

of those processes which grows by what it feeds on, and we may justly expect that it will be continued in the future if it be cared for and cultivated, notwithstanding the fact which Mr. Chadwick pointed out in his report of 1842, that centenarians in some places, like Geneva, were rarer at that time than at other previous times when the value of life generally was less favourable.

If it be the fact that the possession of length of days depends primarily on heredity, we, as sanitarians interested in this question, and accepting the study of it as part of our daily work, have to inquire how far we may assist in improving that heredity towards longevity. We need not be deterred in this course by a feeling, sometimes expressed, that if we should succeed in producing a long-lived race, we should thereby secure also an overflowing race, which would over-populate the world. It is not strong and long-lived people who produce a large and helpless community, but, as we shall see in the sequel, feeble and short-lived populations. I mean by this that, in accordance with our own declared reasons for existing at all as a sanitary organisation, we are quite safe in every endeavour we make to extend the duration of individual healthy life, because, in proportion to the extent of our success in this direction, we remove disease, which is an accident, and introduce the fruits of sanitation, which are all in all to us in our special vocation.

We should, in fact, alter the living types of humanity entirely, since our labours would, of necessity, lead to a reduction of large and feeble populations for smaller, stronger, and healthier ones, the sanitary consummation most devoutly to be wished.

Towards the accomplishment of this object the first consideration is the selection of lives for parentage. Unless parentage be sound, it is clear, from what has already been said, that long storage of life in offspring will certainly fail. If such a social miracle could be performed as the fashion of a proper arrangement, before marriage, to prevent, generally, the marriage of health with disease, or, still more urgently, the intermarriage of disease, there would soon be an advance in the value of life on a scale grand in proportion to the extent to which it was carried out.

It would seem at first sight as if there were here a hopeless problem to solve, a hopeless position to attack. It was so not long ago; but I have noticed of late years, and much sooner than might have been expected, a desire on the part of marriageable persons to avoid the many dangers to health which are so likely to spring from unhealthy unions and from unions likely to lead to shortness of life. One essay, for example, in

my own book, "Diseases of Modern Life," on the Intermarriage of Disease, has brought, I find, to me alone no fewer than thirty-two inquiries on various points touched on in that very short chapter, and has led, notably, twice to the sensible and friendly dissolution of engagements which carried out would almost of necessity have favoured consequences of the most disastrous kind. We may therefore reasonably hope to effect, even within the narrow limits of one generation, a basic advancement in this direction if we give our minds to the simple subject of the selection of the fittest of the human species for the continuous representation of humanity.

In the study of the sanitary branch of human knowledge thus referred to we should not be opening any new path, but rather be helping to widen an old one, and making it all the more popular, by the addition to it of physical as well as moral foundations. For ages past the Church has been doing good sanitary work in the care which it has taken to prevent marriages of consanguinity. It seems to have been seen from very early times that intermarriages of persons of the same family led to concentration of the vital failures of the family and to serious disasters from that cause. The wise provision was therefore instituted by the Church of breaking up the family to a considerable but not to a sufficient extent. What miseries a rule of the kind named checks is indicated by the most common evidence, if such evidence be only looked for. It is enough for me to give one proof alone to set it forth in all its solemnity of purpose. I have on my note-books an instance in one family, including in it three generations, in which seventeen persons were all deleted, to use a very significant expression, by the one factor, the intermarriage of first cousins in whom two diseases—consumption of the lungs on one side and cancer on the other—had found an introduction and a diathesis. From one or other of the diseases named, or from curious admixtures of the diseases which need not be described at the present moment, every one of the family group died prematurely. I admit that had they been all gifted with full capacity for life-storage they might have been models of longevity although they were related to each other; but, inasmuch as there would be no reasonable chance of any such concentration of vitality in so many members of one family at the present stage of human progress, the separation of families, for the widest selection of the fittest to live, is the soundest and most practical method.

The question is a sanitary one in the strictest sense of the word, and no argument of a sentimental kind, indicating acknowledged difficulties, ought for a moment to stand in our way. When we desire to raise into active existence horses for

the race or the plough, sheep for the prize show, or even some specimens of flowers or plants for the sake of economy or beauty, we do not hesitate in determining to take the only natural means that are open to us to gain the required result. It is not until we come to the most precious specimen of all life, *man*, that we pause and practically cease to take any pains whatever. We are then so led away by sentiment that we permit the dearest interests to have the go-by, in order not to wound tender sensibilities; or if we do interfere, it is for the sake of some much lower and baser motive than health and good vital storage. I call this bad sanitation.

#### THE VIRTUE OF CONTINENCY.

The capacity for storage of life lies first in the force of heredity; but there are, as aids even to that force, and as aids also to a force of life that may not be exceedingly strong, certain other influences which we sanitarians should be the last to ignore or forget. These may be considered as secondary influences in some degree; and yet, at the same time, they may be reckoned as possessing powers that in other points of view are of primary importance. I mean by this that they may become bases of health on which heredity itself may be fostered until it becomes a solid foundation. I have named these influences in the opening passages of this address, and I proceed to study the first of them under the head of the virtue of continency, or that virtue which would provide for the limitation of the family circle to such a degree that the actual necessities of the family may never be dangerously taxed by the largeness of it. I maintain that this is strictly a sanitary question, and that no consideration lying before us as sanitarians is more important. In these days, when the shoe pinches so keenly on the sensitive point of over-population, we are being visited by outbreaks of the extremist views on plans and devices for preventing the exuberance of human life; not everywhere, not all over the face of the earth, but in those centres of the earth where, by causes which may also be called accidental, the numbers of population have exceeded the means at command to keep them in a condition which is, in itself, so artificial as to rank among the abnormal conditions of humanity. The proposals on this matter which some would force on us are themselves abnormal, and, under natural states, would inflict a greater evil than they are intended to prevent, that, namely, of depopulating the earth altogether without controlling the passion which is the root of all evil. This is evidenced at the present time in France, where the systematic decrease of the

people is producing, without any corresponding increase of morals, as serious an anxiety amongst some of the most thoughtful minded there as the excessive growth of population is creating anxiety amongst the thoughtful minded here. It is our duty to avoid these extreme views and, free from panic induced by temporary social and political influences, which are purely human and are sure to be rectified under a better and more enlarged human understanding, try to bring man back to a complete accord with Nature, without infringing even one of her most important laws. Our duty in this respect lies in inculcating the very simplest of all the virtues—CONTINENCY OF LIFE, and in favouring all the conditions which render that virtue possible. We know, fortunately, what those conditions are. We know that under a social state in which health of life and wealth of life would coexist we should have a state where a noble civilization would be combined with a very frugal mode of existence, with moderations of passions and pleasures, and with such restraint of character that violent extremes of any kind would never be exhibited by those who wished to be accounted sane. With this would be connected all the external sanitary requirements for the maintenance of mental and physical health; and to these advantages would be added a due prudence in respect to marriage, so that marriages would not be contracted until the married had the means necessary for the maintenance of offspring. This is an essential provision, since death in every degree, great or little, is as surely the shadow of birth as the shadow of the twig of a tree upon the ground and the total eclipse of the omnipotent sun are one and the same phenomenon.

Some will say that the method here propounded is too slow in its action to meet pressing emergencies, although it may be a good method when, by a bolder plan, a preliminary reformation has been secured. But I venture to answer that no preliminary reformation is wanted, because the natural reformation covers all the ground, and because every unnatural change which may be established only makes it a harder task to come back to nature. At this moment we may be erring and straying from the right way like lost sheep; but there is the redeeming virtue in the fact that as we are only erring and straying we may be saved, while by other methods we are not merely erring and straying, but are systematically and intentionally going from the right; are not lost sheep but headstrong ones, rushing into dangers infinitely greater than those we are anxious to avoid, and planting roots of evil which it will take ages of learning, wisdom, self-abnegation, and tribulation to remove; planting perdition that we may relieve poverty.

There are other persons who will agree with me on the question of method, but who will hold that the course I would suggest is simply impossible, and one that has never been, even under the most favourable conditions, attainable. To any objection of this kind I reply from direct evidence showing perfect practicability, and that without going into the poetical regions of the past, or out of the immediate history of our own era.

In the little community of Montreux, in the Vaud, in Switzerland, a parish containing 2,833 persons, a pastor there, M. Bridel, kept a record for many years of the social life. It was a model sanitary record. The births were at the rate of one in forty-five, the deaths one in sixty-four, or at the rate annually of 15.62 in the thousand living. The conditions and the consequent health of so favoured a community were sustained by the comparative slowness and circumspection with which the successive generations of human life were brought into the world. There was no method of interruption to the natural life that could lead to any moral wrong; the social state in which the happy circumstances of one generation were handed down to the next generation "was due," says Sir Francis D'Irvenois, who relates the history, "simply to Swiss forethought and to the virtue of continence."

To this picture of a model community let us take a contrast, existent at the same time, and commented on by the same learned authority.

This contrast was found in the Russo-Greek community at Nisi Belgorod, a community of the same size and, if it had willed, of the same morality. Here the births were one in seventeen, the deaths one in twenty five. "Mark," says D'Irvenois, "the figures which announce the proportional mortality of these contrasted communities. In the Russian community one twenty-fifth disappeared annually; in the Swiss one sixty-fourth. The Russian generations passed away more than twice as rapidly as the generations of Montreux. Who would purchase the advantage, equivocal at best, of a triple number of births, accompanied by this enormous number of premature deaths? In Montreux, too, four-fifths of those born reached the age of twenty, whilst in the Russian district out of one thousand baptised six hundred and sixty one perished before their fifteenth year. The nuptial garments of the mothers were the destined shrouds of the first-born. In the Russo-Greek community the march of life, seemingly so fruitful and rapid if it had been calculated by the birth-rate alone, was, in fact the most murderous in Europe. In the Swiss community the march of life, so seemingly slow if estimated by the same

method, was towards health and a steadily and improving vital progress."

These facts stand on record for our guidance in the study of the best means for the storage of life. They teach us the rate of death to the rate of birth under conditions favourable or unfavourable to persistence of life. They show that the advance of a population and its conditions, with regard to subsistence, are (as D'Irvenois most correctly formulated it) universally correlative; and that a state of comfort stands in relation to the rate of increase either as cause or effect. If the rate is rapid, the state of comfort is in relation of cause. If the rate is slow, the state of comfort is its effect. The conditions of ease and the consequent health of the social body sustained at Montreux were due to the comparative slowness and circumspection with which its successive races were brought upon the scene of the world.

As bearing on the storage of life, this lesson, derivable from two diverse populations, is rigidly relevant. If life must be stored fully the first stages of it must be strong and the last stages of it must be long; for it is in the first stages of it that the duration is secured, in the last that it is realized. We must have a good first childhood if we would have a good second childhood; then the full measure of life is secured.

The evidence is also fair that if we could, by our labours in the directions named above, increase the storage of life in the individual, by what may at first seem to be artificial cultivation, we should in the end cultivate the heredity; for this is precisely what nature does in all her vital processes. She stamps everything that is vital and lasting, through time. Time is her means of improvement in both method and work. Time takes the place, unconsciously, of design or purpose to those who do not follow or understand her ways, consciously and clearly to those who do.

It is, in fact, by this very method that nature maintains the balance of life altogether on the earth. When there is rapid production there is rapid death; when there is slow production there is, *ceteris paribus*, slow death. Fewer people, longer life for the few. But slow production is a sanitary measure, and it and the results of it must be the resultant of purely natural causes. Strive by the unnatural to pervert the natural, and though we may succeed in one way we will fail in another. Limit the numbers of a race, limit growth by the imposition of unnatural laws, and the triumph will be the development of a limited population of an abortive type. We see this in local attempts to play the fool with nature. The wise countryman of Celestial soil checks the natural growth of his female child's

feet by binding them firmly up in bandages. He succeeds to perfection, and he produces a cripple. What is true of the local is equally true of the general; a population may be limited in numbers by infringement of natural laws, but the certain result will be that which sanitarians would deem the worst day's work they ever did, the promotion of a crippled race, a diminutive race, in whom the good storage of a good life would be simply an impossibility. This is just what we do not want. We want to raise a race on each of whom every god has set his seal,

*"To give the world assurance of a man."*

From the study of the topic which lies now before us many questions of practical moment spring, and one above all, namely, how we as sanitary teachers can so proceed as to influence the world towards the adoption of the rule of continency of life? I believe we are already doing that in every effort we make to better the condition of the people of all grades and ranks of life. When we strive to give cleanly and comfortable homes, to find and promote rational amusements, to cultivate and distribute a pure and delightful literature, and to teach those habits which lead to purity of body as well as mind; when we lend ourselves to the maintenance of healthful bodily recreations for members of both sexes; and when we discover and bring into action measures of an innocent and useful character in which the members of both sexes can easily participate without feeling themselves separated by some absurd and supernatural barrier, as if they were human beings of different flesh and blood,—then we are doing the very choicest work for the regeneration of the race, for making it a race that shall be the parent of a greater race, and for checking that overabundance of an inferior race which is the sign and seal of bad blood, and of degraded vital power of body as well of mind.

Let us go on in this course; let us be led into no other, and we shall leave a record which we may, it is probable, never behold, but which will be none the less clear to other eyes, that shall see it when ours are closed for ever.

#### THE BALANCE OF BODILY FUNCTIONS.

The sanitarian, in the new work which lies before him, can render the most telling assistance to the good storage of life and to the storage to good life, by teaching the first steps, in the early days of the journey of life. But there is another course before him which is not less important, and which relates to the art of training the body in such a form that all parts of it shall be kept in perfect balance and, if I may say so, in equal health.



It has been too much of a rule to look upon the work of the trainer as that of one who is ministering to the amusements of life, or to the simple teaching of those who, for a professional purpose or for amateur display, are about to enter into some trial or competition of strength or of skill; and, indeed, I have heard prudish people object to training on this very ground, that whilst it is all right for those who have to get their living by it, or who wish to show themselves off as particularly clever in winning races or other contests of a physical class, it is out of place in all cases where it is the desire to be well brought up and to be of ordinary good deportment. This, however, is merely putting the cart before the horse. These systematic trainings are just the sort of trainings which actually break the balance of parts, which tend to shorten, and which often do shorten, the vital powers of some of the very best endowed of mankind for the sustainment of a long existence. Such local overtraining is really a worse plan than that of employing no training at all, and is only equal in badness with that training into one kind of exercise by which special organs of the body are forced into quick and mature development before the other organs have reached the same development, or have even reached their maturity. I think it worthy of special comment that in every person of very advanced and healthy life whom I have carefully examined as to the physical state, and as to the state that has led to the longevity, this fact has come out first and foremost—that the organic functions were still acting in proper accord and perfect harmony. A comparatively weak body may thus be seen to have the capacity of storing up a long life and of passing by a much stronger body in the race. This was the actual case in the oldest person who ever came under my own direct observation. On the other side I do not remember any one of fine and vigorous frame of body and mind who, dying prematurely, did not die from the failure of some one vital organ almost exclusively. As the one shot which strikes the vital spot in a bird is the cause of death, so the one blow or series of blows on one organic structure in the well-built human form is the constant cause of collapse in the premature failure of that form. We have here before us, presented in the most tempting manner, a study second to none in the range of sanitation. It is a study which opens up to us the widest reach of sanitary practice and skill, extending into the daily life of men, women and children of every rank and of every occupation. At present, as a study it is far too loose and crude to be called a branch of knowledge, while too often it is merely offered to the world as a piece of flagrant and transparent quackery, which deceives the ignorant and, like the bone-setting sham in medi-

cine, does an incalculable amount of injury. We have to reduce this method of equal training of the organs of the body for regular and systematic work to a regular and systematic science, so that it may be taught in elementary schools, become a natural part of the national education, and be so impressed, intelligently, on the mind as to be a duty for observance and conduct throughout the whole of life.

It is impossible too strongly to impress the fact that for long storage of life a physical training of the body, that shall secure a uniform strength, is a primary lesson in sanitation. We, as an Institute, ought to take up this question as one essentially in our own domain. It comes most naturally before us, as health in relation to physical movement, and it would form an admirable subject of a special course of lectures: not a mere ephemeral course, but one that should go on from year to year with a constantly improving strain, adapted to the advances, the necessities, and, I may say, the fashions of the age.

The elements of this part of our subject are simple, but none the less effective on that account. We have to keep the public mind open to the fact that a weak and well-balanced body is practically a stronger body than a strong and unbalanced one; that a weak body may by properly balanced training be made one of great power for the retention of life; and that a body of original strength and beauty may be made of unusually long or of unusually short life, according as it is trained into the conditions leading to the one or the other.

#### PERFECTED OR ALL ROUND TEMPERANCE.

Another aid towards the storage of life is that stoical virtue which may be summed up in the term perfected or all round temperance. I do not include in this term what is commonly understood, abstinence merely from stimulating or alcoholic drinks. Such abstinence is more than half the battle, but it is far from all the battle. The storage of life is reduced by intemperance of speech, of action, and even of thought. We may consider that whatever quickens the action of the heart beyond its natural bounds is a form of intemperance. In our present stage and mode of existence the heart is fitted in each individual, according largely to his heredity, to do a certain amount of work, to beat a certain number of beats, to perform the feat of distributing daily a certain number of foot tons of blood over the body, and then of finishing its course or career. It is probable that in the work thus carried out nothing is ever recalled. So much done, so much lost. The heart may wear out in its own structure by changes of disease going on there, and that adds to

the evil, but I deal now with this ever-working organ in its natural state, as dying out simply by its own work, and it is by so studying it that the difficulties now being considered come into view. Stimulation of various kinds, hastening the decline of power, thus comes into operation and the organ fails under it. Our good and useful friend the postman feels it from the excess of his work on foot; the doctor or nurse feels it when obliged to forfeit the natural time of sleep; the man in the money market feels it when, for that which is not bread, he lets his excitement of sale or purchase carry his heart away into wild hope or wilder despair; the man of unbridled passion, who grows pale or red with rage, feels it to the extremest tension and is almost invariably cut short in his career, long before it is at its natural fulfilment, by this fact of cardiac wear alone. Beyond all these the jealous man feels it and literally corrodes into broken heart long before the proper period for which he was constructed, for of all moral excitements jealousy is the most fatal. It constitutes a distinctive disease.

These are stimulations excited by and through the mind; but to them we must of course add others of grosser quality springing from the improper use of foods and drinks. Here, in regard to foods, there lies before us a wide field for research, for up to the present time there has been very little discovered that can be trusted as proved. That our various tissues are constructed from the foods we take, every school boy and girl is now taught; but what foods are best fitted for the special tissues and parts the most advanced physiologist is not able to say with any of that precision of knowledge which is so urgently required. For instance: there is one tissue of our bodies that is of first and greatest moment, I mean the elastic rubber like tissue which gives elasticity to the lungs, to the arteries throughout all their course, and to some of the important membranous surfaces. If in the lung structure this elastic tissue fails a large share of the expiring function of the lung fails, and Dr. Francis Troup, of Edinburgh, in a splendid paper communicated to the *Edinburgh Medical Journal*, on the detection of pulmonary consumption by the microscope, has lately told us that the presence of the curly filaments of this tissue in the fluid expectorated by the patient is one of the earliest evidences of disintegration of the pulmonary organs. We all see the effects of the degeneration of this elastic structure in the differences of youth and age. We speak of the elasticity of youth, the rigidity of age. We speak figuratively it will be said. No! we speak actually; for we are merely describing differences dependent purely on the condition of this veritable elastic tissue. The knowledge as far as it goes is good. We know the qualities of this tissue; I have myself vulcanised it as

caoutchouc is vulcanised: we know its chemical composition; we know that it must originally be derived from food; but where and how it is constructed in the body, why it is so largely supplied and is so active in quality in the young body, so deficient and inactive in old, we have no clear ideas whatever. We do not know what foods feed this tissue, what diminish it. We do not even know the elementary facts whether it is made at all after birth, or whether we are born, so to speak, with a store of it, which is left to wear out and is never recuperated. On all this matter of feeding, therefore, we have as sanitarians, much to learn, and in this direction of learning we have as a primary duty to determine the most primitive of all questions, whether it is wise to use up as food the half-used-up tissues of the lower animals, or whether we should go direct to the vegetable world for our supplies and never swerve from that course.

I expect, and I say this as a partial animal feeder, that for the storage of life the primary or vegetable source is the soundest and best, and that in time, for the sake of the economy of life, as well as of the economy of money and of suffering, as a human family under the determination to live long and healthily and happily, we shall come back to the first fruits of the earth.

Turning to the drinks which are necessary for perfecting the storage of life, I could say a great deal and shall say little. It would not be becoming of one whose views are so well known as mine to belabour you here with any long observations on the subject of temperance in regard to those fluids which by some wretched adventure of poor humanity in its puerile stage crept into use in certain sections of the world as drinks exciting and vinous. But I may say that we may congratulate ourselves that their use has never extended beyond the human family, and that if the fish of the sea had discovered them the theory of Van Leeuwenhoek had never even to his fertile mind had any foundation. We may congratulate ourselves also as a human family that, except under the most degraded conditions, we are born abstainers from them, and live for our few first years protected from their action. Regarding this action and its influence on the storage of life I should however be carrying complacency into cowardice did I not add further that from the beginning to the end of the chapter the influence of alcohol on all the mechanism of the body that demands most care is towards deterioration and cessation of action, and this so determinately that a race could be produced under its baneful influence in which an artificial natural state—it is no paradox—should bring about a fixed lower limit of storage of life, a limit that should not represent, as its standard of duration, one-fourth

of that which is now well known as the comparatively easily attainable duration.

#### PREVENTION OF DAMAGING DISEASES.

The existence amongst men of certain diseases which lead to physical damage and deterioration, and to the reduction of the capacity for the storage of life, is the last subject to which there is time to refer. Putting aside diseases which kill so often right off the reel, but which may not leave any very serious damage in instances in which there is recovery from them, there are some which in the most conspicuous manner prevent the possibility of complete storage not alone in one but through many generations. The alcoholic diseases, the serofulous and phthisical, the malignant or cancerous, the syphilitic, are, prominently, diseases of this order; and whoever in the sanitary line of research helps to remove them by getting at and removing their causes is amongst the truest friends of humanity that humanity ever possessed.

As against the whole argument of the storage of life, an objection may, I know, be made, that such storage is, after all, not worth having, and that a short life and a merry one is the golden rule. This theory, of the butterfly order, is pretty, but, brought to the proof, is the most miserable practice that the eye of man can see or his ear hear. The men who say it most feel its acute folly also most. When the mind and body are worn out, when there is forgetfulness of things, friends, and events, then, no doubt, the continuance of life is no longer desirable. But between the commencement of the last stage of a long life and the establishment of the complete stage there may be, and often is—nay, always is when the process is healthy—a time of actual pleasure, during which the survey of the past and the recollection of the past are sources of the most peaceful and exalted happiness. For, as in the healthy first period of life hope is the spring, the mainspring of life, so in the last period, when that is healthy, realisation is the note of success and satisfaction. Moreover, in some well-constituted bodies and minds, the actual winter of life is fruitful, nay positively rich in doing and in well-doing, without the fever and intense aspiration of youth, but with the force which springs from knowledge that has ripened, and wisdom that has fortified knowledge. We have amongst us at this very moment one who

has been for three parts of a century a giant in our great cause, and who in the period of life coeval with the century, instead of being tired of life and of work, enjoys both to his heart's content. Need I go one step further in search of an exemplar, and that a living one, of my argument? I need not. I will leave, literally as well as figuratively, the proof of the argument with the Chairman.

The Chairman, Mr. EDWIN CHADWICK, at the close of the address, said: I beg to move a vote of thanks to Dr. Richardson for the great discourse you have heard from him to-day. I venture to add, that the power of sanitation has so far advanced that contractors might contract, for the advancement of the duration of life, for some years; at once for the advancement of the duration of life of the average of all who hear me and who are resident in the Metropolis, by some five years or more. I might present some notion of the gain of life practicable, by showing what is little known, and is difficult to get entertained as charges for malfesance, that the loss of life and of money in this Metropolis, even with its present reduced death-rate, by errors in legislation, and by culpable maladministration, amounts in this Metropolis to not less than 90 lives, and not less than £15,000 every day; and for every year to not less than 35,000 lives, and upwards of five millions and a half in money. On the other hand, I might present examples of more correct applications of the principles of sanitation where the death-rates of cities and towns have been reduced by more than one-half, and where a corresponding gain in life and money has been achieved. I might adduce examples of the total abolition of the so-called children's diseases, and a reduction to one-third of the children's ordinary death-rates. On such grounds large future augmentations of octogenarians and nonagenarians' life may be anticipated from the reduction of the wastefulness of political ignorance. It certainly appears that the larger proportions of centenarians are amongst the lower and generally depressed classes; but among those in exceptionally healthy neighbourhoods and the absence of overcrowding, and always connected with hereditariness, and generally with very simple lives, which will be one great sanitary factor.