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Contributors

British Medical Association. Anaesthetics Committee.

Publication/Creation

London, 1900?]

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BRITISH MEDICAL ASSOCIATION

REPORT OF THE ANÆSTHETICS COMMITTEE

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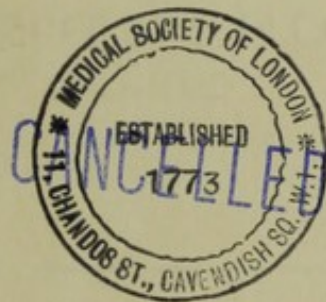
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REPORT OF THE ANAESTHETICS COMMITTEE

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REPORT OF THE ANÆSTHETICS COMMITTEE.

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MR. ROWELL (Hon. Asst. Sec.).	

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MR. HUTCHINSON (Ex-officio).	MR. DAVID WALLACE.
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ANALYSIS SUB-COMMITTEE

MR. HUTCHINSON (Ex-officio).	MR. G. EASTES.
DR. CHILDS (Ex-officio).	DR. HEWITT.
DR. DUDLEY BUXTON.	MR. ROWELL (Hon. Sec.).

The Committee has lost through death three of its members, MR. A. E. DURHAM, PROF. SIR GEORGE MACLEOD, and MR. JOSEPH MILLS. DR. W. V. SNOW and MR. BUTLIN retired from the Committee.

REPORT.

The Anæsthetics Committee present below the report of their Analysis Sub-Committee :—

REPORT OF ANALYSIS SUB-COMMITTEE.

The Analysis Sub-Committee, to whom the work was deputed, begs to present the following Report.

Reference.—“To investigate the clinical evidence with regard to the effects of anæsthetics upon the human subject; and especially the relative safety of the various anæsthetics, the best methods of administering them, and the best methods of restoring a patient in case of threatened death.”

Historical.—The Anæsthetics Committee was appointed in consequence of a resolution unanimously adopted by the Section of Therapeutics at the Annual Meeting of the British Medical Association, held in Bournemouth in 1891. An account of the circumstances which led to its formation may be found at pp. 1088, 1329, *British Medical Journal*, Vol. II, 1891.

Methods adopted.—The first step of the Committee was to institute an inquiry which extended over the year 1892, into all cases of the administration of anæsthetics in the United Kingdom of which accurate notes could be obtained. The following schedule indicates the lines upon which information was sought from the observers :—

SCHEDULE.

Records derived from personal observation in hospital or private practice, or both, during the year 1892.

I. In cases where no dangerous symptoms have occurred :—

1. Number of administrations of each anæsthetic.
2. Nature of case for which anæsthetic was given.
3. Source and quality (especially as regards purity) of the anæsthetic.
4. Method of administration (apparatus, duration, quantity used, etc.).
5. Number of cases in which dangerous symptoms or death occurred with each anæsthetic.
6. Modifications in practice, and precautions adopted :—
 - (a) In certain cases of disease, *e.g.*, heart disease, emphysema, pleurisy, abdominal distension, etc.
 - (b) In certain special operations, *e.g.*, in regions of pharynx, larynx, etc.

II. Special details of cases in which dangerous symptoms or death occurred :—

- (a) Circumstances connected with the anæsthetic.
 1. Its nature, *e.g.*, ether, chloroform, etc.
 2. Purity of drug, *e.g.*, whether obtained from reliable source; how long kept and whether exposed to light, etc. Analysis of samples.
 3. Whether other persons anæsthetised with the same drug displayed similar symptoms.
 4. Method of administration; dilution of anæsthetic; duration of administration.
 5. Quantity used.

- (b) Circumstances connected with the patient.
1. Age, sex, temperament, physique, first time or not of taking anæsthetic; previous drugs, *e.g.*, chloral, etc. Preparation of patient, food, purgatives, clothing.
 2. State of health; presence of nervous, cardiac, vascular, pulmonary, renal, or other disease; anæmia, alcoholism, etc.
 3. Phenomena of anæsthesia, *e.g.*, time taken to produce anæsthesia, struggling, laryngeal spasm, vomiting, etc. Which failed first—pulse, or respiration? Condition of pulse, respiration, reflexes? Was anæsthesia profound?
- (c) Circumstances connected with the operation.
- Nature and length of operation.
- Whether antiseptic spray used; whether patient kept warm; posture of patient; amount of hæmorrhage; occurrence of shock.
- (d) After effects.
- Faintness; exhaustion; vomiting; time taken to recover consciousness.
- (e) Methods adopted in cases in which symptoms of danger or death occurred, *e.g.*, pulling forward of tongue, inversion of patient, artificial respiration (which method?), nitrite of amyl, electricity, heat, etc. Results obtained.

Description of record books supplied to observers.—In order that the observations might be as uniform as possible record books were drawn up containing columns for noting the consecutive number, date, hour, sex, age, general state of patient, nature of operation, anæsthetic employed, method, duration, quantity used, source whence anæsthetic obtained, and after effects in each case. Ample space was provided for general remarks, and full details were requested in the event of any case of death or danger, in accordance with the foregoing schedule. Each observer received a paper which he was requested to fill in at the end of the year of inquiry. This paper contained questions as to his own opinions and practice, and provided columns for a summary of his cases during the year. Professor Ramsay, of University College, kindly consented to analyse samples of the anæsthetics employed in cases which displayed dangerous symptoms.

The Committee obtained from Messrs. Curtice and Romeike's News Agency, newspaper cuttings relating to deaths under anæsthetics in the United Kingdom throughout the year 1892.

The following is a list of the sources from which reports of cases were returned in the record books, together with the names of the observers:—

Names of Observers, Hospitals, etc.

Aberdeen	...	Royal Infirmary	...	...	...	Dr. G. M. Edmond, Mr. J. R. Levack, Mr. W. R. Pirie.
"	...	Hospital for Sick Children	...	...	...	Mr. George Rose.
"	...	Nursing Home	...	...	...	Dr. G. M. Edmond.
Armagh	...	County Infirmary	...	...	...	Mr. J. Mansergh Palmer, Mr. M. Bride.
"	...	Private practice	...	...	...	Mr. J. Mansergh Palmer.
Ashton-under-Lyne	...	District Infirmary	...	...	...	Mr. W. J. Hancock.
Banff	...	Chalmers' Hospital	...	...	...	Dr. Fergusson.
Barnsley	...	Beckett Hospital and private practice	...	...	...	Mr. W. J. Lancaster.
"	...	Private practice	...	...	...	Dr. M. T. Sadler.
Bath	...	Royal Eye Infirmary	...	...	...	Mr. W. M. Beaumont.
"	...	Private practice	...	...	...	Mr. H. G. Terry.
Birkenhead	...	Borough Hospital and private practice	...	...	...	Mr. A. H. Butcher.
Birmingham	...	Private practice	...	...	...	Mr. Lawson Tait, Mr. Charles Martin.
Blackburn	...	The Infirmary	...	...	...	Mr. R. Hunt, Mr. W. B. Bryant, Mr. W. H. Bunting.
Bolton	...	The Infirmary	...	...	...	Mr. G. Wilkinson.
Bradford	...	The Infirmary	...	...	...	Mr. H. B. Kitchin, Mr. W. B. Pettitt.
Bristol	...	Bristol General Hospital and private practice.	...	...	...	Dr. R. G. Poole Lansdown.
"	...	Hospital for Children	...	...	...	Dr. E. J. MacLean, Dr. Colston Wintle.
Burnley	...	Victoria Hospital	...	...	...	Dr. J. Brown, Mr. A. Macgregor Sinclair.
"	...	Private practice	...	...	...	Dr. J. Brown, Dr. James Mackenzie.
Burslem	...	Private practice	...	...	...	Mr. S. K. Alcock.
Cardiff	...	Infirmary	...	...	...	Dr. Sheen, Mr. B. Charles, Mr. C. Morland, Mr. H. Richards, Mr. E. Turner, Mr. A. Watson.
Carlisle	...	Cumberland Infirmary	...	...	...	Dr. Maclaren, Mr. W. G. Bradford, Mr. Lyall, Mr. Matthews
"	...	Private Practice	...	...	...	Mr. W. Bell, Dr. Clarkson, Dr. R. Maclaren.

Chichester	...	The Infirmary	...	...	...	Mr. E. H. Bingley, Mr. Skaife.
Derby	...	Royal Infirmary	...	...	...	Mr. C. H. Taylor.
Devonport	...	Royal Albert Hospital	...	...	...	Mr. J. J. N. Morris.
Dumfries	...		...	...	...	Dr. A. Thomson.
Dundee	...	Royal Infirmary	...	...	...	Mr. J. Brough Law, Dr. D. Steele.
Edinburgh	...	Royal Infirmary	...	...	...	Mr. J. Anderson, Dr. R. J. A. Berry, Dr. Caird, Mr. Cathcart, Professor Chiene, Mr. J. H. Croon, Mr. A. Duke, Mr. John Duncan, Mr. E. G. Fortune, Mr. J. T. C. Laing, Dr. Macgillivray, Mr. J. S. Maclaren, Mr. P. H. Maclaren, Mr. Miller, Professor Simpson, Mr. C. A. Sturrock.
"	...	Royal Hospital for Sick Children	...	...	...	Mr. J. W. Dowden, Mr. J. A. Robertson, Mr. W. F. Robertson.
"	...	Private practice	...	...	...	Dr. Joseph Bell, Mr. C. W. Cathcart, Professor Chiene, Dr. Hutcheson, Dr. Shaw Maclaren, Dr. Burn Murdock, Dr. Heron Watson.
Exeter	...	The Hospital	...	...	...	Mr. G. S. Abram, Mr. H. Andrew, Mr. R. Martyn.
Glasgow	...	Royal Infirmary	...	...	...	Dr. J. H. Campbell, Dr. Clark, Dr. W. J. Fleming, Mr. David Knox, Mr. T. Brough Law, Dr. Lothian, Mr. T. P. Sherer.
"	...	Western Infirmary	...	...	...	Professor George Buchanan, Dr. H. C. Cameron, Dr. T. K. Dalziell, Mr. G. H. Edington, Mr. J. Gilmour, Mr. W. Robertson, Mr. Young.
"	...	Victoria Infirmary	...	...	...	Mr. A. E. Maylard, Dr. Lockhead, Dr. Logie.
"	...	Royal Hospital for Sick Children	...	...	...	Dr. Hector Cameron, Mr. J. B. Mackenzie Anderson, Mr. R. C. Brodie.
"	...	Dental Hospital	...	...	...	Dr. T. Brown Henderson.
"	...	Private practice	...	...	...	Dr. Hector Cameron, Dr. T. Brown Henderson.
Greenwich	...	Seamen's Hospital	...	...	...	Mr. Arthur Jervis, Dr. M. H. Spencer.
Halifax	...	The Infirmary	...	...	...	Mr. G. G. Clarke.
Kilmarnock	...	The Infirmary	...	...	...	Dr. W. Aitken, Dr. Macleod.
Leeds	...	General Infirmary	...	...	...	Mr. E. Atkinson, Mr. G. W. K. Crosland, Mr. R. J. Daly, Mr. E. G. Firth, Mr. A. Mankwell, Mr. W. Mayo, Mr. T. G. Ouston, Mr. J. J. Rowell, Mr. A. E. L. Wear, Mr. A. L. Whitehead.
"	...	Private practice	...	...	...	Mr. Hartley, Mr. Teale.
Lisburn	...	County Antrim Infirmary	...	...	...	Mr. G. St. George.
London	...	Alexandra Hospital	...	...	...	Mrs. F. M. D. Berry, M.D.
"	...	Bolingbroke Hospital	...	...	...	Mr. C. R. Lyster.
"	...	Charing Cross Hospital	...	...	...	Mr. Carter Braine, Dr. Hewitt, Mr. C. J. Woollett.
"	...	Chelsea Hospital for Women	...	...	...	Mr. A. Fausset.
"	...	Dental Hospital of London	...	...	...	Mr. G. H. Bailey, Mr. Carter Braine, Mr. W. Braine, Dr. Buxton, Mr. H. Davis, Dr. Hewitt, Mr. G. Rowell.
"	...	Gordon Hospital	...	...	...	Mr. A. Fausset.
"	...	London Hospital	...	...	...	Dr. F. Hewitt, Mr. Curwen, Mr. F. E. Ingall, Mr. W. Penberthy, Dr. Sequeira.
"	...	Middlesex Hospital	...	...	...	Mr. T. G. A. Burns, Mr. Norton.
"	...	North Western London Hospital	...	...	...	Mr. J. Atkinson, Mr. C. N. Hamper, Mr. C. D. Sutherland.
"	...	Poplar Hospital, Blackwall	...	...	...	Mr. R. H. Collins, Mr. W. J. Radford, Mr. E. G. H. Williams.
"	...	Queen's Square Hospital	...	...	...	Dr. Buxton and Residents.
"	...	Royal Ophthalmic Hospital	...	...	...	Mr. D. J. Wood.
"	...	St. George's Hospital	...	...	...	Mr. A. H. Ward.
"	...	St. Mark's Hospital	...	...	...	Mr. J. Mills, Mr. E. C. Ryall, Mr. W. P. Ryall.
"	...	St. Peter's Hospital	...	...	...	Mr. Carter Braine, Mr. Woodhouse Braine.
"	...	University College Hospital	...	...	...	Dr. Dudley Buxton and the House Physicians.
"	...	Victoria Hospital for Children	...	...	...	Mr. H. G. Cook, Mr. A. Gale, Mr. P. F. Moline, Mr. R. Nairn, Mr. R. Colvin Smith.
"	...	West London Hospital	...	...	...	Mr. R. W. Lloyd and Residents.
"	...	Westminster Hospital	...	...	...	Mr. N. W. Bourns.
"	...	Private practice	...	...	...	Mr. Carter Braine, Mr. T. G. E. Burns, Mr. J. R. Day, Mr. G. Eastes, Dr. Hewitt, Mr. C. S. Murray.
Manchester	...	Salford Royal Hospital	...	...	...	Mr. G. E. Newby.
Maryborough	...	Queen's County Infirmary and private practice.	...	...	...	Dr. D. B. Jacob, Mr. W. G. Jacob.
Newark-on-Trent	...	General Hospital	...	...	...	Mr. E. Ringrose.
Newcastle-on-Tyne	...	Royal Infirmary	...	...	...	Dr. W. Baigent.
"	...	Children's Hospital, Moor Edge	...	...	...	Mr. W. W. Heelas, Mr. F. Lyvett.
Northampton	...	General Infirmary	...	...	...	Mr. H. Bayley, Mr. L. W. Dryland, Mr. Knyvett.
Northwich	...	Victoria Infirmary	...	...	...	Dr. Hassall, Mr. Kershaw, Mr. Love, Mr. Naish.
Nottingham	...	Children's Hospital	...	...	...	Mr. E. C. Kingdon, Dr. L. W. Marshall, Mr. G. B. White.
"	...	Private practice	...	...	...	Mr. G. B. White, Mr. J. White.
Oban	...		...	...	...	Dr. W. Culman.
Oldham	...	The Infirmary	...	...	...	Mr. Craith, Mr. V. Moxey.
"	...	Private practice	...	...	...	Mr. T. Fawsitt.

Oxford	...	Radcliffe Infirmary	...	...	...	Dr. Dalgliesh.
Paisley	...	The Infirmary	...	...	...	Dr. T. Graham.
"	...	Private practice	...	...	...	Dr. W. F. Gibb.
Perth	...	Royal Infirmary	...	...	...	Dr. Charles Stuart.
Portsmouth	...	Royal Hospital	...	...	...	Dr. Ward Cousins, Mr. T. H. Bishop, Mr. A. Pringle, Mr. B. Thorne Thorne, Dr. Watson.
Shrewsbury	...	The Infirmary	...	...	...	Mr. A. C. Black, Mr. W. W. Craig, Mr. D. Keele.
Skye	...	Gesto Hospital	...	...	...	Dr. K. N. Macdonald.
St. Leonard's-on-Sea	...	East Sussex Hospital	...	...	...	Mr. A. R. Ticehurst, Dr. W. G. Holloway, Mr. G. J. Rutherford.
"	"	Buchanan Cottage Hospital	...	...	...	Mr. F. H. Shaw.
Sunderland	...	Infirmary and private practice	...	...	...	Mr. G. B. Morgan.
Swansea	...	Hospital	...	...	...	Mr. J. K. Couch, Mr. T. C. Grey, Mr. E. Lancaster, Dr. T. J. Wood.
Wexford	...	The Infirmary	...	...	...	Mr. D. Hadden.
Weymouth	...	Royal Hospital	...	...	...	Dr. R. W. Carter, Dr. Childs, Mr. Du Boulay.
"	...	Royal Eye Infirmary	...	...	...	Dr. Childs.
"	...	Private practice	...	...	...	Dr. R. W. Carter, Dr. Childs.
Whitehaven	...	Infirmary and private practice	...	...	...	Dr. E. Ablett.
Wigan	...	Private practice	...	...	...	Mr. W. O. Barnish.
Winchester	...	Royal Hants County Hospital	...	...	...	Mr. J. T. Clarke.
Worcester	...	General Infirmary and private practice	...	...	...	Mr. L. J. Wilding.

To all those who furnished the reports, as well as to numerous voluntary helpers who assisted in the work of analysis, the Sub-Committee desires to tender very hearty thanks.

Material collected.—The record books were collected in January, 1893.

In all 136 books were returned, recording details of 25,920 cases.

Of the above-mentioned inquiry papers 94 were returned to the Committee.

Statements without detailed information were received concerning 6,147 cases.

The Committee also received much information by correspondence with various observers, affording further particulars of interesting and obscure cases.

Professor Ramsay furnished a report upon samples of anæsthetics analysed by him.

A report was tendered by Lieutenant-Colonel Edward Lawrie, I.M.S., of Hyderabad, containing a summary of 1,521 administrations of chloroform in India.

From the Press, cuttings concerning 34 deaths under anæsthetics were obtained.

The examination of the series of cases from the record books has been the principal work of the Committee, and forms the basis of this Report.

Interim Reports on progress of work.—Accounts of the progress of the work of the Committee may be found by reference to the Interim Reports published in the *British Medical Journal* on the following dates:—

- (1) 1892. Vol. II., pp. 195, 260.
- (2) 1893. Vol. II., pp. 277, 328.
- (3) 1894. Vol. II., pp. 199, 330.
- (4) 1895. Vol. II., pp. 214, 339.
- (5) 1896. Vol. II., p. 142.
- (6) 1897. Vol. II., p. 156.
- (7) 1898. Vol. II., p. 177.
- (8) 1899. Vol. II., p. 226.

System of analysis applied to cases from the record books.—The system by which the material contained in the record books was eventually analysed was fully described in the fourth Interim Report, July, 1895, and is here reproduced.

The Committee adopted the following definitions and scheme of classification of the cases in the record books:—

DEFINITIONS.

Uncomplicated cases are those in which, so far as the effects of the anæsthetic are concerned, nothing unusual occurs.

Complicated cases are those presenting unusual symptoms or sequelæ referable wholly or in part to the anæsthetic.

Cases with minor complications are those showing some noteworthy departure from the usual phenomena of the anæsthetic given, but not involving actual anxiety or danger.

Cases of anxiety are those presenting symptoms referable wholly or in part to the anæsthetic and requiring the adoption of remedial measures, but not involving immediate danger.

Cases of danger are those in which symptoms caused wholly or in part by the anæsthetic threaten the patient's life.

Cases of death are those in which the death is wholly or in part due to the effects of the anæsthetic given.

All the cases were read, considered, and classified by the Analysis Sub-Committee in accordance with the following scheme. Certain cases were, from want of sufficient evidence, found to be incapable of exact classification. All the cases were consequently arranged in two classes—1. Capable of; 2. Incapable of, exact classification; but in working out most of the statistical tables this division was unnecessary, and the two classes were treated as one.

SCHEME.

	Class I.	Class II.
	Capable of exact classification.	Capable only of approximate classification.
A. Uncomplicated cases.		
B. Complicated cases :—		
(a) Cases with minor complications.		
(β) Cases of anxiety.		
(γ) Cases of danger.		
(δ) Cases of death.		
C. Excluded cases.		

It is obvious that in the exact classification of cases there are often three or four unknown quantities to be taken into consideration. For example, the exact state of the patient's health, the effect of the surgical procedure, the amount of hæmorrhage, and the personal equation of the observer may all conceivably affect a certain recorded case. Because of this inherent difficulty, and as the statistical results of this inquiry are entirely dependent upon the classification of individual cases, the whole of the complicated cases (B) were abstracted in detail, and appear in this Report (p. 14).

The details of each uncomplicated case (Division A) were carefully analysed, and submitted to an elaborate process of tabulation and cross-tabulation. Some idea of the diversity of the facts which had to be transferred and tabulated in the analysis books used by the Sub-Committee may be gathered from the consideration that records of the administration of forty-three distinct anæsthetics, mixtures, or successions of anæsthetics were sent in, administered in many different ways, and that other statements (*e.g.*, age, condition, operation, phenomena of administration, after-effects, quantity used, etc.) had first of all to be tabulated under the particular anæsthetic employed.

The complicated cases (Division B), 733 in number, were analysed on similar lines.

Anæsthetics employed, and number of administrations.—The following is a list of the various anæsthetics, mixtures, and successions of anæsthetics which were employed by the observers, with the number of cases recorded of the administration of each :—

TABLE I.

Reference No.	Anæsthetic employed.	No. of Cases.
1	Chloroform	13,393
2	Ether	4,595
3	" Gas and ether " *	2,071
4	A.C.E. mixture	678
5	Mixtures of chloroform and ether in various proportions	418
6	A.C.E. followed by chloroform	59
7	Chloroform followed by ether	208
8	Ether followed by chloroform	225
9	A.C.E. followed by ether	155
10	Gas and ether followed by chloroform	77
11	Chloroform followed by ether followed by chloroform	4
12	Chloroform followed by A.C.E. followed by ether	38
13	A.C.E. followed by ether followed by chloroform	18
14	Chloroform followed by A.C.E. or by some similar mixture	275
15	Mixtures of chloroform and alcohol	15
16	" Methylene "	12
17	Mixtures of chloroform and ether followed by chloroform	11
18	Gas and ether followed by A.C.E.	3
19	Ether followed by A.C.E.	37
20	Mixtures of chloroform and ether followed by ether	4
21	Chloroform followed by mixtures of chloroform and ether	14
22	Ether followed by mixtures of chloroform and ether	3
23	Gas followed by A.C.E.	2
24	Gas followed by chloroform	2
25	Ether followed by chloroform followed by mixtures of chloroform and ether	2
26	Gas followed by ether followed by a mixture of chloroform and ether	1
27	(Afterwards placed under another heading.)	
28	Nitrous oxide	2,911
29	Nitrous oxide mixed with oxygen	597
30	Morphine followed by chloroform	3
31	(Afterwards placed under another heading.)	
32	Gas and ether followed by chloroform followed by ether	1
33	Mixtures of chloroform and ether followed by chloroform followed by mixtures of chloroform and ether.	1
34	Morphine followed by ether	4
35	Ether followed by chloroform followed by ether	3
36	Ether followed by chloroform followed by A.C.E.	5
37	A.C.E. followed by ether followed by A.C.E.	9
38	Morphine and atropine followed by gas and ether	11
39	Morphine and atropine followed by gas and ether followed by A.C.E.	1
40	Ether followed by A.C.E. followed by chloroform	3
41	Chloroform with a few drops of ether occasionally	23
42	Gas followed by chloroform followed by ether	1
43	Morphine and atropine followed by ether	1
44	Morphine followed by chloroform followed by ether	1
45	Chloroform followed by ether followed by A.C.E.	1
	Grand total	25,896
	† Excluded cases (Division C).	24
	Total number of cases in record books	25,920

* Either nitrous oxide followed by ether, or ether gradually added to nitrous oxide.

† These 24 cases were excluded for the following reasons :—

In 8, record too imperfect for even approximate classification ; in 8, no mention of the anæsthetic ; in 5, cocaine used ; in 1, doubt as to anæsthetic mentioned ; in 1, no anæsthesia produced ; and in 1, no anæsthetic administered.

Results of analysis: the uncomplicated cases.—The uncomplicated cases (A) of which the definition has already been given (p. 9) amounted to 25,163, being 97·169 per cent. of the total cases in the record books.* Of these, 24,685 are allocated in Class I, and the remaining 478 in Class II. The following table gives the ratio of Division A to the total number of administrations of the various anæsthetics of which not less than 100 cases were recorded.

TABLE II.†

No.	Anæsthetic.	Total Records.	No. of cases in Division A.	Ratio of Division A to total.
1	Chloroform	13,393	12,955	96·730 per cent.
2	Ether	4,595	4,455	96·953 "
3	"Gas and ether"	2,071	2,026	97·827 "
4	A.C.E. mixture	678	660	97·345 "
5	Mixtures of chloroform and ether	418	406	97·129 "
7	Chloroform followed by ether	208	196	94·230 "
8	Ether followed by chloroform	225	216	96·000 "
9	A.C.E. followed by ether	155	148	95·484 "
14	Chloroform followed by A.C.E. or by some similar mixture	275	270	98·182 "
28	Nitrous oxide	2,911	2,888	99·210 "
29	Nitrous oxide mixed with oxygen	597	596	99·832 "

In the large majority of instances no note was made of any departure from the normal routine of anæsthesia. Details often occur, which are either unimportant or do not come within the scope of this inquiry, but are of value as indicating the care bestowed upon the records by the observers. On other occasions reference is made to phenomena which, although in themselves noteworthy departures from the normal, were not held to be due in any degree to the effects of the anæsthetic. There are examples of such phenomena attributed to surgical procedure, hæmorrhage, the antecedent condition of the patient (see p. 118 *et seq.*) exposure during or after the operation, or an association of these. The adjudication of such cases involved a careful weighing of the evidence available as to whether the anæsthetic played any and what part in the causation of the phenomena. In this connection it is noteworthy that no less than 52 out of a total of 81 deaths recorded fall into Division A. Full details of these are printed at p. 118.

The Divisions A and B merge into one another, and in many instances cases might with almost equal propriety be supposed to belong to either division. The particular criteria adopted by the Committee in allocating these cases appear under the general account of the complicated cases (B) at pp. 13, 34, 46.

The results of the analysis of the details of the uncomplicated cases (A) are given under the special headings sex, age, etc., at p. 65 *et seq.*

The complicated cases.—The complicated cases (Division B), of which the definition has already been given (p. 9), were 733 in number, being 2·831 per cent. of the total cases in the record books. Of these cases 612 were placed in Class I, and the remaining 121 (*i.e.*, nearly one-sixth) in Class II.

* In this, as in all places in which the "total number of cases in the record books" is referred to, the 24 cases of Division C are excluded.

† The percentages are brought to the nearest third place of decimals in this and subsequent tables.

The following table gives the ratio of the complicated cases to the total number of administrations of those anæsthetics of which not less than 100 administrations are recorded :—

TABLE III.

No.	Anæsthetic.	Total Records.	No. of cases in Division B.	Ratio of Division B to total.
1	Chloroform	13,393	438	3'270 per cent.
2	Ether	4,595	140	3'047 "
3	" Gas and ether "	2,071	45	2'173 "
4	A.C.E. mixture	678	18	2'655 "
5	Mixtures of chloroform and ether	418	12	2'871 "
7	Chloroform followed by ether... ..	208	12	5'770 "
8	Ether followed by chloroform... ..	225	9	4'000 "
9	A.C.E. followed by ether	155	7	4'516 "
14	Chloroform followed by A.C.E. or by some similar mixture	275	5	1'818 "
28	Nitrous oxide	2,911	23	0'790 "
29	Nitrous oxide mixed with oxygen	597	1	0'168 "

The complicated cases are subdivided into :—

- Cases with minor complications (α).
- Cases of anxiety (β).
- Cases of danger (γ).
- Cases of death (δ).

the definitions of which may be found at p. 9.

The abstracts of the complicated cases are given below under these subdivisions.

Cases with minor complications.—The cases with minor complications (B α) are 389 in number (*i.e.*, 531 or rather more than one-half of the total cases in Division B). Of these 306 are in Class I and 83 in Class II. This proportion of Class II to the total number of cases in the subdivision B α , *viz.*, more than one-fifth, is higher than that in any other subdivision, and may be explained by the consideration that, many of the cases being but slight departures from the normal, the notes were often not precise enough for exact classification.

The following table gives the ratio of cases in the subdivision B α to the total number in Division B and to the total number in the record books (A and B together) under the headings of the particular anæsthetics dealt with in the two previous tables,

TABLE IV.

Number and Name of Anæsthetic.	Percentage of complicated cases (B).	Number in the subdivision B α .	Ratio of B α to whole of Division B.	Ratio of B α to A and B combined (<i>i.e.</i> , to total cases).
1. Chloroform	3'270	198	45'205 per cent.	1'478 per cent.
2. Ether	3'047	96	68'571 " "	2'089 " "
3. " Gas and ether "	2'173	31	68'8 " "	1'497 " "
4. A.C.E. mixture	2'655	11	61'1 " "	1'622 " "
5. Mixtures of chloroform and ether	2'871	3	25'000 " "	0'718 " "
7. Chloroform followed by ether	5'770	6	50'000 " "	2'885 " "
8. Ether followed by chloroform	4'000	1	11'1 " "	0'400 " "
9. A.C.E. followed by ether	4'516	7	100'000 " "	4'516 " "
14. Chloroform followed by A.C.E. or by some similar mixture	1'818	2	40'000 " "	0'727 " "
28. Nitrous oxide... ..	0'790	21	91'304 " "	0'721 " "
29. Nitrous oxide mixed with oxygen	0'168	1	100'000 " "	0'168 " "

The following are instances of phenomena which led the Committee to place cases in this subdivision.

1. Respiratory :—

Partial failure or feebleness of respiration.
Obstructed breathing.
Excessive bronchial secretion.
Presence of vomited material.
"Spasm."
'Spasm of glottis.'
"Falling back of tongue."
Excessive cough.
Cyanosis.

2. Circulatory :—

"Faintness."
"Syncope."
"Shock."
Failure of pulse.
Pallor.
Collapse as after-effect of anæsthetic.

3. Nervous and muscular :—

Excessive excitement.
Violent struggling.
Rigidity.
Tremor.
Epileptic or epileptiform fit or convulsion.
Persistent reflex movement.

4. Micturition.

5. Defæcation.

6. Prolonged narcosis after withdrawal of anæsthetic.

7. Vomiting lasting over 24 hours.

8. Undesirable phenomena leading to change of anæsthetic.

When such phenomena, considered by the light of all the circumstances of the case, appeared to be of a trivial character, and not to have materially affected the patient's well-being nor demanded active treatment; or when they were due mainly to the effects of the surgical procedure or pre-existing condition of the patient, and only in a very minor degree to the action of the anæsthetic given, the case was placed in subdivision *a*.

Below are the abstracts of all the cases with minor complications, arranged under the various anæsthetics. The record of each case is given as far as possible in the exact words of the observer, except that symbols are used for abbreviation; and the order of the sentences has been altered where necessary to show the sequence of events.

Each abstract is divided into four paragraphs describing :—

- (1) The condition of the patient (Pt.).
- (2) The nature of the operation (O.), with the month and time of day.
- (3) The anæsthetic (An.), nature of, manner and method of giving, duration, quantity.
- (4) The progress of the case, symptoms, and remedies.

The following abbreviations are used :—

C.=chloroform; E.=ether; G. and E.=gas and ether; ACE.=the A.C.E. mixture; G.=nitrous oxide; G. and O.=nitrous oxide mixed with oxygen; Meth.=methylated; Mins.=minutes; M.=male; F.=female; Pt.=patient; A.R.=artificial respiration; O.=operation; R.=respiration.

At the end of the abstract of each case in Class I will be found symbols indicating the view of the Committee as to the causation of the unusual or dangerous symptoms presented by the case. Three symbols are used:—

“AN.” denotes that the anæsthetic or its method of administration was accountable for the symptoms. Under “AN.” are included unadvisable methods and faulty postures.

“O.” signifies that the symptoms were attributable to the severity, duration, or special character of the operation.

“PT.” indicates that the phenomena recorded were due to the condition of the patient previous to the administration.

When in addition to the symbol “AN.” which occurs in every case, one or both of the symbols “O.” and “PT.” also appear, each factor is to be held in some measure responsible for the complication. When these symbols are arranged horizontally they indicate by their order the relative share that each factor had in the production of the symptoms. When arranged vertically they indicate either (1) that the factors played equal parts, or (2) that the Committee could not decide which had the greatest share in the production of the symptoms.

ABSTRACT OF CASES WITH MINOR COMPLICATIONS.

(In observers' own words wherever possible.)

ANÆSTHETIC I.—CHLOROFORM.

Class I cases.

Cases in B a I, Anæsthetic No. 1.

- | | |
|--|---|
| <p>1.—F. 59. Good.
Oct. For scirrhus mammae.
C. 40 mins. (Afterwards mixture of C. and E.)
C. to begin with, and then C. and E. mixed. Pt. twice caused alarm by stopping breathing, but only for a few seconds. A.R. not necessary. Sick after. AN.</p> | <p>8.—F. 47. Delicate.
March, noon. Ovariectomy.
C., on towel. $\text{̄}xxviii$. 75 mins.
Pt. stopped breathing. Tongue was pulled out and jaw forward. All came right. Slight sickness after. AN.</p> |
| <p>2.—M. 32. Strong.
Oct., 5 p.m. For hæmorrhoids.
C., on towel. $\text{̄}iv$. 20 mins.
Some difficulty with the breathing, <i>e.g.</i>, stopped twice for short time. AN.</p> | <p>9.—M. 44. Good.
Dec., afternoon. For hæmorrhoids.
C., on towel. $\text{̄}xvii$. 50 mins.
Took 20 mins. to go under. Tongue fell back, stopped breathing. Turned cyanotic. No sickness after. AN.</p> |
| <p>3.—M. 10. Good.
Sept., 9.40 a.m. Radical cure of hernia.
C., on lint. $\text{̄}iv$. 30 mins.
Respiration failed once. AN.</p> | <p>10.—M. 62. Strong man.
Dec., 11 a.m. For epithelioma of arm.
C., on towel. $\text{̄}xv$. 40 mins.
Breathing interrupted. Tongue pulled forward. Slight sickness after. AN.</p> |
| <p>4.—M. 14. Strumous.
May, 11 a.m. Exploration of kidney.
C., on towel. $\text{̄}ix$. One hour.
Took anæsthetic badly, breathing somewhat irregular. Con-junctival reflex not reliable. AN.</p> | <p>11.—M. 15. Strumous.
Oct. Castration (left).
C., method unstated. $\text{̄}ivss$. 35 mins.
Stertorous breathing during whole of anæsthesia, a quantity of mucus forming and so rendering breathing difficult. Tongue pulled forward and throat sponged out. AN.</p> |
| <p>5.—M. 40. Good.
Nov., 10 a.m. Nephrotomy.
C., on single fold of towel. $\text{̄}viii$. 40 mins.
Took C. badly, breathing embarrassed. AN.</p> | <p>12.—M. 24. Healthy.
Jan., 2 p.m. Trimming badly crushed fingers.
C., on Skinner. $\text{̄}vi$. Half an hour.
Severe dyspnœa from mucus in throat. Administration discontinued. AN.</p> |
| <p>6.—F. 38. Strong. No brandy before administration.
10 a.m. For patellar bursitis.
C., open method. 10 mins.
Breathing ceased about 2 mins. after administration was stopped. Head lowered at once. Sick afterwards. AN.</p> | <p>13.—M. 6. Good.
Feb., 1 p.m. Scraping tuberculous bone.
C., on towel. 25 mins.
During course of the C., patient became sick and some of the vomit appeared to be choking him. Turning on side and lowering head relieved symptoms. AN.</p> |
| <p>7.—M. 54. Weakly.
Nov., 12.10 p.m. Forming biliary fistula.
C., on towel. $\text{̄}xlv$. 70 mins.
Tongue pulled forward during O., as breathing became irregular. Slight faintness. AN.</p> | |

14.—F. 39. Gastric catarrh.
Sept. Ovarian cyst removed.
C., on mask. \bar{v} viii. 40 mins.
Spasm of glottis. Tongue drawn forward, and hypodermic of ether administered. Some sickness followed, lasting 18 hours. AN.

15.—F. 42. Fair.
April. Excision of cancerous glands.
C., on towel. \bar{v} ii. Half an hour.
Spasm of larynx during administration. After-effects—sickness. AN.

16.—F. 8. Good.
Sept., 9 a.m. For hernia.
C., on lint. \bar{v} iv. 20 mins.
Spasm of larynx troublesome. AN.

17.—M. Fair.
Amputation of leg.
C., Meth. on lint. \bar{v} xiii. One hour.
Well marked stage of excitement. C. suspended twice during administration owing to spasm of glottis. No vomiting. AN.

18.—F. 3. Very rickety. Anæmic.
March. For abscess in ear.
C., on lint. 15 mins.
The child got some spasm of the larynx, with tremendous recession of ribs. AN.

19.—M. 7. Fair.
Nov., 12.30 p.m. For psoas abscess.
C., on double lint. \bar{v} iii. 10 mins.
Some spasm of glottis towards end. After-effect—vomited. AN.

20.—M. 42. Alcoholic.
Oct., 11 a.m. Suprapubic cystotomy and closure of urinary fistula.
C., on towel. \bar{v} xxvii. 70 mins.
Took C. badly. Came out very rapidly on several occasions during O. Tongue pulled forward several times, as breathing became laryngeal. AN.

21.—M. 10. Healthy appearance.
Jan., 11 a.m. For tubercular elbow.
C., on flannel inhaler.
Tongue fell back twice, was brought forward with forceps. After-effects—sickness. AN.

22.—M. 32. Good. Pt. had been prepared by an aperient the previous night, followed next morning by an enema. An early breakfast and only a little beef-tea two hours before operation.

March. For fractured nasal bones.
C., method unstated. \bar{v} ii. 10 mins.
Great struggling. Tongue slipped back twice, though jaw was well held up. AN.

23.—M. 35. Good.
May, 4.30 p.m. Amputation through metacarpus.
C., on towel. \bar{v} iv. 30 mins.
Pt. became cyanotic owing to tongue falling back. Relieved on pulling forward. When partially round closed his teeth tightly on tongue until mouth forced open. AN.

24.—M. 5. Very strumous.
Feb., 10 a.m. For caries of metatarsus of great toe.
C., on Skinner. \bar{v} iii. 12 mins.
Five minutes going under. Considerable laryngeal irritation at first. AN.

25.—M. 21. Poor.
Nov., 2 p.m. For necrosis of ribs.
C., on towel. \bar{v} xii. 80 mins.
This Pt. was 15 mins. in becoming anæsthetised. In the previous, and some of the following cases, the anæsthesia was delayed without cause in the patients. On two occasions the

same sample has caused violent laryngeal irritation in the administration (coughing, etc.). The cause appears to be due to exposure of the chloroform to light. AN.

26.—F. 57. Considerable loss of flesh.
Feb., 5 p.m. Amputation of arm for necrosis.
C., on Skinner. \bar{v} viii. 50 mins.
Injection of ether \bar{M} xx. Cough from irritation throughout. AN.

27.—M. 6 months. Good.
Aug. Electrolysis of nævus.
C., on mask. Anæsthetised in 2 mins. Altogether \bar{v} ii. 15 mins.

Pt., when anæsthetised, took one long inspiration to two short and quick expirations. Got cyanosed with feeble pulse. Recovered quickly, but was longer than usual coming round. The nævus bled freely after the needles were removed. AN.

28.—M. 10. Good.
May, 2 p.m. Amputation of foot.
C., on towel. \bar{v} iv. 45 mins.
Cyanosed. AN.

29.—M. 31. Excited condition after injuries.
Feb., 11 a.m. Amputation below knee.
C., on towel. \bar{v} iv. One hour.
Great amount of lividity about lips. Took C. badly, stage of excitement prolonged. After-effects—no vomiting. AN.

30.—M. 65. Moderate.
July, 3 p.m. Iridectomy.
C., on towel. \bar{v} ii. 15 mins.
Rather cyanosed. AN.

31.—F. 28. Fair.
Aug., 9.30 a.m. Hysterectomy.
C., on towel. \bar{v} xvi. 90 mins.
"While fully under the influence of the anæsthetic, about the middle of the O., Pt. became sick, retching violently, so that I had to desist from operating for a minute or two." By pushing the C. the sickness soon ceased without vomiting taking place. AN.

32.—F. 50.
Sept., 9 a.m. Excision of breast.
C., on corner of towel. 80 mins.
Marked pallor, sickness, and faintness. AN.

33.—F. 53. Healthy.
Jan., 11 a.m. Excision of mamma.
C., on towel. \bar{v} xiii. 30 mins.
Became faint during administration. Breathing somewhat shallow throughout. After-effects—sickness. AN.

34.—M. Satisfactory.
May, 11 a.m. "Sharp spooning" cervical glands.
C., on corner of towel.
Pt. got rather faint at one time, evidently from sickness. Vomited and recovered. After-effects—good. AN.

35.—M. 53. Good.
Sept., 11.30 a.m. Castration.
C., on corner of towel.
Pt. somewhat faint at one time, probably from sickness. A little ether was given. After-effects—good. AN.

36.—F. 24. Good.
June, 10 a.m. Sinus scraped.
C., on corner of towel. 10 mins.
A trifle faint during administration. AN.

37.—M. 57. Healthy.
Nov., 11 a.m. For fatty tumour on thigh.
C., on towel. \bar{v} xv. 22 mins.
Pt. became slightly faint during administration. No stimulants, however, required. AN.

- 38.—F. 23. Fair health.
May, noon. Tenotomy at knee.
C., on double lint. $\bar{\text{v}}\text{iv}$. 40 mins.
Sickness during administration, and faintness. AN.
- 39.—F. 19. Good. Nervous. Pt. had been prepared by aperient previous night, followed next morning by enema. An early breakfast and only a little beef-tea two hours before operation.
March. Amputation of toe.
C., method unstated. $\bar{\text{v}}\text{vi}$. 20 mins.
Faint last 5 mins. Took a lot of C. before unconscious. AN.
- 40.—F. 17. Fair.
Dec. Varicose veins.
C., on mask. $\bar{\text{v}}\text{ii}$.
Became rather faint in the middle of the operation. Was very sick. AN.
- 41.—M. 4. Good.
April, 3 p.m. Circumcision.
C., Meth. on lint. $\bar{\text{v}}\text{iii}$. 15 mins.
Cyanosis with vomiting. Slight attack of syncope. Recovered after vomiting. AN.
- 42.—M. 46. Satisfactory.
May, 9 a.m. For fistula in ano.
C., on corner of towel. Few mins.
A momentary syncope occurred, leading to a little anxiety. Sickness followed, and quick recovery. After-effects—good. AN.
- 43.—Sex and age unstated.
Oct. Double lumbar colotomy.
C., method unstated. (Afterwards E.)
Collapse under C., therefore changed to E. Was very collapsed before administration of E. AN.
- 44.—M. 42. Strong.
June, 9.45 a.m. Excision of shoulder.
C., open method. (Afterwards E.)
Breathing became shallow, and pulse weak and very slow under administration of C., so E. was substituted with good results. AN.
- 45.—M. 74. Good.
March. Removal of epithelioma behind ear.
C., on lint. $\bar{\text{v}}\text{iv}$. 20 mins.
Pt. was rapidly anaesthetised, but breathed badly and had very weak pulse throughout O. Recovered slowly. Vomited after. AN.
- 46.—F. 24. Good.
Aug. 10 a.m. Excision of patellar bursa.
C., on corner of towel. 15 mins.
Pulse became slow and feeble after Pt. was put under, and the lips were exceedingly pale. Sickness with obstinate vomiting followed, lasting for about half an hour after Pt. regained consciousness. AN.
- 47.—F. 9. Weak.
March. Removal of necrosed bone from pelvis.
C., with Krohne's Junker. 35 mins.
Pt. became very pale. Pulse very weak. (Was very frightened before operation.) Vomiting. AN.
- 48.—F. 6 months. Good.
March. For naevus.
C., from Junker. 8 mins.
Face became very pale. Pulse weak (slightly).
After-effects—vomiting. AN.
- 49.—F. 48. Emaciated and anaemic. Heart and kidneys normal. Suffering from chronic bronchitis. Narrow-chested. First time of taking C. Purgative night before. No food for $5\frac{1}{2}$ hours.
May, 10 a.m. Excision of adenoma of mamma. No spray. No evidence of shock during O.
- C., on Skinner. $\bar{\text{v}}\text{iii}$. 22 mins. C. kept 10 days, not exposed to light. No other Pt. evinced any bad symptom with same C.
Pt. behaved in normal manner until 5 mins. after suspension of administration, then pulse began to fail, pallor, breathing faint. Treatment: elevation of end of table, brandy by mouth, E. $\bar{\text{M}}\text{xv}$ hypoderm. Came round rapidly. AN.
- 50.—F. 4. Good.
March, 9 a.m. Exploring buttocks for foreign body, needle extracted.
C., on towel. 20 mins.
On attempting to give ether (with Clover's inhaler), child struggled so frantically that C. was substituted. Corneal reflex abolished in about 5 secs. Muscular relaxation complete in about 8 secs., but still feeling. Last 10 mins. of O. complete anaesthesia, pale lips, and cheeks a little dusky. Pulse small and very compressible. Second heart sound much accentuated. First sound not detectable. Anaesthesia remained complete for 45 secs., then suddenly Pt. jumped up and began to cry. Good colour returned. First sound now loud. AN.
- 51.—M. 15. Weak. Nervous. Prepared by aperient and enema.
March. Radical cure of hernia.
C., method unstated. $\bar{\text{v}}\text{vi}$. 20 mins.
Went under very easily, but breathing soon became shallow, followed by extreme pallor and slight emesis. Pulse very small and quick. Sudden cyanosis, not due to tongue slipping back, lasted a minute and a half, after which, breathing and pulse improved. Return of consciousness quick. AN.
- 52.—F. 11. Good.
Sept., 10.20 a.m. For strabismus.
C., on mask and towel. $\bar{\text{v}}\text{iv}$. 48 mins.
Much vomiting before complete anaesthesia. Pulse feeble and intermittent. Second time of taking chloroform, had same trouble before. AN.
- 53.—M. 16. Good.
April, noon. Scraping cervical glands.
C., on towel. $\bar{\text{v}}\text{v}$. 20 mins.
During O., Pt.'s head and shoulders were well raised, and about middle of time pulse became almost imperceptible. Head and shoulders lowered. Pulse at once improved. AN.
- 54.—M. 10. Good.
May, 11 a.m. Taking cast and reducing dislocation of elbow.
C., by open method. $\bar{\text{v}}\text{xii}$. One hour.
At one time pulse failed suddenly, and could not be felt at the wrist. R. continued. Pulse returned after about 30 secs. AN.
- 55.—M. 13. Fairly strong.
May, 9 a.m. Amputation above knee.
C., open method. 45 mins. (Afterwards E.)
Heart became rapid and irregular, and E. was substituted for C. with good effect. AN.
- 56.—F. 35. Good.
Oct. Ovariectomy.
C., on double lint. (Afterwards mixture of C. and E.)
After one hour under C., Pt. got rather cyanosed, and pulse became weak and fluttering. Equal parts of E. and C. then given, when pulse and colour at once improved and Pt. bore rest of O. well. AN.
- 57.—F. 30. Good.
Nov. Double ovariectomy and hysterectomy.
C., on double lint. (Afterwards mixture of C. and E.)
Pt. took C. very well for one hour. Then pulse failed a little and equal parts of E. and C. were given, with immediate improvement. AN.

- 58.—M. 28. Healthy.
April, noon. Varicose veins ligatured.
C., on towel. $\bar{z}xxiv$. 45 mins.
E. substituted on towel for several minutes owing to extremely weak circulation. AN.
- 59.—F. 29. Healthy.
April, noon. For sarcoma of forehead.
C., on towel. $\bar{z}xvi$. 10 mins.
Pulse flagged during administration. ACE substituted on the towel for a few minutes. AN.
- 60.—F. 42. Good.
Feb., 11 a.m. Excision of mamma.
C., on towel. $\bar{z}iii\frac{1}{2}$. $12\frac{1}{2}$ mins. (Afterwards E.)
Pulse was weak for a short time and breathing ceased for a few seconds, so C. was stopped. Continued with E. AN.
- 61.—M. 47. Good.
April, 1 p.m. Castration.
C., on corner of towel. (Afterwards E.)
He presented usual alcoholic difficulties, *i.e.*, struggling, etc. Pulse became somewhat weak and irregular. This was quickly rectified by using E. before O. commenced. AN.
- 62.—F. 36. Good.
June. Laparotomy.
C., on double lint. (Afterwards mixture of C. and E.)
C. and E. equal parts given during last 15 or 20 mins. as pulse had begun to fail. An immediate improvement took place on adding the E. AN.
- 63.—M. 54. Good.
March. "Cleaning hand."
C., on towel. 25 mins. (Afterwards E.)
As Pt. had somewhat of a weak pulse towards end of O., ether was substituted. AN.
- 64.—M. 24. Strong, rather thin (? underfed).
Nov., 10.30 a.m. Removal of sebaceous cyst of eyelid.
C., on towel, open. $\bar{z}vi$. 35 mins.
Struggled and talked a great deal whilst getting under. Pulse good throughout. Breathing became shallow at one period and Pt. became very pale and felt faint when conscious. Was given Sp. Am. Co. $\bar{z}i$. Slept after O. Vomited once. AN.
- 65.—F. 22. Good.
Aug., 9 a.m. Removal of mamma.
C., on corner of towel. Half an hour.
Administration of E. for a few mins. in middle of O., because Pt. rather white. AN.
- 66.—F. 26. Good.
June, afternoon. For ununited fracture of patella.
C., on towel. $\bar{z}xxiv$. 70 mins.
Slightly alcoholic. Considerable collapse after O. AN.
- 67.—M. 3. Strumous.
July. Castration.
C., method unstated. $\bar{z}i$ $\bar{m}iv$. 10 mins.
Sickness with some collapse and exhaustion after O. Good recovery. AN.
- 68.—M. 17. Indifferent.
Aug. For empyema.
C., on lint. About $\bar{z}iv$.
Pt. took anæsthetic badly, resisting and giving a great deal of trouble. He was practically never under its influence, and finally the opening in the chest was made under ether spray. AN.
- 69.—F. 17. Good. Pt. had been prepared by an aperient the previous night, followed by an enema the next morning. An early breakfast and only a little beef-tea two hours before O. For examination in retained menses, and aspiration.
C., method unstated. $\bar{z}viii$. 30 mins.
Epileptic attack during O. AN.
- 70.—M. 9 months. Good.
Nov., 8 p.m. To reduce inguinal hernia.
C., on towel. 15 mins.
Child took C. very badly, and had a fit while under. AN.
- 71.—M. 40. Good.
July, 5 p.m. Amputation of right hand at wrist.
C., on lint. $\bar{z}xiii$ ss. One hour.
Much spasm, epileptic in character. AN.
- 72.—M. 52. Plethoric.
May. Removal of tumour from neck.
C., on double lint. $\bar{z}xii$. 45 mins.
Convulsions while going under, very marked. AN.
- 73.—F. 6 months. Good health.
July. For hare lip.
C., on double lint. $\bar{z}ii$. 20 mins.
Convulsions during administration. AN.
- 74.—M. 60. Broken down.
June, noon. For extensive hæmorrhoids.
C., on flannel. $\bar{z}iv$. 10 mins.
Slow in getting under. Slight convulsion. AN.
- 75.—F. 5 months.
Electrolysis.
C., on mask. 7 mins.
Slight convulsion. AN.
- 76.—M. 11. Healthy. (2nd administration.)
April, 9 a.m. Suprapubic lithotomy.
C., on modified Skinner. $\bar{z}xxxi$. 95 mins.
Considerable difficulty was encountered in this case in getting the boy completely under the anæsthetic, due to the fact that whenever water was injected into the bladder a powerful reflex effect was produced, although Pt. was quite unconscious. The diaphragm became fixed and the boy got into an asphyxiated condition, so that both the C. had to be temporarily removed and the tension in the bladder relieved. Finally the O. had to be performed without any preliminary distension of the bladder. AN.
- 77.—M. 14. Good.
Dec., 12.45 p.m. O. for cleft palate.
C., on towel. $\bar{z}xiii$. 95 mins.
Pt. took C. very well, but took a long time to come round. A hypodermic injection of E. was given into arm. AN.
- 78.—F. 24. Good.
Oct., 1 p.m. For bursa over ankle joint.
C., on towel. $\bar{z}xvi$. 20 mins.
After-effects—sickness. Great difficulty in getting Pt. to come out of C. AN.
- 79.—F. 54. Good.
July, 3 p.m. Electrolysis for scirrhus.
C., on Skinner. $\bar{z}vi$. 20 mins.
Vomited for four days after. AN.
- 80.—M. 30. Not very debilitated.
March, 1 p.m. Resection of ribs for empyema.
C., on towel. 20 mins.
Severe sickness for three days. AN.
- 81.—M. 12. Fair.
April. Excision of hip joint.
C., on sponge. One hour.
Sick for three days. AN.
- 82.—F. 56. Fair.
April. For scirrhus of breast.
C., open method. $\bar{z}iv$ ss. 30 mins.
After-effects—sickness, continuing about three days. AN.
- 83.—F. 42. Fat, not anæmic.
Oct. Exploration of uterus.
C., 30 mins.
Ready in 10 minutes. Some sickness and retching for $2\frac{1}{2}$ days. Headache. AN.

- 84.—M. 14. Tubercular. (6th administration.)
Sept., 9 a.m. Scraping tubercular sinuses over rib.
C., on modified Skinner. \bar{v} vi. 15 mins.
Vomiting for two days after. He has been excessively sick every time he has had C. AN.
- 85.—M. 32. Fair.
Nov. Suturing ununited fracture of femur.
C., on Skinner. \bar{v} x. 45 mins.
Nine mins. going under. Vomiting for two days. AN.
- 86.—F. Fairly good.
Sept., 9 a.m. Ovariectomy.
C., on corner of towel. 45 mins.
Retching pretty constant for two days. Pedicle was a thick and broad one, and was ligatured. After-effects—good. AN.
- 87.—M. 20. Weakly.
May, 9 a.m. Dilating sinus in chest wall.
C., on towel. \bar{v} x. 35 mins.
Sick for two days. AN.
- 88.—F. 25. Good.
Dec., 11 a.m. Oophorectomy (unilateral).
C., on towel. \bar{v} ix. 25 mins.
Pt. was exceedingly sick and continued so up till two o'clock on the following day, when it gradually wore off. AN.
- 89.—M. 8. Good.
June. For single genu valgum.
C., on towel. \bar{v} iv. 20 mins.
Sickness. Vomiting for 30 hours. AN.
- 90.—M. 18. (3rd administration.)
Jan., 9 a.m. Tubercular knee excision.
C., on modified Skinner. \bar{v} xix. 100 mins.
Pt. vomited while under influence of anæsthetic and during day and night after. It was checked by Vin. Ipecac. \bar{v} x. AN.
- 91.—M. 9. Very strumous.
May, 3 p.m. Scraping strumous glands.
C., on towel. \bar{v} xvi. 30 mins.
Vomiting for 12 hours after. Slight hæmatemesis. Cause unknown. AN.
- 92.—M. 35. Slight trace of albumen in urine. Heart sounds normal.
Nov., 1.45 p.m. Amputation through arm for sarcoma radii.
C., on mask. (Afterwards E.)
C. was commenced with, but was discontinued after \bar{v} i was given owing to continuous sickness, which ceased when E. was given. AN.
- 93.—M. 17. Anæmic. Nervous.
Nov., 1.55 p.m. Varicocele.
C., with Junker. \bar{v} iii. 15 mins. (Afterwards E.)
Pt. was sick continually with C., so changed to E., after which he was not sick until he came round. AN.
- 94.—F. 25. Fair.
April, 12 noon. Drainage of bladder per vaginam.
C., on flannel. \bar{v} iv. 25 mins. (Afterwards ACE.)
Pt. took anæsthetic badly. Breathing very shallow from the first. After about 25 minutes C. stopped, and ACE substituted. No improvement. AN.
- 95.—M. 17. Good.
Sept., 3 p.m. Osteotomy.
C., on Skinner. \bar{v} ii. (Afterwards ACE.)
Took C. badly, so ACE used. After-effect—vomited. AN.
- 96.—M. 19. Strong.
Sept., 12 noon. Resecting ribs.
C., on towel. \bar{v} xii. 30 mins.
Took a long time to go under, much excitement. C. pushed. Breathing became quiet and natural. Pulse 75. Eyeballs, which had been oscillating, gradually became fixed. Slight sign of danger appeared by interfering with diaphragm, the breathing becoming irregular. After-effects—sick. AN.
- 97.—M. 35. Very good.
Feb., noon. Excision of nævus (?) of upper lip.
C., on open towel. \bar{v} xxvi. 40 mins.
During O. a little saliva and blood got into trachea and embarrassed respiration a little. The C. was stopped and Pt. allowed to come out a little, when he coughed it up. C. then resumed. Pt. salivated a great deal during O. Very restless and noisy afterwards. AN. O.
- 98.—F. 33. Poor. Anæmic.
May, 2 p.m. Dilatation of cervix uteri.
C., method unstated. \bar{v} iss. 15 mins.
During dilatation pulse suddenly became intermittent, but recovered itself without interference. AN. O.
- 99.—M. 8. Fairly healthy.
Oct., 7 p.m. Washing out abdomen, suturing perforating wound.
C., on towel. 70 mins. (Afterwards E.)
He was suffering a good deal from shock, so E. was used at the latter part of the O. After-effects—sickness. Boy brought into hospital quite unprepared, hence the vomiting. AN. O.
- 100.—M. 11. Tubercular. (6th administration.)
Oct., 9.30 a.m. Amputation at hip joint.
C., on modified Skinner. \bar{v} xvi. 45 mins.
Very collapsed and sick for two days. Battley's solution \bar{v} x given after O. for his pain. AN. O.
- 101.—F. 4. Fair.
July. Excision of knee.
C., on towel. One hour.
Considerable shock. Pt. remained deeply under influence of C. for considerable time after O. AN. O.
- 102.—M. 3. Weak and feverish.
Oct., noon. Amputation of leg.
C., on towel. \bar{v} xii. 50 mins. (Afterwards ACE.)
Breathing became very shallow and irregular under C. AN. PT.
- 103.—M. 37. Apparently healthy.
April, 1 p.m. Reduction and radical cure of irreducible inguinal hernia.
C., on towel. 20 mins.
Pt. did not take C. well, the stage of excitation being well marked and considerably prolonged. The breathing stopped for a few seconds at one time during administration, but on pulling tongue forward, it again became natural. Near the close of the O. the Pt. was sick, and vomited a considerable quantity of partially digested food. Slight sickness after. AN. PT.
- 104.—F. 60. Stout and rather feeble.
Feb., 11 a.m. Excision of mamma.
C., on open towel. \bar{v} xxviii. 40 mins.
Tongue pulled forward during O. because breathing not quite free. Slight vomiting after O. stopped by a little hot water. AN. PT.
- 105.—F. 44. Not good.
Nov. Oophorectomy.
C., on double lint. 40 mins.
Fat, plethoric woman, did not breathe well. Tongue had to be pulled forward twice. No alarming symptoms. AN. PT.
- 106.—F. 17. Bronchitic and weakly.
Nov., 11 a.m. Osteotomy for knock knees.
C., on one fold of towel. \bar{v} vii. Half an hour.
Became cyanosed, breathing difficult and inclined to stop. Administration of anæsthetic stopped. Came round all right. AN. PT.
- 107.—F. 23. Anæmic. Emaciated.
Sept. For abdominal tumour.
C. method unstated. \bar{v} iv \bar{v} l50. 45 mins.
On peritoneal cavity being opened, Pt. became cyanosed, the respiration very jerky and infrequent. She, however, recovered and afterwards took C. well. AN. PT.

- 108.—F. 38. Poor condition. Had been suckling lately.
Nov. Amputation of breast.
C., on lint. \bar{v} vii. 40 mins.
Pt. turned a bad colour, and had weak pulse soon after administration was begun. It was given carefully, allowing Pt. to breathe pure air every minute or so. She remained a bad colour and had a weak pulse for 30 mins. after C. was stopped.
AN. PT.
- 109.—M. 9. Fair.
April. Circumcision.
C., on lint. \bar{v} iv. Nearly one hour.
This child, a semi-idiotic subject, was violently excited, struggled a great deal, and did not take anæsthetic well. His pulse was at times intermittent, his breathing shallow, and his recovery slow.
Vomited after. AN. PT.
- 110.—M. 38. Debilitated by suppuration.
Oct., 5 a.m. Opening up stump for secondary hæmorrhage.
C., on towel. 30 mins. (Afterwards E.)
Heart failed with C., so E. was substituted; but he required hypodermics of E. to bring him round. The weakness was due to inflammation, not to overdose of C. After-effect—vomiting.
AN. PT.
- 111.—M. 7. Very anæmic.
June. Scraping hip.
C., method unstated. \bar{v} xvi. One hour.
Pt. became very white and faint, but was kept lightly under, and soon recovered. AN. PT.
- 112.—F. 69. Weak.
May. Amputation of arm.
C., with Junker. 20 mins.
Pt. was soon anæsthetised, and required very little to keep her under. Became very pale and pulse very weak. AN. PT.
- 113.—F. 50. Rather weak. Mitral systolic.
July, 11 a.m. Ovariectomy.
C., on towel. \bar{v} x. (Afterwards E.)
Slight retching during operation. E. given because of pallor and weak pulse. AN. PT.
- 114.—F. Very feeble.
Oct., afternoon. Amputation through forearm.
C., on towel. (Afterwards E.)
The pulse was observed to become feeble, so E. was substituted for C. AN. PT.
- 115.—F. 50. Bad subject. "Goitre, weak heart, etc."
Sept., 10 a.m. Ovariectomy, with numerous adhesions.
C., on towel. (Afterwards E.)
Pt. became weak under C., improved on E. being substituted.
AN. PT.
- 116.—F. 37. Weak.
April. Excision of breast.
C., on towel. 45 mins.
Pt. became weaker and paler during O. Hypodermic injections of E. were given. AN. PT.
- 117.—F. 7. Tubercular.
Nov. Excision of hip joint.
C., on lint. \bar{v} iv. Half an hour. (Afterwards E.)
There was considerable pallor of the face, lips, and ears, therefore E. was substituted during latter third of the time, but there was little, if any, appreciable improvement in above conditions. AN. PT.
- 118.—M. 6. Anæmic.
May. For psoas abscess.
C., method unstated. \bar{v} iii. Half an hour.
Pt. became very anæmic and pulse bad during the administration, but revived almost immediately after amyl nitrite. AN. PT.
- 119.—M. 41. Good health (alcoholic).
March. Removal of recurrent tumour from neck.
C., on double lint.
General convulsive spasm lasting several mins., until well under anæsthetic. AN. PT.
- 120.—M. 16. Not good.
May. Excision of hip joint, afterwards amputation.
C., on sponge. \bar{v} ii. 40 mins.
Vomiting for two days. AN. PT.
- 121.—M. 3. Healthy.
March, 2 p.m. For hare lip and cleft palate.
C., on Skinner. \bar{v} vi. 35 mins.
Owing to the very free bleeding the condition of the Pt. became rather critical, and after the first 10 mins. of the O. very little more C. was placed on inhaler. Vomited several times. O. AN.
- 122.—F. 22. Epileptic.
Nov., 3 p.m. Opening cyst in upper jaw.
C., with Krohne's Junker. \bar{v} ii. 10 mins.
Slight fit before she came round. No trouble. PT. AN.
- 123.—M. 71. Chronic bronchitis.
Oct. For dislocation of shoulder.
C., on mask. \bar{v} iii. 15 mins.
Rolling of eyes 40 secs. Oscillation of pupils 15 secs. Slight struggling for 3 mins., then tranquil. Pupils dilated, then contracted. No vomiting. After-effects—slight increase of cough for two days. PT. AN.
- 124.—M. 16. Healthy until present illness.
April, noon. Laparotomy for purulent peritonitis with intestinal obstruction of three weeks' standing.
C., on Skinner. \bar{v} vii. 69 mins.
Apnoea came on 2 mins. after commencing to give C., and lasted for about 1 min. Pt. kept well until intestines were manipulated a good deal, then pulse became very weak and irregular, and remained so until the washing out of the peritoneal cavity was completed, and then improved. No after-vomiting. PT. O. AN.
- 125.—M. 50. Healthy.
Oct., 12.50 p.m. Removal of half lower jaw for epithelioma.
C., on towel. \bar{v} L. One hour.
Tongue held forward during whole O. Occasionally breathing interrupted, but soon resumed on cleaning out back of pharynx, and forcibly pulling tongue forward. AN.
O.
- 126.—M. 50. Very flabby. Glycosuria. Tongue dry and furred. Perforation of palate.
Jan., 1 p.m. Amputation just above knee for gangrene of foot.
C., on mask. Till anæsthesia \bar{v} iii. 10 mins. Altogether \bar{v} ix. 40 mins.
Breathed very badly throughout whole of O. Tongue pulled forward all the time. AN.
PT.
- 127.—M. 16. Healthy.
Oct., 6 p.m. Amputation through leg.
C., on towel. 45 mins. (Afterwards E.)
Pt. had received a gunshot wound of leg, and had lost a good deal of blood, so E. was used as the pulse became weak, and he had two injections of E. \bar{m} xxx afterwards. AN.
PT.
- 128.—F. Fair.
May. Strangulated hernia.
C. (Afterwards mixture of C. and E.)
E. was mixed with C. half-way through the operation, as Pt.'s pulse was found to be failing. AN.
PT.

Cases in Class II.

Cases in B a II, Anæsthetic No. 1.

- 129.—F. 10. Excited.
Sept., 4 p.m. Excision of cervical glands.
C., on towel. \bar{v} iv. 35 mins.
Towards close of O. Pt., being only partly under influence of C. and feeling prick of sutures, gave short struggle, breathing became spasmodic, and then ceased altogether. Flicking with wet towel. Respiration re-established.
- 130.—M. 10. Good.
July. Scraping sinus of hip.
C., method unstated. 40 mins.
Pt. stopped breathing twice. Pulse good.
- 131.—F. 64. Debilitated.
Oct., 3 p.m. Radical cure of inguinal hernia.
C., on towel. \bar{v} o mins.
Stopped breathing once, soon recovered.
- 132.—F. 56. Fair.
July, 9.45 p.m. Removal of clitoris.
C., on corner of towel. 5 mins. (Afterwards E.)
E. used on account of respiration getting shallow.
- 133.—F. 14. Good. (2nd administration.)
June, 4 p.m. Excision of hip.
C., on single fold of towel. \bar{v} iv. One hour.
Took it badly. Breathing only affected. Circulation normal.
Had taken it well on previous occasions.
- 134.—M. 39. Healthy. (1st administration.)
March, 9.40 a.m. Excising ganglion on wrist.
C., on Skinner. \bar{v} xvii. 35 mins.
Pt. became asphyxiated, but recovered without much treatment, tongue only being pulled forward.
- 135.—M. 15. Tubercular. (2nd administration.)
March, 10 a.m. Scraping glands.
C., on Skinner. \bar{v} x. 35 mins.
After-effects—sick. Pt. became asphyxiated when sick, while coming out of C.
- 136.—M. 43. Good.
Nov., 4 p.m. For hæmorrhoids.
C., on one fold of towel. 20 mins.
Breathing much embarrassed.
- 137.—M. 3. Weak.
March. Osteotomy of femur.
C., with Junker. 7 mins.
Face became cyanosed towards end of O. Breathing shallow.
Pupils not dilated.
- 138.—F. 9. Strumous.
Dec., 3 p.m. Amputation at hip.
C., on lint. \bar{v} xi. 50 mins.
Very faint at times. Hypodermic injection of E. used at intervals.
- 139.—F. 50. Feeble.
Aug. Ovariectomy.
C., on lint. (Afterwards E.)
Pt. got very faint towards end of O. E. added with good results.
- 140.—M. 2 months. Good.
Sept., 10 a.m. Circumcision.
C., on lint. \bar{v} iss. 10 mins.
After-effects—faint.
- 141.—M. 5. Good.
Sept., 10 a.m. Circumcision.
C., on lint. \bar{v} ii. 10 mins.
After-effects—faint.
- 142.—F. 15. Anæmic.
Oct. For sebaceous cyst.
C., on lint. \bar{v} ii. 30 mins.
After-effects—faint.
- 143.—F. 21 $\frac{3}{2}$. Good.
Jan., 1 p.m. Excision of nævus.
C., on lint. \bar{v} i. 15 mins.
After-effects—faint. Vomited.
- 144.—F. 10. Good.
Feb., 3 p.m. Tenotomy of tendo Achillis.
C., on lint. \bar{v} i. 13 mins.
After-effects—vomited. Very faint before vomiting.
- 145.—F. 8. Healthy.
March, 10 a.m. Gouging out necrosed metatarsal bone.
C., on lint. \bar{v} iii. 30 mins.
After-effects—faintness. Vomited bilious matter twice.
- 146.—F. 45. Good. Rather intemperate.
July, 11 a.m. Excision of mamma.
C., on lint. \bar{v} viii. 45 mins.
After-effects—faintness, vomiting, no serious symptoms.
- 147.—F. 23. Good.
Nov., 2 p.m. Extraction of teeth.
C., on lint. \bar{v} xii. 35 mins.
After-effects—slightly faint.
- 148.—M. 22. Good.
Jan., 10 a.m. For tubercular testicle.
C., on lint. \bar{v} iv. 15 mins.
After-effects—slight faintness.
- 149.—F. 8. Weak, strumous. Leg riddled with sinuses.
Pt. prepared by aperient the previous night, followed next morning by enema. An early breakfast, and only a little beef-tea two hours before O.
March. Amputation through middle of thigh.
C. \bar{v} x. 30 mins.
Breathing shallow at first, improved markedly after 5 mins.
Faint at end. Sp. Ammon. Aromat. Recovered. Brandy $\frac{3}{4}$ per rectum.
- 150.—M. 72. Good.
Nov., 9.20 a.m. Excision of part of jaw and floor of mouth.
C., on corner of towel. (Afterwards E. used for a time.)
Faintness during short period of anæsthesia, and E. used for few minutes.
- 151.—F. 22. Good.
March, noon. Ovariectomy.
C., on flannel. \bar{v} xii. 40 mins.
Pulse got weak and respiration sighing towards end of O.
Administration stopped, and quick recovery ensued.
- 152.—M. 46. Good.
Dec., 9 a.m. Excision of varicose veins.
C., on corner of towel. (Afterwards E.)
E. given during greater part of O., as Pt. was very weak.
- 153.—F. 42. Anæmic.
Feb., 1 a.m. For adherent placenta.
C., on lint. 15 mins.
Pt.'s pulse was extremely bad, being very frequent, irregular and weak for about 30 mins. after C.
- 154.—F. 36. Weak.
July, 9 a.m. Ovariectomy.
C., on corner of towel. (Afterwards E.)
E. substituted for C., owing to weak pulse.

- 155.—F. 51. Good.
Dec., 9 a.m. Excision of breast and glands.
C., on towel. (Afterwards E.)
Administration of C. till Pt. was slightly under, and as her pulse was poor E. was used all through O.
- 156.—F. 40. Good.
Aug. Ovariectomy.
C., on lint. (Afterwards mixture.)
Pulse got weak towards end of O. Some E. was added, and pulse improved.
- 157.—M. 10. Temperature 101·8°. Quick, small pulse.
Nov. For acute periostitis and septic osteomyelitis. Tibial medulla scraped out.
C., on lint. \bar{v} ix. 45 mins.
Pulse rapid and small, getting smaller after Pt. taken to ward.
Given brandy \bar{v} i, in warm water \bar{v} iii, per rectum.
- 158.—M. 24. Bad.
Feb. Incision into leg.
C., on lint. 25 mins.
After effects—pulse feeble. Sick. Enema of brandy given.
- 159.—F. 50. Very feeble.
Jan., 9.30 p.m. Ovariectomy.
C., with Junker. \bar{v} xii. 105 mins.
Took \bar{v} v of C. before anaesthesia was produced.
After-effects—collapsed.
- 160.—M. 15. Thin and pale.
Jan., 4 p.m. Removal of necrosed bone from tarsi.
C., on Skinner. \bar{v} vii. 45 mins.
After effects—shock. Slight sickness.
- 161.—F. 32. Weak. Heart irregular.
Nov., 1 p.m. Removal of glands in axilla.
C., on Skinner. \bar{v} iv. 35 mins.
After-effects—slightly collapsed.
- 162.—M. 16. Weakly.
Oct., 1 p.m. Making counteropenings and scraping.
C., on Skinner. \bar{v} iii. 20 mins.
After-effects—collapsed.
- 163.—F. 31. Weak.
July, 12.15 p.m. Opening axillary abscess.
C., on Skinner. \bar{v} iv. 20 mins.
After-effects—collapsed.
- 164.—F. 4. Good.
For dilated gall bladder. Cholecystotomy.
C., on Skinner. \bar{v} iv. \bar{v} 50. 60 mins.
Somewhat exhausted.
- 165.—F. 2. Strumous.
Nov. Excision of elbow.
C., on Skinner. \bar{v} iss. 25 mins.
Some exhaustion, but good recovery.
- 166.—M. 10. Good.
Aug. Radical cure for hernia.
C., on towel. \bar{v} ivss. 55 mins.
Took C. well. After-effects—great collapse.
- 167.—M. 3. Good.
March. Arthrectomy.
C., on towel. \bar{v} ii. 60 mins.
After effects—collapse.
- 168.—F. 8. Moderate.
Aug., 2 p.m. Excision of hip.
C., on towel. \bar{v} iii. 50 mins.
After-effects—slight collapse.
- 169.—F. 42.
July, 11 a.m. Amputation of breast with axillary glands.
C., on one fold of towel. \bar{v} viii. One hour.
After-effects—very collapsed.
- 170.—M. 6. Bad.
Oct., 3 p.m. For hip disease.
C., on lint. \bar{v} ii. 20 mins.
After-effects—shock.
- 171.—F. 14. Good.
Oct., 2 p.m. Excision of naevus.
C., on lint. \bar{v} iii. 40 mins.
After-effects—shock.
- 172.—M. 4. Fair.
Oct., 4 p.m. Excision of hip.
C., on lint. \bar{v} ivss. 40 mins.
After-effects—shock.
- 173.—M. 1. Good.
Oct., 3 p.m. Trephining for hydrocephalous.
C., on lint. \bar{v} iii. 45 mins.
Vomiting during O. After-effects—shock.
- 174.—M. 4. Bad.
Sept., 2 p.m. Excision of hip.
C., on lint. \bar{v} ii. 20 mins.
After-effects—shock.
- 175.—F. Bad.
Aug., 2 p.m. Excision of hip.
C., on lint. \bar{v} v. 45 mins.
After-effects—shock.
- 176.—F. 8. Fair.
July, 3 p.m. For abscess in hip.
C., on lint. \bar{v} iiiiss. 35 mins.
After-effects—shock.
- 177.—M. 9. Bad.
June, 3.30 p.m. For necrosis of tibia.
C., on lint. \bar{v} ii. 16 mins.
After-effects—shock.
- 178.—? Sex. 2 $\frac{3}{4}$. Fair.
June, 2.30 p.m. Craniectomy.
C., on lint. \bar{v} iiiiss. 35 mins.
After-effects—shock.
- 179.—? Sex. 1 $\frac{5}{8}$. Good.
June, 2.30 p.m. Craniectomy.
C., on lint. \bar{v} iiiiss. 35 mins.
After-effects—shock.
- 180.—M. Bad.
Aug. Resection of ribs.
C., on lint. \bar{v} ii. 22 mins.
Four mins. to get under. After-effects—suffered much from shock.
- 181.—M. 19. Weak and anæmic. Kidneys amyloid.
Sinus of back scraped and drained.
C., on Skinner. \bar{v} iiiiss. 20 mins.
Four mins. going under. After-effects—severe shock.
- 182.—M. 15. Strumous and anæmic.
April. Strumous axillary glands.
C., on Skinner. \bar{v} vi. 35 mins.
Six-and-a-half mins. going under. After-effects—shock.
- 183.—M. 67. Emaciated and suffering from absorption.
April. Symes' amputation.
C., on Skinner. \bar{v} iiiiss. 25 mins.
Five mins. going under. After-effects—shock.
- 184.—M. 4. Healthy.
July, 3.45 p.m. For congenital cystic tumour of axilla.
C., on Skinner. \bar{v} viii. 65 mins.
After-effects—collapse and sickness.
- 185.—F. 55. Has lost flesh, mitral systolic murmur.
May, 4.50 p.m. Excision of breast for epithelioma.
C., on Skinner. \bar{v} vii. 35 mins.
After-effects—some collapse and sickness.

- 186.—F. 3. Strumous.
March, 4 p.m. Examination of knee joint.
C., on Skinner. \bar{v} iss. 10 mins.
After-effects—sick and slight collapse.
- 187.—F. 25. Pale from hæmorrhage.
Jan., 11 a.m. Suturing deep wound of perinæum.
C., on Skinner. \bar{v} x. 50 mins.
Injection of E. \bar{M} xv given during administration (once), and after, once. Collapse and slight sickness afterwards.
- 188.—M. 7. Has lost flesh.
May, 3.30 p.m. Amputation lower third of thigh, for strumous knee.
C., on Skinner. \bar{v} viii. 40 mins.
After-effects—sickness and slight collapse.
- 189.—F. 46.
May, 3.45 p.m. Excision of breast, for encephaloid cancer.
C., on Skinner. \bar{v} vii. 30 mins.
After-effects—slight collapse.
- 190.—F. About 40. Thin. Fair pulse and heart sounds.
Jan., 2 p.m. For a very adherent growth in abdominal cavity.
C., on Skinner. \bar{v} xii. One hour.
No complication during administration. A good deal of hæmorrhage during O. Some collapse afterwards, with feeble pulse, pallor, etc. Considerable retching and vomiting some hours after O.
- 191.—M. 47. Fair.
Oct. Left lumbar colotomy.
C., on sponge. \bar{v} iv. 25 mins.
Violent. Slight collapse after.
- 192.—M. 12. Very weak.
Dec. Excision of hip.
C., on towel. \bar{v} iiiss. 60 mins.
Very collapsed after O.
- 193.—M. 4. Anæmic. Suffering from diarrhœa.
Feb. Arthrectomy.
C., on towel. \bar{v} iii. 45 mins.
Greatly collapsed for some time after. Reacted to warmth and stimulants. Took C. well.
- 194.—F. 46. Weak.
Sept., 10 a.m. Ovariectomy.
C., open method. 80 mins.
Very collapsed after O. for about one hour. After rallying vomited several times within next six hours.
- 195.—F. 1 $\frac{1}{2}$. Bad.
Oct., 4 p.m. For suppurating hydrocele in neck.
C., on lint. \bar{v} iss. 35 mins.
Shock and vomiting after O.
- 196.—F. 26. Good.
July, 11.30 a.m. Using curette and cautery.
C., on towel. \bar{v} xvi. 40 mins.
Pt. had a strong convulsive seizure as she was going under.
- 197.—M. 33. Emphysema.
Oct., 10 a.m. For abscess of back.
C., on lint. \bar{v} ii. 10 mins.
Had epileptiform convulsion going under anæsthetic.
- 198.—M. 55. Good.
Suprapubic cystotomy.
C., on Skinner. \bar{v} vi. 55 mins.
Administration had to be stopped several times, as Pt. took it so badly.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 2.—ETHER.

Cases in Class I.

Cases in B a I, Anæsthetic No. 2.

- 199.—M. 21. Good.
Sept., 4.15 p.m. For abscess of neck.
E., with Clover. $\frac{1}{2}$ oz. (Afterwards C.)
Pt. became asphyxiated under E., so C. was continued with.
AN.
- 200.—M. 33. Alcoholic.
Dec., 12.30 p.m. For fistula in ano.
E., with Clover. (Afterwards C.)
Became asphyxiated with E., C. substituted. After-effects—vomited. AN.
- 201.—M. 7. Good.
Nov. Tonsillotomy for post-adenoid growths.
E., with Clover. \bar{v} iii. 8 mins.
There was considerable resistance to taking E. Breathing ceased for about 30 secs. Slight compression of chest and raising the arms two or three times above the head, with pulling out the tongue restored the breathing. AN.
- 202.—F. 24. Good.
Feb., 9.30 a.m. Oophorectomy.
E., with Clover. $3\frac{1}{2}$ oz. 35 mins.
Breathing became bad during O., but recovered itself. After-effects—vomited. AN.
- 203.—F. 36. Good.
July, 10 a.m. Extraction of teeth.
E., with Clover. \bar{v} vi. (Afterwards C.)
Pt. breathed badly whilst inhaling E., so the anæsthetic was changed. After-effects—sick. AN.
- 204.—F. 35. Anæmic. Feeble.
Feb., 2 p.m. Removal of uterine decidua.
E., with Clover. 1 oz. (Afterwards ACE.)
Breathed badly, and got cyanosed with E., which was discontinued and followed by ACE, which was taken well. AN.
205. M. 15.
Jan., 8.30 a.m. For nasal polypi and necrosis and lymphoid growth.
E., Meth., with Clover. 1 oz. 7 mins. (Afterwards C.)
Obstruction to respiration very severe; troublesome coughing during administration of E., and respiratory spasm. No struggling. AN.
- 206.—F. 30. Indifferent.
Dec., 10 a.m. Abdominal section. Removal of right ovary.
E., with Clover. 4 oz. 50 mins.
Cyanosis. A large quantity of fine frothy mucous during administration. Shallow and almost imperceptible respiration. On withdrawal of anæsthetic pulse very small, followed after a long interval by copious vomiting of bile. AN.
- 207.—M. 31. Dyspeptic.
Jan., 4 p.m. Tooth extraction.
E., with Clover. 10 mins. (Afterwards C.)
Anæsthesia in 3 mins. Gave C. after 10 mins. on account of great mucous secretion in mouth, interfering with O. Very sick afterwards, and came round very slowly, but pulse full and strong throughout, and respiration steady and slow. AN.

- 208.—F. 27. Weak from long illness.
Jan., 10.30 a.m. Shortening bone in conical stump.
E., with Clover. 27 mins.
After-effects—much bronchial secretion. AN.
- 209.—M. 38. Strong.
March, afternoon. For necrosed elbow.
E., with Clover. $1\frac{1}{2}$ oz. (Afterwards C.)
Went up to " $2\frac{1}{2}$ " on Clover at first. Much secretion and cyanosis, so changed to C. This very soon quickened breathing and stopped any further secretion. AN.
- 210.—F. 25. Hysterical.
June, 10.20 a.m. Examination of abdominal tumour.
E., with Clover. $1\frac{1}{2}$ oz. (Afterwards C.)
C. substituted owing to mucous accumulation in throat and mouth. AN.
- 211.—F. 26. Anæmic.
Jan., 9.50 a.m. Twelve stumps extracted.
E., with Clover. 1 oz. (Afterwards C.)
After getting under with E. Pt. was much salivated, and owing to large accumulation of saliva in mouth and pharynx, C. was substituted. After-effects—no vomiting. AN.
- 212.—F. 21. Healthy.
May, afternoon. For necrosis of jaw.
E., with Clover. $\frac{1}{2}$ oz. (Afterwards C.)
Much frothing and secretion, and pulse 90 with E. After C. was begun breathing became very quiet, secretion stopped, and pulse fell. AN.
- 213.—M. 28. Good.
April, 11 a.m. Wiring fractured patella.
E., with Clover. $3\frac{1}{2}$ oz. 70 mins.
Some temporary cyanosis from food in larynx. After-effects—very sick. AN.
- 214.—M. 21. Some debility after long illness.
Nov., 12.30 p.m. Excision of shoulder.
E., with Clover. (Afterwards C.)
E. had to be discontinued, as it caused asphyxial attacks with closure of mouth. These seemed to be rather due to small quantities of fluid getting into air passages than to tongue getting back. Soon after C. was commenced, a gag being kept in the mouth all the time, R. became quieter, and in the end all went well. Same difficulty with this Pt. some months ago. AN.
- 215.—F. 40. Good.
July. Excision of elbow.
E., with Clover. (Afterwards C.)
Shortly after operation commenced Pt. became very cyanosed, with much spasm of glottis and of jaws, which were opened with great difficulty. The tongue was then pulled forward and Pt. began to breathe well and regained her colour. C. was used for the rest of the O., and was taken well. After the O. was over it was ascertained that the same thing happened when Pt. was operated on ten years before. Nothing abnormal discovered in heart or lungs. AN.
- 216.—M. 26. Good.
Nov., 10.30 a.m. Castration.
E., with Clover. (Afterwards C.)
E. caused so much respiratory spasm that C. was substituted. After-effects—vomited. AN.
- 217.—M. 38. Good.
Nov., 10 p.m. Crushing piles.
E., with Clover. (Afterwards C.)
E. discontinued, as it caused so much respiratory spasm. C. substituted. Breathing very stertorous, otherwise Pt. took it well. AN.
- 218.—M. 32. Fair.
May, 10.30 a.m. Removal of cyst from neck.
E., with Clover. (Afterwards C.)
E. tried first, but owing to respiratory spasm C. was substituted. Pt. required a good deal of latter to keep him under. After-effects—great sickness. AN.
- 219.—M. 16. Fair.
April, 10 a.m. Examining perineal wound.
E., with Clover. (Afterwards C.)
E. caused a good deal of respiratory spasm, so C. substituted. AN.
- 220.—M. Good.
June. Scraping sinus of foot.
E., with Clover. (Afterwards C.)
E. caused much respiratory spasm, and so discarded. AN.
- 221.—M. 31. Good.
May, 10 a.m. Enucleation of eye.
E., with Clover. (Afterwards C.)
E. caused so much stertor and dyspnoea that C. was substituted. AN.
- 222.—M. 58. Good.
Jan., 4 p.m. For Dupuytren's contraction.
E., with Clover. \bar{v} iii. 5 mins. (Afterwards C.)
E. produced spasm and coughing. AN.
- 223.—M. 47. Weak.
April, 9 a.m. Removal of carious bone from toe.
E., with Clover. \bar{v} ii. 5 mins. (Afterwards C.)
Much spasm during administration of E. AN.
- 224.—M. 35. Very anæmic. Had had C. four times before.
Feb., 4 p.m. External urethrotomy.
E., with Clover. (Afterwards C.)
He was of a most excitable and hysterical nature. E. brought on intense spasms and cyanosis. Spasms were present to a much less extent with C. There was the greatest difficulty in keeping him under; in an instant of neglect there would be a spasm. Pulse always kept up. No sickness afterwards. AN.
- 225.—F. 22. Good.
Feb., 2.30 p.m. Amputation of leg.
E., with Clover. 4 oz. 40 mins.
Stopped breathing during administration, owing to swollen tongue falling back. At once resumed respiration on pushing jaw forward. After-effects—vomiting. AN.
- 226.—M.
Feb., 3.30 p.m. For fistula in ano.
E., with Clover. 3 mins. (Afterwards C.)
Pt. had had E. three times and wished to have it again. It was administered in usual way, Pt. breathing regularly and deeply. After three minutes' administration the strength was increased, and this was quickly followed by momentary cessation of breathing and violent coughing. Chin pushed forward and tongue pulled out, when he began to breathe regularly and to expectorate thick ropy mucus. Pt. returned to semi-consciousness very quickly, so C. was given, anæsthesia being rapidly induced. Pt. vomited about one minute after administration of C. commenced, but otherwise took it well, and returned to consciousness very quickly after administration ceased. AN.
- 227.—F. 16. Tubercular.
Dec., 11 a.m. For lupus.
E., with Clover. 1 oz. (Afterwards C.)
The O. was concluded under C., on account of coughing and salivation. AN.
- 228.—M. 41. Good.
April, 9.45 a.m. Removal of lipoma.
E., with Clover. (Afterwards C.)
E. caused so much dyspnoea and coughing that C. was substituted. After-effects—vomited. AN.
- 229.—M. 61. Suffering from septic poisoning.
Jan., 4 p.m. Perineal section.
E., with Clover. (Afterwards C.)
E. caused much bronchial irritation. AN.

- 230.—M. Good.
May. Lithotripsy.
E., with Ormsby. 2 oz. (Afterwards C.)
Pt. struggle and coughed. Considerable coughing. Changed to C. AN.
- 231.—M. Healthy.
March. Ligature of posterior tibial, behind ankle.
E., with Clover. (Afterwards C.)
Anæsthetic changed on account of excitement and bronchial irritation. AN.
- 232.—M. 60. Fair.
April, noon. Wheelhouse's operation.
E., with Clover. (Afterwards C.)
E. caused much irritation. AN.
- 233.—M. Fairly good.
March, 10.30 a.m. Wheelhouse's operation.
E., with Clover. (Afterwards C.)
E. caused too much irritation, so changed to C. AN.
- 234.—M. 16. Good.
Dec., 12.30 p.m. Radical cure for hernia.
E., with Clover. 1 oz. 7 mins. (Afterwards C.)
E. caused coughing and retching, C. therefore substituted.
After-effects—a little vomiting. AN.
- 235.—F. 36. Hysterical.
Aug., 9.15 a.m. Perineorrhaphy.
E., with Clover. 10 mins. (Afterwards C.)
Took E. badly. Much cough. C. after first 10 mins. AN.
236. F. 25. Good.
March, 3.20 p.m. Teeth and stumps extracted.
E., with Clover. 1 oz. 9 mins. (Afterwards C.)
E. caused cough and when pushed did not readily produce anæsthesia. C. substituted. AN.
- 237.—F. 44. Good.
Nov. For scirrhus of mamma.
E., with Clover. (Afterwards C.)
Coughing and spasm with E. Took C. well. AN.
- 238.—F. 20. Good.
Oct. For "abscesses of joint and shoulder."
E., with Clover. (Afterwards C.)
Much coughing and straining with E. Took C. well. AN.
- 239.—F. 30. Good.
Aug. Exploratory laparotomy and lumbar nephrectomy.
E., with Clover. (Afterwards C.)
Very fat woman. Much coughing and straining under E.
Took C. well. AN.
- 240.—M. 37. Good.
Aug. For hæmorrhoids.
E. with Clover. (Afterwards ACE.)
Pt. was a drunkard. Got blue and breathed badly under E., which was abandoned. Pt. was kept under ACE with difficulty. AN.
- 241.—F. 20. Good.
Jan. Opening abscess.
E., with Clover. 1 oz. (Afterwards C.)
Got blue while taking E., so C. was substituted. AN.
- 242.—M. 37. Good.
Feb. 3.30 p.m. Scraping sinuses.
E., with Clover. 1½ oz. 10 mins. (Afterwards C.)
Much cyanosis and coughing with E. Anæsthetic changed in consequence. AN.
- 243.—M. ? Age. Bad.
March. For fistula in ano.
E., with Clover. About ʒiv. (Afterwards C.)
This Pt. took E. very badly, struggling violently, and almost at once becoming cyanosed. C. was then substituted with success, but it was some hours before he had fully recovered from its effects. After-effects—much vomiting. AN.
- 244.—M. 34. Robust.
Feb. O. on anus.
E., with Clover. 2 oz. (Afterwards C.)
Pt. became very livid and breathing laboured. C. substituted.
After-effects—vomiting. A good deal of blood with the vomiting. AN.
- 245.—F. Plethoric.
June, 9 a.m. Double Oöphorectomy.
E., with Clover. 3 oz. 30 mins. (Afterwards C.)
Pt. very livid from the E. from the first. Changed to C. AN.
- 246.—M. 46. Good.
Oct., 2.45 p.m. For hæmorrhoids.
E., with Clover. 1½ oz. (Afterwards C.)
Lividity with E., stertor, etc. AN.
- 247.—F. 28. Good.
July, 9 a.m. Perineorrhaphy.
E., with Clover. 8 oz. 80 mins.
Slight collapse. No after-effects. AN.
- 248.—F. 67. Not satisfactory.
May, 3.20 p.m. For tumour of neck.
E., with Clover. 2 oz. 37 mins.
Vomited and collapsed afterwards. AN.
- 249.—M. 43. Wasted.
May, 2 p.m. Amputation of legs.
E., with Clover. 5 oz. 40 mins.
After-effects—vomiting and excitement almost maniacal. AN.
- 250.—F. 28. Good.
April, 2 p.m. Trephining tibia.
E., with Clover. 2 oz. 20 mins.
A semi-maniacal condition occurred as Pt. came round. AN.
- 251.—M. 17. Bad. Strumous subject.
Feb. Amputation of great toe.
E., with Clover. Amount very small. (Afterwards C.)
E. was administered to this Pt., but his struggles were so violent that C. had to be substituted after a few inhalations. He took this well, but was some time recovering from its effects. AN.
- 252.—M. 35. Alcoholic.
March. Scraping callous ulcer.
E., with Clover. (Afterwards C.)
Long in getting under; great excitement. Excessive bronchial secretion, therefore C. substituted for E. AN.
- 253.—F. Fair.
Feb. Curetting uterus.
E., with Clover. (Afterwards C.)
Began with E., but changed to C. on account of struggling. AN.
- 254.—M. 28. Phthisis, rather acute.
Sept., 2 p.m. For palmar ganglion.
E., with Clover. 15 mins. (Afterwards C.)
Took E. badly, would not breathe, held breath. Had to be held. Changed after 5 to 7 mins. from Clover to Ormsby with good result. But mucus and difficult breathing, so gave C., which he took well. AN.
- 255.—M. 47. Healthy.
March, 3 p.m. Enucleation of eyeball.
E., with Clover. 1 oz. (Afterwards C.)
Pt. could not be got under with E., so after O. had begun, C. was substituted, with the result that a quiet, sleep-like anæsthesia was soon produced, in great contrast to the noisy, struggling semi-anæsthesia produced by E. (which was pushed). AN.
- 256.—M. 38. Good.
April, 3 p.m. Incisions for extravasation of urine.
E., with Clover. (Afterwards C.)
E. used first, but caused much struggling, so C. was substituted, the Pt. requiring a large amount to keep him under. AN.

- 257.—M. Good.
July, 10.30 a.m. Removal of epithelioma of hand.
E., with Clover. (Afterwards C.)
Very violent, rigid and choky, with E., so C. substituted.
After-effects—vomited. AN.
- 258.—F. 29. Anæmic. Hysterical.
March, 12.10 p.m. For lipoma of back.
E., with Clover. 1 oz. 10 mins. (Afterwards C.)
Took 6 mins. to go under. Marked excitement and great rigidity of limbs. Much better under C. Pulse fell, and breathing became very quiet. After-effects—sickness. AN.
259. M.—47. Healthy.
Jan. Breaking down old fracture of femur, vicious union.
E., with Clover. (Afterwards C.)
Changed to C. on account of persistent rigidity. AN.
- 260.—M. "Early stage of starvation."
Dec., 10.30 a.m. First stage of gastrostomy.
E., with Clover. (Afterwards C.)
Anæsthetic changed on account of bronchial irritation and muscular rigidity. AN.
- 261.—M. 26. Good.
Dec., 2 p.m. Radical cure for hernia.
E., with Clover. (Afterwards C.)
Pt.'s muscles remained quite rigid under E. anæsthesia, so C. was substituted. AN.
- 262.—M. 42. Healthy.
Nov., 2 p.m. Hæmorrhoids.
E., with Clover. (Afterwards C.)
It was impossible to get Pt. relaxed under E.; corneal reflex was abolished and the pupils widely dilated, but the muscles were so rigid that it was impossible to flex the hip joints. C. was substituted, and flaccidity was soon obtained. AN.
- 263.—M. 31. Very alcoholic, red-faced, bloated.
March, 3 p.m. Abdominal section.
E., with Clover. 10 mins. (Afterwards C.)
A very difficult case. Rigidity persisted for some time with E., so changed in about 10 mins. after beginning to C. Though this relaxed the arms, the abdomen remained rigid throughout. Respiration quick and jerky. AN.
- 264.—M. 56. Obviously alcoholic. Slow, full pulse.
Feb., 3 p.m. Wheelhouse's operation.
E., with Clover. 5 oz. 55 mins. (Afterwards C.)
Considerable rigidity, preventing Clover's crutch being applied. Overcome by about 3ss of C. on Skinner. Then E. again. No further delay or difficulty. AN.
- 265.—M. 50. Good.
Aug., 11.30 a.m. Amputation of finger, and removing gland in axilla.
E., with Clover. (Afterwards C.)
No amount of E. would cause complete relaxation of muscles, so C. was substituted. AN.
- 266.—M. 64.
June, 6 p.m. Putting up fractured femur.
E., with Clover. 2 oz. (Afterwards C.)
Pt. was only relaxed on one occasion for about 2 mins. C. tried in order to see if he would respond to that better. AN.
- 267.—M. 54.
Jan., 2.20 p.m. For hæmorrhoids.
E., with Clover. (Afterwards C.)
Commenced with E., great muscular tremor and rigidity, to overcome which C. was given. Day very cold. After-effects—sick. AN.
- 268.—F. 33. Fair.
July, 10 a.m. Dilating and curetting for endometritis, and arresting serious hæmorrhage afterwards.
E., with Clover. 4 oz. A little over one hour.
An epileptiform seizure during the administration. Consciousness tardily returned. No after-effects. AN.
- 269.—F. 33. Non-anæmic. Thin, small.
Feb., 2.30 p.m. Removing two ovarian tumours.
E., with Clover. 3 oz. 60 mins.
Easily ready for O. in 4 mins. Vomited two hours afterwards. Next day vomited once. Cough troublesome with much expectoration. AN.
- 270.—M. 56. Good.
May, 6 p.m. Excision of piles.
E., with Clover. 2 oz. 30 mins.
After-effects—transient glycosuria. AN.
- 271.—M. 25. Good. Strong.
Jan., 12 noon. Removal of cyst.
E., with Clover. 1½ oz. 15 mins. (Afterwards C.)
Difficult to get under with E., so gave C. AN.
- 272.—M. 26. Good.
Nov., noon. Smash of hand.
E., with Clover. (Afterwards C.)
Some difficulty in taking E., so used C. AN.
- 273.—M. 49. Good.
Nov., 10.45 a.m. Passing œsophageal bougie.
E., with Clover. 1 oz. (Afterwards C.)
Some difficulty in taking E., C. substituted. After-effects—
not sick. AN.
- 274.—M. 11. Good.
Sept., 4 p.m. Radical cure of hernia.
E., with Clover. (Afterwards C.)
Pt. unable to take E. at first, so C. was employed. AN.
- 275.—M. 60. Debilitated.
Oct., 10.40 p.m. Extravasation of urine.
E., with Clover. ½ oz.
E. taken very badly and rapidly. C. given, and large quantity required to keep Pt. under. AN.
- 276.—M. Good.
April, 10 a.m. Removal of growth near knee.
E., with Clover. (Afterwards C.)
E. used at first, but rejected for C., as it would not produce narcosis. AN.
- 277.—M. Good.
March. For crushed toes.
E. ʒiv. (Afterwards C.)
Seven minutes getting under. Took E. very badly. C. then used. AN.
- 278.—M. 48. Carcinoma recti.
March, 12.30 p.m. Plastic O., after colotomy.
E. ʒiv. (Afterwards C.)
Did not take E. well, so C. was substituted, being well ta'en. AN.
- 279.—M. 41. Healthy.
April, noon. Amputation of two fingers.
E., with Clover. (Afterwards C.)
Pt. would not become insensible under E., so C. was substituted. AN.
- 280.—F. 24. Good.
July, 10 a.m. Extraction of many teeth.
E., with Clover. 5 mins. (Afterwards C.)
Pt. became violently sick with E., so C. then substituted. Result satisfactory. After-effects—vomiting. AN.
- 281.—M. 23. Good.
Nov., 4.20 p.m. Amputation of toe.
E., with Clover. 1 oz. (Afterwards C.)
Took E. badly. Gave C. AN.
- 282.—F. 30. Good.
Aug. Ovariectomy.
E., with Clover. (Afterwards C.)
Pt. was very intolerant of E., though there was no bronchitis or lung trouble. AN.

283.—F. 46. Good.
April. Examination of vagina.
E., with Clover. (Afterwards C.)
Pt. intolerant of E. AN.

284.—M. 39. Alcoholic habits.
Jan. Scraping suppurating glands in neck.
E., with Clover. 2 oz. (Afterwards C.)
Violent struggling under E., C. subdued him. AN. PT.

285.—F. 29. Good.
May, 9 a.m. Salpingectomy.
E., with Clover. 2 oz. 40 mins.
Pt. got very faint towards end of operation, but no special treatment was required. AN.
O.

286.—M. 59. Very unsatisfactory.
Aug., 2.30 p.m. Slitting up old sinuses about hip.
E., with Clover. 2 oz. 10 mins.
After about six respirations Pt. became very cyanosed, and continued so during the whole administration; the pulse became small and rapid. Pupils dilated throughout. Urine loaded with albumen. After-effects—vomited. AN.
PT.

287.—M. 38. Alcoholic subject with mitral systolic murmur. Had no trouble with heart.
April, 2 p.m. Enuclation of eyeball.

E., with Clover. $\frac{1}{2}$ oz. 7 mins. (Afterwards C.)
E. did not relax very well, and had caused a great deal of struggling; on pushing it, Pt. became much cyanosed, and breathing stertorous, then shallow. (Anæsthetic was removed as soon as breathing became stertorous.) After about two minutes, breathing became better, and C. was substituted, and under it R. became quiet, but complete anæsthesia was not obtained, as the colour became blue on pushing the anæsthetic in the least. Sufficient anæsthesia was obtained to do the O. without the Pt. struggling, but there was only slight muscular relaxation. AN.
PT.

288.—M. 14 $\frac{1}{2}$. Slight mitral disease. Pulse good.
Jan., 11 a.m. Amputation of three fingers and thumb for crush.

E., Meth., with Clover. 5 oz. 85 mins.
Vomited during O.; took anæsthetic badly all through; became cyanosed very soon. Inhaler kept at "2" and frequently removed. Pulse good all through O. Took over two hours to recover consciousness, and became very blue, with rapid pulse and respiration, and expectoration of brownish, blood-stained sputum. AN.
PT.

Cases in Class II.

Cases in B a II, Anæsthetic No. 2.

289.—F. 28. Fairly good.
Dec., 11 a.m. Curetting uterus.
E., Meth., with Clover. $\frac{1}{2}$ oz.
The lady did not breathe under the E. Took C. well, but required it freely to keep reflexes away. After-effects—headache for two days.

290.—M. 49. Weak health.
Dec., 11 a.m. Amputation of great toe.
E., with Clover. (Bad construction.) 4 oz. 30 mins.
E. caused great irritation and choking. The Clover instrument was the worst I ever handled.

291.—M. 11. Bad.
Sept., 3 p.m. For diseased cervical glands.
E., method unstated.
"Shock."

292.—F. 38. Weak.
Aug., 12.30 p.m. Washing out peritoneal cavity.
E., with Clover. 1 $\frac{1}{2}$ oz. 35 mins.
After effects—collapsed.

293.—F. 20. Good.
Jan. Removal of polypus of nose.
E., with Clover. 1 $\frac{1}{2}$ oz. 15 mins.
Pt. lost a good deal of blood. Somewhat collapsed.

294.—F. 24. Good.
March, 9 a.m. Curetting for endometritis.
E., with Clover. 2 oz. 18 mins.

Considerable amount of bilious vomiting. Did not regain consciousness for 30 mins. after the anæsthetic was withdrawn, and her colour remained a leaden blue for a long time. She is naturally stout and apathetic.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 3.—"GAS AND ETHER."

Cases in Class I.

Cases in B a I, Anæsthetic No. 3.

295.—M. 37. Big, very heavy, red, and fat.
March, 2.30 p.m. For fistula.
G. and E., with Clover. 3 oz. 30 mins.
Went off soon with G., and was then very blue. R. stopped, but at once began when head was over end of table. Very blue at one time, with lid reflex present. Never properly under for O. After-effects—vomited twice. Cough very much, and for some days. AN.

296.—M. 44. Red-faced, big, fattish.
May. For hæmorrhoids.
G. and E., with Clover. 10 mins.
Took it well, and not much G. R. ceased in 5 mins.; head put over table end. Came right. After-effects—vomited once. AN.

297.—F. 32. Very nervous.
Nov., 11.15 a.m. Examination of cervix, etc.
G. and E., with Ormsby. 30 mins.
Allowed her to come out of deep anæsthesia, and teeth got clenched and breathing ceased for a while. Upper teeth over lower prevented one pushing jaw forwards. Opened mouth and passed fingers to base of tongue, and breathing at once came on again. AN.

298.—F. 23. Fat, non-anæmic.
Feb., 3.20 p.m. Pelvic examination.
G. and E., with Clover. 5 mins.
R. stopped at first when well under. Pulled up chin and introduced gag between teeth. After-effects—slight headache and taste. AN.

- 299.—M. 13. Good.
May, 3 p.m. Removal of cervical glands.
G. and E., with Ormsby. 2 oz. (Afterwards C.)
C. substituted for E., on account of collection of mucus in pharynx. AN.
- 300.—F. 9. Good.
Nov. Lithotripsy.
G. and E., with Ormsby. (Afterwards C.)
E. produced great bronchial secretion. Did not improve much under C. AN.
- 301.—F. 42. Average, but ? bronchitic.
March, 2.30 p.m. O. on finger.
G. and E., method unstated. 20 mins.
A few drops of C. given at end. Much mucus. AN.
- 302.—M. 20. Healthy.
Feb. Radical cure of hernia.
G. and E., with Ormsby.
E. produced so much mucus and cough that C. was employed and acted very well. No cough, etc. AN.
- 303.—F. 24. Healthy.
April. For growth under jaw.
G. and E., method unstated. (Afterwards C.)
C. used on account of E. causing copious mucous secretion and cough. AN.
- 304.—M. 31. Fair.
June, afternoon. For ganglion of wrist.
G. and E., with Ormsby. 2 oz. (Afterwards C.)
E. caused so much coughing and secretion of mucus that C. had to be given, with complete cessation of the symptoms. Pt. had had hæmoptysis. AN.
- 305.—F. 20. Good.
Oct. For diseased glands.
G. and E., with Ormsby. 2½ oz. (Afterwards C.)
E. caused too much coughing and too great secretion of mucus. AN.
- 306.—F. 50. Good.
March, 2 p.m. Inguinal colotomy.
G. and E., method unstated. 2 oz. (Afterwards C.)
Changed to C. because of cough. AN.
- 307.—M. 65. Stout, debilitated by constant pain and hæmaturia.
Sept., 2 p.m. Suprapubic cystotomy, and removal of sarcomatous tumour of bladder.
G. and E., with Clover. 1 oz. 15 mins. (Subsequently C.)
Irritable larynx, coughed constantly under E., and became cyanosed. Subsequently took C. very quietly. AN.
- 308.—F. 48. Plethoric and full-blooded.
Dec., 2.30 p.m. Excision of hypertrophied and cancerous left breast.
G. and E. 1 oz. 10 mins. (Afterwards C.)
During administration of E. Pt. became cyanosed, and had small, quick pulse, and much dyspnoea. The subsequent administration of C. was well borne, and the pulse became full and lessened in frequency. AN.
- 309.—M. 17. Well nourished.
Jan., 3 p.m. Removal of cervical glands.
G. and E., Meth., with Ormsby. 6 oz. One hour.
Pt. became very pale during administration, and had very contracted pupils. Retching as after-effect. AN.
- 310.—M. 25. Good.
April, 2.30 p.m. Tooth extraction.
G. and E., with Hele's apparatus.
Pt. very faint for 10 mins. after. AN.
- 311.—M. ? Age. Good.
April. For tubercular testis.
G. and E., with Clover. (Afterwards C.)
Took E. so badly that C. had to be used. AN.
- 312.—M. 35. Good.
March. Mules' operation.
G. and E., with Clover. (Afterwards C.)
Took E. very badly. O. done under C. AN.
- 313.—M. 35. Good. Very strong, big, thick-necked.
May. For varicocele.
G. and E., with Clover. 50 mins. (Afterwards C.)
Took E. very badly, continued with C. AN.
- 314.—M. 40. Average.
March, 1.30 p.m. For varicocele.
G. and E., Meth., method unstated. (Afterwards C.)
Considerable difficulty. ? Meth. E. the cause. AN.
- 315.—M. 55. Nervous.
Sept., 2.15. Rectal O.
G. and E., with Clover. 15 mins. (Afterwards C.)
C. given because of muscular rigidity. Soon relieved it. AN
- 316.—M. 29. Alcoholic.
Aug. Examination of foot.
G. and E., with Clover. (Afterwards C.)
Changed to C. because of rigidity. AN.
- 317.—M. 32. Good.
July, 10.30 a.m. For sebaceous tumour in neck.
G. and E., with Ormsby. 4½ oz. 40 mins.
Pt. had tonic spasm, simulating epilepsy, at commencement of inhalation of E. AN.
- 318.—F. 55. Not very good.
Nov. Amputation of breast.
G. and E., method unstated. 4½ oz. 65 mins.
After-effects—sick for three days. AN.
- 319.—F. Very weak and anæmic.
Jan., 2 p.m. Abdominal section.
G. and E., with Ormsby. 3½ oz. 50 mins.
Pulse very weak, 120. Pt. became very pale, and the breathing shallow. PT. AN.
- 320.—F. 42. Emphysematous and bronchitic.
July, 3.30 p.m. Amputation of breast.
G. and E., with Ormsby. (Afterwards C.)
Had to change to C. because of cough and mucus. AN.
PT.
- 321.—M. 28. ? Alcoholic. Has bronchitis, I believe, in winter.
July, 2.15 p.m. For hernia.
G. and E., with Ormsby. 20 mins. (Afterwards C.)
Took G. and E. badly. Cough, blueness, etc., during change. Under E. rather difficult expiration, large pupils, etc. After 20 mins. changed to C., because of mucus, cough, etc. Gradually got smaller pupils, no cough. Still sounds of mucus during expiration, and fair colour. AN.
PT.
- 322.—M. 40. Robust.
Feb., 3 p.m. Removal of cervical glands.
G. and E., method unstated. 3 oz. (Afterwards C.)
Pt. bronchitic. Much coughing during administration of E. C. therefore substituted. (At end of O., E. resumed with good effect as Pt. became rather faint.) AN.
PT.

Cases in Class II.

Cases in B a II, Anæsthetic No. 3.

323.—F. 10. Weak.
Oct., 4.45 p.m. Excision of hip.
G. and E., with Ormsby. 2 oz. 45 mins.
Very collapsed.

324.—F. 45. Weak.
May, 10 a.m. Ovariectomy.
G. and E., with Ormsby. 3 oz. 40 mins.
Pt. became collapsed after anæsthetic was discontinued.

325.—F. 30. Very nervous.
May, 2.45 p.m. For hæmorrhoids.
G. and E., with Ormsby. 3 oz. 30 mins.
Some tendency to faintness after administration was over.
Cause doubtful. Took soup at twelve (O. 2.45 p.m.), but little,
if any, brought up afterwards. Vomited a little brownish mucus
a quarter of an hour after O. was over.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 4.—A.C.E. MIXTURE

Cases in Class I.

Cases in B a I, Anæsthetic No. 4.

326.—M. 9. Fairly healthy, but strumous.
Aug., 4 p.m. For strumous glands (cervical).
ACE., method unstated. (Afterwards C.)
ACE. caused much mucous secretion, which, when swallowed,
caused so much vomiting that C. had to be given, which Pt. took
well. AN.

327.—M. 4. Good.
May. Circumcision.
ACE., by open method. \bar{v} iv. 20 mins.
Child breathed badly all through. Chin was well held up,
but tongue at one time fell back on to larynx, child turned blue,
but quickly recovered on drawing it forward with forceps. AN.

328.—M. 21. Healthy.
July, 2 p.m. Radical cure of hernia.
ACE., from Clover. 15 mins. (Afterwards E.)
In this case a mistake was made. A Clover's inhaler was
charged with ACE. This was used for 15 mins., at the end of
which time E. \bar{v} viii was put in. Then E. was given on an
Ormsby. There was much tendency to swallowing, coughing,
and duskiness. AN.

329.—M. 52. Average.
July, 2.45 p.m. Radical cure of hernia.
ACE., from Clover. (Afterwards E.)
A similar mistake (as in case 328), was made here, the ACE.
bottle (which was similar to the E. bottle) being used. The
mistake was discovered by the Pt. becoming dusky and with
feeble breathing—quite different effects from those usually met
with. AN.

330.—F. 54. In fairly good health. Had brandy \bar{v} i.
30 mins. before operation.

Feb., 9 a.m. For ovarian cyst.
ACE., method unstated. 25 mins. (Afterwards E.)
ACE. given for first 25 mins. The patient being rather faint,
and pulse getting weak, E. was substituted for rest of time. Pt.
rallied well and had no sickness, but felt sick. No antiseptic
spray used. AN.

331.—F. 42. Good.
Feb., noon. For scirrhus mammae.
ACE., from Clover.
Anæsthetic given by Clover's inhaler. Pt. slightly faint and
cyanosed during O. Sick after. AN.

332.—? Sex and age.
Dec. Excision of eye.
ACE., from mask. (Afterwards C.)
This Pt. could not be relaxed with ACE. Sick after.
AN.

333.—M. 37. Thin, weak, anæmic from loss of blood.
May, 9.30 a.m. Plugging rectum, and stopping hæmorrhage.
ACE., on Skinner's mask. (Afterwards G. and E.)
Had O. for hæmorrhage and prolapsus about a week ago.
Has had hæmorrhage since. Tried ACE., but it produced
retching and bilious vomiting, so gave G. and then E. with good
results. AN.

334.—M. 7. Fair.
July. Tenotomy.
ACE., from Clover. \bar{v} iii. 12 mins.
Pt. was not quite under when O. was begun. His pulse
became unaccountable, and lasted so till 3 mins. after tenotomy
was done, when it quickly returned to the normal rate. AN.
O.

Cases in Class II.

Cases in B a II, Anæsthetic No. 4.

335.—F. 1 $\frac{1}{2}$. Very weak.
Oct. 3 p.m. Incisions for cellulitis.
ACE., from towel. \bar{v} iss. 12 mins.
Afterwards much collapsed.

336.—F.
June. For labial cyst.
ACE., from mask.
Very faint after removal to bed. Slight sickness.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 5.—MIXTURES OF CHLOROFORM AND ETHER
IN VARIOUS PROPORTIONS.

Cases in Class I.

Cases in B a I, Anæsthetic No. 5.

- 337.—F. 43. Anæmic.
Jan., noon. Curetting and cautery to uterus.
Mixture of equal parts of Meth. C. and Meth. E., from Clover.
(Afterwards C., then mixture again.)
Pt. struggled violently after short administration of mixture,
so continued with pure C. on a towel, and resumed mixture when
thoroughly under. Anæmic from loss of blood the last two
years. Slight sickness after. AN.
- 338.—F. 34. Alcoholic.
April, 11.30 a.m. Removal of suppurating ovarian cyst and
enucleation of myoma.

Mixture of Meth. C. 1 part and Meth. E. 2 parts, from Clover
̄xl. 70 mins.
Pt. had epileptiform convulsion whilst going off, pulse very
weak during early administration. No heart mischief. Slight
sickness after. AN.

- 339.—F. 45. Fair.
Oct., 1 p.m. For ulcerating scirrhus of mamma.
Mixture of C. and E., equal parts. ̄xxxii. 40 mins.
Sickness for two days. AN.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 7.—CHLOROFORM FOLLOWED BY ETHER.

Cases in Class I.

Cases in B a I, Anæsthetic No. 7.

- 340.—M. 19. Strumous.
May, 3.30 p.m. Scraping caries of ilium and opening tubercular
abscess of arm.
C. to insensibility by open method, then E. from Clover, ̄viii.
(Afterwards C.)
E. caused vomiting of large quantity of frothy mucus after
being administered for about 15 mins., and C. was substituted.
Nausea after. AN.
- 341.—M. 18. Weak.
Dec., afternoon. Thoracoplasty.
C., then E. E. ̄xvi. (Afterwards C.)
C. given at first instead of gas. C. was eventually substituted
for E. because of mucus. AN.
- 342.—M. 38. Negro. Good.
Feb., 12.30 p.m. Amputation of little toe.

C. to anæsthesia on lint, then E. from Clover. C. ̄ii. E.
̄xii. 25 mins.
Pt. became very violent and excited as soon as any attempt
was made to give E. I have noticed that negroes almost
always take E. very badly. AN.

- 343.—? Sex. 19. Strumous.
March, 10.30 a.m. Excision of knee (tubercular). C. on
towel, then E. 65 mins.
Required ̄xvi to put under. C. administered for 15 mins.
before anæsthesia produced. Sickness and depression lasting
for 48 hours after. AN.

344.—M. 29. Bronchitis.
May, afternoon. For fistula in ano.
C. ̄iv on towel, then E. from Clover ̄iv. 15 mins.
E. cyanosed him very much indeed. Pulse small, 80, and at
times intermittent. Extreme care had to be taken. AN.
PT.

Case in Class II.

Case in B a II, Anæsthetic No. 7.

- 345.—M. 50. Fairly good.
Oct. For elephantiasis of scrotum.

C., on towel, ̄xxiv, then E., ̄xvi. 45 mins.
Pt. became very weak during O. Pulse bad.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 8.—ETHER FOLLOWED BY CHLOROFORM.

Class I.

Case in B a I, Anæsthetic No. 8.

- 346.—M. 70. Feeble.
Aug., 2.30 p.m. Extirpation of eyeball.
E., from Clover, ̄xii, then C., on towel, ̄i. 30 mins.

Very feeble pulse, hypodermic of digitalis given. AN.
PT.

CASES IN CONNECTION WITH ANÆSTHETIC No. 9.—A.C.E. FOLLOWED BY ETHER

Cases in Class I.

Cases in B a I, Anæsthetic No. 9.

- 347.—M. 60. 6 ft. 2 in. or 6 ft. 3 in., thin.
July, 8 a.m. Suprapubic cystotomy.
ACE., then E., method unstated. (Afterwards C.)
Changed to C. because of irregular breathing with E. AN.
- 348.—M. 60. Very stout and plethoric.
May, 4 p.m. Lithotomy.
ACE., then E., method unstated. E. $\bar{3}$ xl to xlvi. 35 mins.
(Pure E.)
Coming round had cough and setting of teeth, with difficulty of R. Had some difficulty in keeping his breathing free. Soon got all right. AN.
- 349.—M. 60. Very broad and florid.
July, 8.30 a.m. Lithotomy.
ACE., then E., from Skinner and Rendle. (Afterwards ACE.)
Tried E., but had to give it up from difficult R. and cough.
AN.
- 350.—M. 55. Stout, good heart sounds.
May, 8 a.m. Lithotomy.
ACE., then E., method unstated. (Afterwards C.)
Had to change to C. because of rigidity and movement of legs. AN.

- 351.—M. 60. Stout, bronchitic, emphysematous.
May, 5 p.m. Examination of bladder.
ACE. then E., method unstated. (Afterwards C.)
Neither E. nor ACE. could be borne, producing long, difficult and moist expiration, blueness, mucus, etc. Had to use C., and even under this his breathing was not tranquil, but very much better. AN.
PT.

- 352.—F. 54. Stout, chronic bronchitic.
Jan., 9.30 a.m. Removal of uterine polypus.
ACE., then E., method unstated. (Afterwards ACE.)
Took E. badly, cough, etc.; changed to ACE., which was taken well. AN.
PT.

- 353.—M. 70. Very stout.
April. Lithotomy.
ACE. then E., method unstated. (Afterwards C.)
Would not bear even ACE. Had to go on with C. eventually. AN.
PT.

CASES IN CONNECTION WITH ANÆSTHETIC No. 10.—GAS AND ETHER FOLLOWED BY CHLOROFORM.

Cases in Class I.

Cases in B a I, Anæsthetic No. 10.

- 354.—F. 13. Good.
June, 7 p.m. O. on cervical glands.
G. and E., from Ormsby, then C. $\bar{3}$ xi. 100 mins.
Enlarged tonsils caused great trouble, even with C.
AN. PT.
- 355.—M.
Jan., 10.30 a.m. For strangulated hernia.
G. and E., then C. E. $\bar{3}$ xvi, C. $\bar{3}$ liv (*sic*). 30 mins.

- Could not be thoroughly relaxed with E. or C., though both were pressed. AN. PT.
- 356.—M. 20. Robust.
Sept., 3 p.m. For varicose veins.
G. and E., from Ormsby, $\bar{3}$ xlvi, then C. on Skinner, $\bar{3}$ viii.
40 mins.
Pt. affected with general tremors and much spasm of ad-
ductors during administration. AN. PT.

CASES IN CONNECTION WITH ANÆSTHETIC No. 14.—CHLOROFORM FOLLOWED BY A.C.E. OR BY SOME SIMILAR MIXTURE.

Case in Class I.

Case in B a I, Anæsthetic No. 14.

- 357.—M. Good. Heart weak.
Nov., 12.30 p.m. For hæmorrhoids.
C. $\bar{3}$ xii, then ACE, $\bar{3}$ viii, open method. 15 mins.

- C. was taken badly, Pt. became very weak during O. and for some time after was quite hysterical. AN.
PT.

Case in Class II.

Case in B a II, Anæsthetic No. 14.

358.—M. 44. Weak heart.
Feb., 2 p.m. For hæmorrhoids.

C. then ACE., both on lint, C. $\bar{\text{v}}\text{vi}$, ACE. $\bar{\text{v}}\text{v}$. 25 mins.
Faint after.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 20.—MIXTURES OF CHLOROFORM AND ETHER
FOLLOWED BY ETHER.

Case in Class I.

Case in B a I, Anæsthetic No. 20.

359.—M. 42. Fair. Had pleurisy two years ago. No lung trouble now. Prepared by aperient the previous night, followed next morning by enema. An early breakfast and only a little beef-tea two hours before O.

March. Excision of knee.

Mixture of E. 7 parts and C. 1 part, from Clover, $\bar{\text{v}}\text{xvi}$; then E., from Clover, $\bar{\text{v}}\text{xvi}$. 45 mins.

Took mixture well at first, breathing quiet and regular. Pulse good. In 7 mins. breathing became irregular, pulse fair. After $\bar{\text{v}}\text{xvi}$ of mixture had been given and breathing was still not good,

E. was substituted, after which breathing and pulse improved, but not for long. In a few minutes breathing became shallow and slow, with occasional deep sighs. No marked cyanosis. Conjunctival reflex absent, but anæsthesia not deep. Pupils small. Pulse now became very changeable, alternating in volume very frequently. Anæsthetic stopped for some minutes. Breathing slightly better, but not good. Index on Clover's inhaler averaged $2\frac{1}{2}$, never higher than $3\frac{1}{2}$. Vomiting 3 hours after O. All right 6 hours after O. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 21.—CHLOROFORM FOLLOWED BY MIXTURES
OF CHLOROFORM AND ETHER.

Case in Class I.

Case in B a I, Anæsthetic No. 21.

360.—F. 34. Fair. Has mitral systolic murmur. Prepared by aperient the previous night, followed next morning by enema. An early breakfast, and only a little beef-tea two hours before O.

Aug. Electrolysis of goitre. C. $\bar{\text{v}}\text{i}$ by open method, then mixture of E. and C. (7 parts E. to 1 part C.) $\bar{\text{v}}\text{iv}$. 15 mins.

C. used to begin with. Pt. was very cyanosed all the time, and breathing difficult. PT. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 24.—GAS FOLLOWED BY CHLOROFORM.

Case in Class I.

Case in B a I, Anæsthetic No. 24.

361.—F. 24. Healthy.
Feb., 2.15 p.m. Removal of iron wire from face.
G., then C. from Ormsby (Meth.) (Afterwards E.)
By a mistake on the part of the attendant, $\bar{\text{v}}\text{viii}$ of C. was used

instead of $\bar{\text{v}}\text{viii}$ of E. At the commencement of the O. Pt. became somewhat cyanotic. Had dilated pupils. Mistake discovered quickly by odour. No ill effect. AN.

CASES IN CONNECTION WITH ANÆSTHETIC No. 28.—NITROUS OXIDE.

Cases in Class I.

Cases in B a I, Anæsthetic No. 28.

- 362.—F. 21. Flabby and anæmic.
April, afternoon. Extraction of teeth.
G., from gasometer.
Had had G. before. On both former occasions she was very bad (R. stopped, and sickness followed administration). On this occasion she stopped breathing for some 20 secs., when the face-piece was removed, but recovered without assistance. Involuntary micturition took place, and she was very sick on coming round. She had just had a heavy meal, and the G. was not used at the administration from a knowledge of her former symptoms. AN.
- 363.—F. 23. Strumous appearance.
Jan., afternoon. Extraction of teeth.
G., from gasometer.
This Pt., after three or four breaths of G., began to retch, and the retching efforts continued with pallor until anæsthesia was well established. Good result. AN.
- 364.—F. 18. Healthy.
Jan., 9.30 a.m. Extraction of teeth.
G., from gasometer.
Attempt at vomiting. AN.
- 365.—M. 26. Healthy.
Feb., morning. Extraction of teeth.
G., method unstated.
Great excitement and struggling. AN.
- 366.—M. 6.
Jan., morning. Extraction of teeth.
G., method unstated.
Violent jactitation. Could not extract. Micturition. AN.
- 367.—M. 30. Somewhat cachectic in appearance. Had been a ship's cook. Denied any former illness.
Feb., afternoon. Removal of stump and opening abscess externally.
G., from gasometer.
As soon as face-piece was removed Pt. threw himself about in the most violent fashion. With the assistance of four persons he was held sufficiently quiet for the completion of the O., but he broke the extracting chair. He felt nothing. AN.
- 368.—? Sex and age.
March, afternoon. Extraction of teeth.
G., from gasometer.
Excitement and rigidity with noise. Good anæsthesia. AN.
- 369.—? Sex. Adult.
Feb., forenoon. Extraction of teeth.
G., method unstated.
Very excited on recovery. AN.
- 370.—M. Adult.
April, morning. Extraction of teeth.
G., method unstated.
Excitement. Fought wildly on recovering. AN.
- 371.—F. 22. Anæmic.
Feb., morning. Extraction of teeth.
G., method unstated.
Slight epileptiform convulsion on recovery, commencing with slight twitching of the left eyelid. No history of previous fits. AN.
- 372.—? Sex and age.
May, afternoon. Extraction of teeth.
G., from gasometer.
Sickness after. AN.
- 373.—F. 27. Anæmic.
Jan., 9.30 a.m. Extraction of teeth.
G., from gasometer with Clover's face-piece.
This Pt. had to have gas given on two occasions in one morning with an interval of about a quarter of an hour. After 2nd administration she retched; did not vomit. She was very nervous and neurasthenic. AN.
- 374.—F. 22.
Extraction of teeth.
Feb., forenoon.
G., method unstated.
Retching after recovery. ? Swallowed some blood. AN.
- 375.—Child.
Feb., forenoon. Extraction of teeth.
G., method unstated.
Micturition. AN.
- 376.—? Sex and age.
March, afternoon. Extraction of teeth.
G., from gasometer.
Micturition while under. AN.
- 377.—F. 12.
March, afternoon. Extraction of teeth.
G., from gasometer.
Micturition. AN.
- 378.—? Sex and age.
June, morning. Extraction of teeth.
G., method unstated.
Micturition. AN.
- 379.—M. Adult.
April, forenoon. Extraction of teeth.
G., method unstated.
Micturition. AN.
- 380.—? Sex and age.
May, afternoon. Extraction of teeth.
G., from gasometer.
Micturition. AN.
- 381.—F. Adult.
April, morning. Extraction of teeth.
G., method unstated.
Micturition. AN.
- 382.—? Sex and age.
April, afternoon. Extraction of teeth.
G., from gasometer.
Involuntary defæcation. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 29.—NITROUS OXIDE MIXED WITH OXYGEN.

Case in Class I.

Case in B a I, Anæsthetic No. 29.

383.—? Sex and age.
Jan., afternoon. Extraction of teeth.

G. and O., from Hewitt's apparatus.
Retched afterwards. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 30.—MORPHINE FOLLOWED BY CHLOROFORM.

Case in Class I.

Case in B a I, Anæsthetic No. 30.

384.—F. 49. Fair.
May, noon. For scirrhus mammae.
Morphia, then C. on towel. ℥xii. 25 mins.

Hypodermic of morphia $\frac{1}{8}$ gr. before O. Persistent vomiting
for three days. ? Hysterical. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 35.—ETHER FOLLOWED BY CHLOROFORM
FOLLOWED BY ETHER.*Case in Class I.*

Case in B a I, Anæsthetic No. 35.

385.—M. 30. Double aortic murmur.
April, 9 a.m. Ligature of popliteal artery.
E., then C. ℥ii, then E. Altogether ℥xlvi of E. Total time
60 mins. Methods unstated.
Pt. remained somewhat rigid during greater part of O.,

though pupils were widely dilated. When only slightly under
anæsthetic there was much tremor over whole body. Presence
of frothy mucus in pharynx was troublesome, and for a short
time during O. on this account C. was administered, but with
no marked benefit. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 37.—A.C.E. FOLLOWED BY ETHER FOLLOWED
BY A.C.E.*Case in Class I.*

Case in B a I, Anæsthetic No. 37.

386.—M. 60. Looks older. Emphysematous, thin.
March, 8.30 a.m. Lithotrity.
ACE. from Skinner and then Rendle, then E. from Ormsby,
then ACE. Altogether 45 mins.
After induction of anæsthesia tried E., but had to change.
Pt. during O. did remarkably well with ACE., pulse and colour
being good and R. deep and regular. After withdrawing ACE.

(some manipulation with catheter and examination of rectum
going on though Pt. passive and under anæsthetic) face became
gradually paler and pulse slower and feebler. No vomiting.
By rubbing cheeks and lips the pallor passed off. He was a
feeble man, looking more like 70. He had "fish" at 9 p.m. last
evening. He is abstemious. No vomiting when I left him
with good pulse and colour. AN. PT.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 38.—MORPHINE AND ATROPINE FOLLOWED BY GAS AND ETHER.

Cases in Class I.

Cases in B a I, Anæsthetic No. 38.

387.—F. 44. Healthy, but very highly nervous.
Sept., 2.30 p.m. Curetting uterus.
G. and E. 45 mins. A preliminary hypodermic of morphia $\frac{1}{8}$ gr. and atropin $\frac{1}{180}$ gr. was given. (Afterwards ACE.)
E. caused much vomiting after she was moved from her bed—where the anæsthetic was commenced—to the operating table. ACE. was substituted and was very well taken. AN.

388.—F. 37. Exceedingly stout, with a short, thick neck. Organs healthy.

Jan., 2.45 p.m. Laparotomy for par-ovarian cyst.
G. and E. about \bar{v} xxxii after a preliminary hypodermic of morphia $\frac{1}{4}$ gr., atropin $\frac{1}{180}$ gr. 90 mins.

Some difficulty was at one time experienced owing to the short, stout neck of Pt., the E. causing great venous congestion of the vessels of the neck and root of the tongue. There was no vomiting during or immediately after O. Pulse varied from 120 to 130, and R. was about 32. This Pt. only vomited once after O., though she felt very sick. AN. PT.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 41.—CHLOROFORM WITH A FEW DROPS OF ETHER OCCASIONALLY.

Case in Class I.

Case in B a I, Anæsthetic No. 41.

389.—M. 10. Strumous.
April, 2.40 p.m. Excision of elbow.

C., with little E. occasionally, on flannel in wire frame.
Nearly \bar{v} viii. 42 mins.
Got rather faint towards end of O. AN. O.

CASES OF ANXIETY.

Cases of Anxiety.—The cases of anxiety (B β) are 162 in number, *i.e.*, 221 of the total cases in Division B. Of these 162 cases only 22 are placed in Class II, the remaining 140 being in Class I. The number of cases of anxiety which occurred under each anæsthetic may be found by reference to Table VI, p. 64.

The following are instances of phenomena which led the Committee to place cases in this subdivision:—

1. Respiratory:—

Failure of respiration.
Obstructed breathing.
Cyanosis.

2. Circulatory:—

"Faintness."
"Syncope."
"Shock."
Failure of pulse.
Pallor.

3. Nervous and muscular.

4. Unduly deep anæsthesia.

5. Bronchitis as an after-effect of the anæsthetic.

6. Vomiting lasting over four days.

7. Undesirable symptoms, which were other than trivial, requiring change of the anæsthetic, or its absolute withdrawal with postponement of the operation.

When such phenomena, being other than trivial, called for definite remedial measures but did not immediately threaten life, the case was placed in subdivision β .

The abstracts of all the cases of anxiety follow, arranged upon the same plan as that employed for the cases with minor complications.

ABSTRACT OF CASES OF ANXIETY.

ANÆSTHETIC I.—CHLOROFORM.

Class I cases.

Cases in B β I, Anæsthetic No. 1.

- 390.—M. 56. Average. Alcoholic. Dilated capillaries.
July, 2.40 p.m. Removal of tongue.
C., from Skinner and Junker. $\bar{\zeta}$ xii on Skinner. ? How much used with Junker. Skinner used for 35 mins. during ligation of linguals. Junker used for 5 mins.
Considerable excitement, shouting, singing, etc. Much rigidity, holding of breath, tendency to rise up, then opisthotonos, resting on heels and head, dilated pupils, etc. Under in 8 to 9 mins. Kept snoring breathing, and no corneal reflex. Once pushed C. so that R. nearly ceased and may have missed out one or two phases, but by withholding the anæsthetic, and rubbing lips, it soon came again. After removal of tongue, much hæmorrhage and cyanosis, the latter lasting 10 to 15 mins. after deep narcosis. Pt. moved away very dusky. AN.
- 391.—F. 25. Strong.
Sept., 6 p.m. For cut of shoulder.
C., on towel. $\bar{\zeta}$ v. 18 mins.
Stopped breathing for 30 secs. Ammonia to nostrils caused recommencement. AN.
- 392.—M. Good.
April. Removal of glands from axilla.
C., on towel. 50 mins.
Pt. took nearly 40 mins. to get under C. For 20 mins. was quite coherent. When he finally got under, R. stopped for a few seconds; tongue pulled forward and A.R. about to be begun, when he recommenced breathing. Pulse then began to intermit. E $\bar{\mathcal{M}}$ xxx injected twice hypoderm. Pt. quickly revived. He was a little sick subsequently. AN.
- 393.—M. Good.
Oct., 9.50 a.m. Slitting up fistula in ano.
C., on towel. 8 mins.
After the scraping of the fistula, the Pt. stopped breathing and became pallid. A.R. restored him at once. AN.
- 394.—M. 25. Good.
Aug., 9.30 a.m. Suturing and wiring smashed hand.
C., on towel. 30 mins.
The C. was taken well, except that shortly after Pt. was put under he stopped breathing. A.R. started him again all right. AN.
- 395.—F. 12. Sound. No food for 5 or 6 hours.
Nov. Tenotomy for strabismus.
C., on towel. Amount used was small. 10 mins. No other Pt. has shown similar symptoms with same C.
Pt. took it quietly. When not deeply under she stopped breathing. A.R. (Sylvester). Pulse not very strong, but did not change when C. was administered. A second time during the O., though Pt. had had very little C. and was not fully under, the breathing became unappreciable. No after-effects. AN.
- 396.—F. 19. Very neurotic.
April. For strumous knee.
C., on towel. $\bar{\zeta}$ v. 22 mins.
Very excited at first. Cried and struggled. Pupils dilated whole time till just at end. After 10 mins., during which breathing was irregular, breathing suddenly ceased, pulse at time being fair. A.R. at once. Breathing returned faintly after 30 secs. or less, then became regular, though shallow throughout. Anæsthesia was slight at the time. Conjunctival reflex only just lost. AN.
- 397.—M. 32.
Jan., 2.20 p.m. For trigeminal neuralgia.
C., with Junker. 80 mins.
R. twice ceased in first stage and again 65 mins. from commencement. A.R. done for 1 min. Pulse good all through. AN.
- 398.—F. 25. Delicate.
July, 4.30 p.m. Scraping gland in neck.
C., on Skinner. $\bar{\zeta}$ viii. 40 mins.
R. ceased after 10 mins. of C.; A.R.; recovery in about 3 mins. Pulse good all the time, about 60. After-effect—much vomiting. AN.
- 399.—M. Good.
Dec., 7 p.m. Examining stricture.
C., method unstated. 30 mins.
Marked rigidity. Large quantity of C. required to abolish reflex on touching urethra. Excessive secretion of mucus in pharynx. Breathing became shallow. Head lowered and tongue pulled forward. Revived in 3 or 4 mins. AN.
- 400.—M. 3. Strumous.
July. Circumcision.
C., on towel. 20 mins.
Stopped breathing twice. Inversion. Pulse always good. AN.
- 401.—M. Good.
June, 10.30 a.m. Excision of cancer of mouth and glands.
C., method unstated. 50 mins.
Stopped breathing at one time, about middle of O. Elevation of trunk and limbs. Soon recovered. AN.
- 402.—M. 5. Good.
May. 3 p.m. Necrosis of rib. Excision.
C., on sponge. $\bar{\zeta}$ i. 10 mins.
R. ceased for a few seconds. Suspended. Liq. ammon. fort. used freely. A.N.
- 403.—M. 6 months. Healthy.
Nov., 10 a.m. Circumcision.
C., on lint. About 10 mins.
Child took some time going under (nearly 10 mins.), breathing was shallow. O. commenced, caused struggling. Breathing became gasping, and child cyanosed. R. stopped for a few seconds, but was resumed on lowering the head. O. concluded without any more anæsthetic. Amount given not measured. Out-patient, said not to have had any breakfast. AN.
- 404.—M. 16. Good.
Aug., 9 a.m. Lithotripsy.
C., on mask. $\bar{\zeta}$ x. One hour.
Pt. stopped breathing several times and became cyanosed. Slightly sick afterwards. AN.
- 405.—F. Good.
March, 2.30 p.m. For pelvic growth.
C., with Junker. $\bar{\zeta}$ ix. Two hours.
At first pelvic manipulations Pt. ceased breathing and became cyanosed. Anæsthetic stopped. Tongue pulled forward, rapidly recovered. Took anæsthetic badly throughout. AN.

406.—M. 5.
Nov., 10 p.m. Circumcision.
C., on towel. \bar{v} iii. 15 mins.
No struggling. Child got a little cyanotic with shallow breathing. Inversion. Cyanosis passed off. AN.

407.—M. 41. Alcoholic. Flabby.
Jan., 11.15 a.m. For adhesions of shoulder joint.
C., on towel. \bar{v} iii. 14 mins.
Struggling almost immediately. Breathing became bad 3 mins. after administration was begun; remained so for 3 or 4 mins., then became stronger. When fully anaesthetised breathing became bad, short, and jerky. Cyanosis very marked. Strong ammonia to nostrils, and application of wet towel soon brought Pt. round. After-effect—sickness. AN.

408.—M. 35. Good.
March. Primary amputation.
C., on towel. 20 mins.
Just after O. was completed stoppage of breathing occurred, due to accumulation of mucus in larynx. Head was hung over edge of table, tongue pulled forward. A.R. He got very cyanosed. The forcible R. caused the material to be dislodged from the larynx, and Pt. recovered. AN.

409.—M. 53. Fairly good.
Sept., 11 a.m. Castration.
C., on corner of towel. (Afterwards E.)
Some respiratory difficulty and pallor with C., nothing very alarming. Subsequent sickness. After-effects—good. AN.

410.—M. Poor.
March, 1.12 p.m. Scraping scrofulous glands of neck.
C., on towel. \bar{v} iii. 25 mins.
Heart and R. failed momentarily during O. Tongue pulled out by forceps, and Pt. allowed to come nearly out while O. continued. AN.

411.—F. 44. Good.
Nov., 9.20 a.m. Excision of breast and axillary glands.
C., on towel. 72 mins.
Great depression during administration. Pulse weak, and R. arrested at one time. A.R. resorted to. AN.

412. F. 63. Feeble.
Feb. Removal of recurrent scirrhus of mamma.
C., on towel. \bar{v} ix. 35 mins.
Faint towards end. Strong ammonia applied. Relief. AN.

413.—F. 23. Condition fair. Neurotic.
July. Excision of pre-patellar bursa.
C., on towel. \bar{v} iii. 13 mins.
Became very faint. Brandy \bar{v} per rectum. AN.

414.—M. 15. Weak.
June. Scraping sinuses.
C., on lint. \bar{v} ix. 25 mins.
Two slight attacks of syncope. AN.

415.—M. 6. Good.
Aug., 10.20 a.m. Osteotomy.
C., on lint. \bar{v} ii $\frac{1}{2}$. 12 mins.
Shock and faintness, so administration discontinued and legs raised. Pulse became imperceptible. Breathing continued satisfactorily. AN.

416.—M. 21. Good.
Jan., noon. Amputation of great toe.
C., on towel. \bar{v} iv. 20 mins. (Afterwards E.)
Took a very long time to go under. After 8 mins. was wheeled in. No conjunctival reflex, no excitement stage. O. begun. Pt. showed marked reflex. Then suddenly came distinct alteration in the pulse, together with a great sigh. We continued C. Suddenly I noticed a marked pallor come over the face, and the pulse slid from under the finger; R. steadily continued, with slight sign of failing. The heart obviously seemed first to fail. A.R. and head lowered, and strychnine recovered him. AN.

417.—M. 4 months. Good.
July, noon. For naevus.
C., on towel. \bar{v} iss. 8 mins.
O. begun before he was under. Felt shock acutely. Pulse ran down to 45. Became very pale. No sickness afterwards. AN.

418.—M. 7. Good.
July, noon. For phimosis.
C., on towel. \bar{v} iii. 10 mins.
O. begun before he was under; felt shock acutely. Pulse ran down to 36. All orbital reflexes had gone before the O. was begun. No after-sickness. AN.

419.—M. Good health.
Feb. Arthrectomy (knee).
C., method unstated. 45 mins. (Afterwards E.)
Administration begun with C. Pt. got pulseless, and vomited mucus soon after he was under. Inversion. Restoration. E. substituted. AN.

420.—F. 51. Indifferent.
Feb. 9.45 a.m. Removal of mamma and clearing out left armpit.

C., method unstated. 60 mins. (Afterwards E.)
Pt. was first put under C., but pulse became very weak and intermittent. Bottom of the table was elevated, and heat applied to præcordium. E. substituted for C. No marked improvement for some time with E., but Pt.'s condition more satisfactory during latter half of O. "Breathing not affected to anything like the same degree in comparison to the pulse." AN.

421.—F. 40. Suffering from cancer of breast. Cachexia had not definitely set in. No cardiac murmur, but slight impurity of cardiac first sound at apex. Bowels had been cleared out by purgative and enema. No solid food taken during the day.

May, 3 p.m. Amputation of mamma, and removal of gland from axilla.

C., on folded lint. \bar{v} iv, and about \bar{M} 40. 55 mins.
Pt. did not take the anaesthetic well, holding her breath. Radial pulse almost inappreciable at one time, about 20 mins. after commencement of administration. E \bar{M} x injected. There was no sickness. Answered to reflex stimulus by the time dressing was completed. AN.

422. M. 29. Dilated heart.
Oct., noon. For fistula.
C. on towel. \bar{v} viii. 10 mins.
Much struggling. Pulse went very small and irregular, and Pt. became cyanosed. Breathing remained good and steady. Obvious right heart failure. E. injections with success. AN.

423.—M. 70. Healthy.
Aug., 10 a.m. Removal of tumour from region of right breast.
C., on lint. \bar{v} iii. 15 mins.
Became pale. Breathing stertorous. Pulse weak. Gave brandy before and during O. AN.

424.—M. 10. Fair.
April, noon. Scraping lupus of face.
C., method unstated. \bar{v} ii. 20 mins.
When Pt. had been under a few minutes, the face became whitish. R. continued, but pulse at wrist could not be felt. A.R. performed. Brought him round in a minute or two. AN.

425.—M. 22. Good health. No cardiac lesion. Pt. of very nervous and excitable disposition.
May, noon. Ligature of varicose veins.
C., on towel. \bar{v} xx. 35 mins. (Afterwards mixture.)
Pt. under in 6 mins. After the O. had proceeded for 10 mins. attention was called to the fact that Pt. was very pale, although R. was quite regular. No pulse to be felt at wrist, the heart having evidently stopped entirely. Pt.'s head was immediately drawn over edge of table, and E. hypod. \bar{M} xxx given. The

pulse was at once felt to beat and was soon quite strong again. After this E. was mixed with C. on the towel. No after-effects except retention of urine for 48 hours. AN.

- 426.—M. 55. Good.
Dec., 3 p.m. Enucleation of eyeball.
C., on sponge. \bar{v} iii. 15 mins.
Collapse following; nitrite of amyl was used. AN.
- 427.—M. 18. Good, no alcoholic history.
Jan., noon. For varicose veins (slight).
C., on lint. \bar{v} viii. 30 mins.
Pt. some time getting under. (O. at 12 noon). After-effect—at 1.30 p.m. commenced to get delirious, had subsequently to be strapped down. Traumatic delirium. Chloral and pot. brom. were administered. Next day Pt. all right. AN.
- 428.—F. 33. Good.
Jan., 2 p.m. Excision of thyroid.
C., on lint. \bar{v} xii. 105 mins.
After-effects—some bronchitis; stimulating expectorants given. AN.
- 429.—F. 15. Good.
Feb., 11.10 a.m. Excision of knee.
C., on towel. \bar{v} xii. One hour.
Easily under influence of anæsthetic. Vomiting for 4 or 5 days afterwards. AN.
- 430.—F. 45. Good.
Feb., 3 p.m. For hæmorrhoids.
C., on Skinner. (Afterwards mixture.)
Pt. went off easily in about 5 mins.—less than \bar{v} i of C. used. After about 3 or 4 mins., breathing became shallow, and pulse weak. Administration stopped, and a mixture of alcohol C. and E. given. Got slightly better, but still took it badly, colour pale. Rallied well. AN.
- 431.—F. 25. Good.
May. Laparotomy.
C., on lint. (Afterwards ACE.)
Under C. cyanosis, with wide dilatation of pupils; so ACE. was substituted with good results. AN.
- 432.—M. 30. Tubercular. Phthisical. (1st administration.)
Oct., 9.45 a.m. For hæmorrhoids.
C., on modified Skinner. \bar{v} vi. 45 mins. (Afterwards E.)
As Pt. grew extremely livid during the administration of C., and his breathing feeble, as also the pulse, E. was substituted for C. He took E. well. After-effects—none. AN.
- 433.—F. 43. Satisfactory, but very nervous.
Aug., 11.30 a.m. Removal of mamma and axillary glands.
C., on corner of towel. (Afterwards E.)
Pt. was somewhat pallid and faint, and E. was substituted for C. It was given in a cone with sponge. AN.
- 434.—M. 13. Feeble.
May. Tenotomy and amputation of toe.
C., on towel. 35 mins. (Afterwards E.)
C. was administered upon towel at first. Pulse and breathing became very shallow, so pure E. was administered in cone. Breathing improved. After-effects—sickness. AN.
- 435.—M.—? 29. Pulse 88, soft, regular. Fair heart sounds, good lung expansion. Dilated and unequal pupils. Intelligent, clear, answers slowly but rationally. He is partly blind; not nervous.
May, 2 p.m. For cerebellar tumour.
C., on Skinner. (Afterwards E.)
Pulse at first quick, then slower. After 5 mins. from beginning of O. pulse became very quick and running. R. good. Trephine not yet applied. Changed to E. with good effect, and gave it throughout, keeping up only a light anæsthesia. AN.

- 436.—F. 42. Good condition.
May, noon. For ruptured perineum.
C., method unstated. (Afterwards E.)
After inhalation of C. \bar{v} ii, Pt. became pale, breathing shallow, and pulse weak and intermittent. Changed to E. Pulse, R., and colour improved rapidly. AN.
- 437.—F. 38. Strong, healthy.
May, 11 a.m. Excision of mamma.
C., on towel. \bar{v} xxv. 30 mins. (Afterwards E.)
During O. Pt. became very pale. Pulse weak, R. shallow. E. was given on towel, and she revived. After-effects—very sick. AN.
- 438.—M. 24. Healthy. (1st administration.)
May, 9.15 a.m. Radical cure of inguinal hernia.
C., on modified Skinner. \bar{v} viii. 20 mins. (Afterwards E.)
Pt. under C. became very pale, with fixed pupil, not much dilated. Pulse slow and weak. R. was shallow and irregular. E. was then given and head lowered; and after that Pt. had no bad symptoms. Pulse improved, colour returned to lips, and respirations were full and regular. AN.
- 439.—F. 30. Good.
July, 9.25 a.m. Excision of superior maxilla.
C., on towel. 5 mins. (Afterwards E.)
C. had been given for 5 mins., when pulse slowly but steadily became weak and irregular. Pallor appeared, and R. became shallow. Head lowered, pulse and R. improved. E. now given for 30 mins. before she was sufficiently under to proceed with O. AN.
- 440.—M. 37. Healthy-looking, tall. Has epithelioma of larynx. Audible stridor, though not marked. No attacks of dyspnoea lately.
Jan., 2 p.m. Removal of half of larynx for epitheliomatous growth.
C., on Skinner, and lint, given gradually. \bar{v} xi. 55 mins.
R. became more audible and expiration prolonged. After 4 mins. slight rigidity. Still good lid-reflex, but breathing getting shallower and not so efficient. Circulation good. R. now ceased for several seconds, and tracheotomy instruments were in readiness; after a few seconds, however, R. went on again. Tracheotomy performed soon after. No further trouble. Cornea never quite insensitive. AN. PT.
- 441.—M. 32. Unhealthy. (3rd administration.)
March, 9.40 a.m. Scraping stump.
C., on modified Skinner. \bar{v} xvii. 40 mins.
Sick while under, and R. ceased. Pt. became livid, not at time of sickness, but while almost under. This occurred three times, but no artificial aid was necessary. Pt. had a rigor after he was out of C. while in bed. AN. PT.
- 442.—F. 55. Suffers from asthma and chronic bronchitis. Stout and dyspnoic.
July, 8.45 a.m. Removing wens from head.
C., with Krohne's inhaler. \bar{v} ii. 10 mins.
During administration Pt. struggled violently for breath; became very dusky in the face. R. ceased. Pulse beat whole time. A.R. quickly restored her. AN. PT.
- 443.—M. 18. Weak. Pulse was very weak before O.
Sept., 10.30 a.m. Amputation of leg.
C., method unstated. 30 mins.
Half-way through O. Pt. began to breathe badly. Radial pulse could not be felt. Head lowered, tongue drawn forward. Brandy \bar{v} ii injected. Pulse improved at once, and R. became deeper in about 20 or 30 secs. All right again in 2 mins. AN. PT.
- 444.—M. 12. Good. No food given since previous night.
Jan. Excision of eye.
C., method unstated. \bar{v} iii. 15 mins.
Faint. R. almost *nil*. Pulse feeble. Inversion. Ammonia inhalation. Ended in sickness. Good deal of undigested food. AN. PT.

445.—M. 16. Not good.
April, 5.30 p.m. Incision of abdominal abscess; left iliac region. Extraction of bullet from right iliac region, beneath internal oblique muscle.

C., on sponge. \bar{v} iii. 30 mins.

Slight collapse, but rallied with nitrite of amyl and stimulants. O. performed in a wretched, dirty, close room. Tongue pulled forward. Pulse 130 before O., and weak. AN. PT.

446.—M. 32. Tubercular.

Jan., noon. Castration.

C., method unstated. \bar{v} viii. 16 mins.

Immediately after cord was cut Pt. collapsed; pulse rapid and weak; cyanosed. Tongue well pulled out, and feet raised. E. \bar{M} xx given hypoderm. For an hour after Pt.'s pulse was feeble and irregular. Was given strophanthus hypoderm., and hot sponges to cardiac region when he got back to bed. Breathing all the time was nearly normal, but shallow. Sickness afterwards. AN. PT.

447.—M. 82. Good health till last two years. Had bad pneumonia one year ago. Gut strangulated for three days. Arteries rigid. Heart weak, but no organic disease. Lungs emphysematous. Not prepared for O.

Feb. Herniotomy.

C., on towel. \bar{v} xvi. 45 mins.

Fully anaesthetised for 10 mins. Then pulse became irregular and weak, R. being also shallow. In a few minutes pulse stopped for two or three respirations. Then both pulse and R. remained good for 5 mins. or so. These phenomena were repeated four times. For last 20 mins. anaesthesia was only partial. Breathing improved towards end. Made splendid recovery. AN. PT.

448.—M. 7. Bad.

May. Excision of hip.

C., with Junker. \bar{v} ii. 25 mins.

Pulse became very weak, pupils dilated. Nitrite of amyl given; pupils immediately contracted. AN. PT.

449.—F. 68. Apparently healthy, but probably alcoholic habit. Over fat. Full subject, thick tongue, no teeth. Had usual early breakfast.

Feb., 10 a.m. Cauterisation of epithelioma of vulva.

C., on Skinner's mask. \bar{v} vi. 30 mins.

Deep anaesthesia, causing anxiety. Tongue drawn forward. AN. PT.

450.—F. 32. Very anaemic, functional murmurs. Suffering from salpingo-ovariitis.

Abdominal section.

C., method unstated. (Afterwards E.)

When 10 mins. under C., during O. suddenly became pale with weak pulse. E. hypoderm., and substitution of E. for C. on towel were sufficient to restore. AN. PT.

451.—F. 29. Very anaemic. Brandy \bar{v} ii given before O.

June. Oöphorectomy.

C., method unstated. (Afterwards E.)

Under C. 10 mins., then became suddenly pale. Pulse feeble; strychnine given hypoderm., then E.; and C. changed for E. Pulse gradually improved, and O. safely completed. AN. PT.

452.—M. 2 months. Weak.

Nov., 4.30 p.m. Circumcision.

C., on lint. \bar{v} ss. 5 mins.

Child weak, O. postponed. AN. PT.

453.—F. 48. Bronchitic (chronic) and weak.

Sept. O. postponed.

C. Meth., on towel. \bar{v} iii. 6 mins.

Pt. coughed violently in going under, and brought up much phlegm; some regurgitated, and she became deeply cyanotic. Administration suspended, as it was deemed inadvisable to proceed, and O. was deferred until bronchitis should have improved. AN. PT.

454.—M. 45. Good, plethoric. Piles clamped on previous day under E., with no complication.

Nov., 10 a.m. Removal of plug from rectum.

C., open method. 6 mins.

Plug removed when Pt. just insensible and relaxed. When plug removed through anus Pt. became faint. R. became very feeble about 15 secs. after pulse was affected. Brandy \bar{v} i injected, under skin. Head lowered, chin drawn forward. Pt. breathed well in about $1\frac{1}{2}$ mins. O. AN.

455.—M. 39. Has lost flesh considerably.

Sept., 3.40 p.m. For old empyema.

C., on Skinner. \bar{v} vi. 30 mins.

Administration stopped on account of cyanosis, and difficulty of breathing. Injection of E. \bar{M} xx. PT. AN.

456.—M. 18. Weak.

March. Gastrostomy.

C., on towel. 55 mins.

During O. there was difficulty in breathing owing to collection of mucus in throat (which had to be sponged away). After O. he was 25 mins. before he regained consciousness. He retched constantly. Tendency of fluid to collect in throat, interfering with breathing and causing cyanosis. Teeth clenched. Pt. kept on side to prevent fluid from entering larynx. To accelerate return to consciousness he had brandy enema, E. hypoderm., incessant flicking with wet towel, foot of bed raised, hot bottles. Pulse kept fairly good throughout. Chief danger caused by regurgitation of fluid from stomach. PT. AN.

457.—M. 55. Collapsed.

March, 4 p.m. Herniotomy.

C., on lint. \bar{v} iv. 40 mins. (Afterwards E.)

Pulse very bad before administration; soon after failed. E. given on lint. Pulse recovered at once. PT. AN.

458.—F. 22. Moderate health. Sub-acute bronchitis.

Jan., noon. Removal of appendages for double pyo-salpinx.

C. Meth., on towel. \bar{v} iv. 25 mins.

After-effects—no sickness. Severe bronchitis. PT. AN.

459.—F. 46. Bronchitis.

March, 11 a.m. Removal of pyo-salpinx.

C. Meth., on towel. \bar{v} viii. 30 mins.

After-effects—acute bronchitis, lighted up by the anaesthetic and cold weather. PT. AN.

460.—M. 19. In a feeble state. Lardaceous disease.

Feb. Amputation of thigh.

C., on lint. \bar{v} xvi. 50 mins.

During O. the pulse became very feeble, and so Pt. was given two hypodermic injections of E. (\bar{M} xv doses). After-effect—sickness, which continued on and off for four days. Has since made good recovery. PT. AN.

461.—M. 23. Weakly and anaemic.

Feb., 4 p.m. Excision of scrofulous knee.

C., on Skinner. \bar{v} xii. 105 mins. (Afterwards ACE.)

Pupils never contracted during moderate or deep anaesthesia. Heart became very feeble. Pulse at wrist imperceptible. E. \bar{M} 60 injected hypodermically and head lowered. ACE. substituted. Got slightly better. Breathing perfect throughout. PT. O. AN.

462.—M. 14. Weak.

Aug. For necrosis of femur.

C., on towel. \bar{v} v. 25 mins.

Breathing was arrested twice during O. A.R. resorted to, and liq. ammon. fort. inhaled. R. returned at once. AN. PT.

463.—F. 8. Weak. Struma. (Aperient previous night. Enema, morning; beef-tea.)

March. Draining knee joint.

C., on towel. \bar{v} iii. 15 mins.

Took well at first. Quiet. After \bar{v} ii had been given, breathing suddenly became very shallow, and all but stopped. Head

lowered, tongue withdrawn. A.R. for 2 mins. Breathing improved. Pulse feeble and quick throughout. After-effects—slight nausea. AN.
PT.

464.—F. 46. Fair.
June, 9 a.m. Thyroidectomy.
C., on flannel inhaler. \bar{v} . 50 mins.

Signs of asphyxiation which quickly passed away, and Pt. recovered consciousness, but no more C. was given after superior and inferior thyroids were tied. There was alarming hæmorrhage from under the clavicle, which could not be stopped until sponges were packed in. She died 12 hours after. AN.
PT.

465.—M. 25. Extensive scarring of face from lupus, some mechanical obstruction to breathing.
Dec., 2.30 p.m. Plastic O. for nose.
C., on Skinner. \bar{viii} . 35 mins.
C. stopped on account of cessation of R. and cyanosis. Lungs apparently choked with mucus, etc. AN.
PT.

466.—F. 13 months. Weak.
Sept., 7 p.m. Abscess connected with necrosis of femur opened.
C., on covered frame. \bar{xi} . 10 mins.
Syncope attack. R. feeble, but did not cease. Oxygen inhaled, speedy recovery. AN.
PT.

467.—M. 60. Weak. No signs of heart disease on auscultation.
June, noon. Suprapubic cystotomy.
C., method unstated. \bar{xii} . (Afterwards E.)
During O. the heart showed signs of impending failure, the pulse becoming weak and face blanched. The respirations became deeper and fewer per min. E. was first administered in equal parts with the C. when these symptoms were noticed; not much improvement being noticed, a capsule of amyl nitrite was given. Pt. markedly improved. E. given alone on towel till end of O. Rallied well from O. Pt. progressed most satisfactorily for 11 days, and then died from cardiac syncope with scarcely any warning. No post-mortem. AN.
PT.

468.—M. Weak.
March, 10.30 a.m. Inguinal colotomy for malignant disease of rectum.
C., on towel. \bar{xvi} . (Afterwards E.)
Anxiety. Required a hypodermic of E. during O., because of excessive pallor and feeble pulse. AN.
PT.

469.—M. 70. Unhealthy. (2nd administration.)
Feb., noon. Redressing wound.
C., on modified Skinner. \bar{vi} . 25 mins.
Weak and collapsed. Very pale while under. E. \bar{xxv} hypodermically. AN.
PT.

470.—F. 61. Stout, nervous, plethoric, but had lost a considerable quantity of blood from bleeding piles. C. given three days before with no dangerous symptoms.
March, noon. Removal of piles by clamp and cautery.
C., on red flannel nose-piece. \bar{vi} . 15 mins.
After O. the face became blue, and cold perspiration was seen on body. Radial pulse almost imperceptible. Pt. was quite conscious and complained of weakness. E. \bar{xx} was given hypodermically, and slightly improved pulse. E. \bar{xx} hypoderm. again, given after 10 mins., and with amyl nitrite and hot bottles this produced a satisfactory pulse. Pt.'s pulse on removal to bed became again unsatisfactory, but under treatment of mustard leaf to heart, potash water, and then potash and brandy by mouth, became satisfactory once more. AN.
PT.

471.—M. 15. Strumous, emaciated.
May, noon. Excision of knee.
C., on towel. \bar{xii} . 40 mins.
Pulse failed several times during O. E. was injected hypodermically three times. AN.
O.
PT.

472.—M. 6. Strong. Albumen in urine.
June, 9.15 a.m. Excision of hip joint.
C., by open method. 30 mins. (Afterwards mixture.)
Became pulseless suddenly during administration. A.R., hot sponge over heart, and inversion were at once resorted to with good result. Administration continued with E. and C. AN.
O.
PT.

473.—F. 45. Rather anæmic.
March, 4 p.m. Removal of breast, axillary glands, and pectoral muscles.
C., on towel. (Afterwards E.)
Some syncope, so changed to E. Matters did not greatly improve until after vomiting had occurred. After-effects—good. AN.
O.
PT.

Cases in Class II.

Cases in B β II, Anæsthetic No. 1.

474.—F. 6. Good.
May, 4.30 p.m. Osteotomy.
C., on single fold of towel. 15 mins.
Breathing shallow, irregular, intermittent, threatened to stop altogether. C. removed, and child got gradually better.
475.—F. 12. Excited. (1st administration.)
Jan. Iridectomy.
C., \bar{vi} . 8 mins.
Took anæsthetic badly. Stopped breathing twice. Sick afterwards.
476.—F. 7. Good.
Oct. Plastic O.
C., on towel. \bar{iv} . 60 mins.
Breathing shallow. A.R. improved Pt.
477.—F. 60. Satisfactory.
June, 12.45 p.m. Removal of submaxillary tumour.
C., on towel. 45 mins.
Difficulty with R. at one stage. A.R. required.

478.—M.
Nov. For prostatic calculi.
C.
Took anæsthetic badly, becoming very livid. Sick after.
479.—M. 4.
Oct., noon. For malignant epulis of upper jaw.
C., on towel. \bar{xvi} . 20 mins.
Pt. became very cyanotic and his breathing very shallow; was considerable time coming out of C.
480.—M. 49. Weak.
April, 11 a.m. Removal of cancer of rectum.
C., on lint. \bar{x} . 50 mins.
Tendency to syncope.
481.—M. 10. Very pale.
July, noon. For ingrowing toe-nail.
C., on towel. \bar{iv} . 10 mins.
Felt O. very much.

- 482.—F. 65. Condition good.
Oct., 10.30 a.m. Ovariectomy.
C., by open method. 50 mins.
Became somewhat collapsed at one stage of O., but rallied again. E. $\bar{\text{v}}$ injected hypodermically. Vomited 2 hours afterwards.
- 483.—M. 11 months. Healthy. (2nd administration.)
Feb., 10.40 a.m. Examining prepuce.
C., on modified Skinner. $\bar{\text{v}}$ iii. 10 mins.
Slightly collapsed and very pale for some minutes.
- 484.—M. 38. Very weak.
Aug., 4 p.m. Dressing knee, feeding through tube.
C., by open method. 45 mins.
Pt. became a great deal collapsed after introduction of food through tube. Hypodermic of brandy $\bar{\text{M}}$ xx gradually revived him again. Vomited afterwards.
- 485.—M. 16. Tubercular. (5th administration.)
Oct., 9.15 a.m. Amputation at hip joint.
C., on modified Skinner. $\bar{\text{v}}$ xv. 70 mins.
No sickness, but was much collapsed, and did not recover consciousness. Transfusion of normal salt solution done, which rallied Pt. somewhat. Hypodermic of E. administered. Pt. was very sick 2 hours afterwards.
- 486.—M. 4. Weakly.
March, 10.30 a.m. Opening chest in back for empyema.
C., on lint. 15 mins.
Became blue and collapsed at end of O. E. injection $\bar{\text{M}}$ xx.
- 487.—M. 8. Exhausted.
July, 11 a.m. Opening and draining empyema of left side.
C., on lint. $\bar{\text{v}}$ v. 20 mins.

Pt. never lost conjunctival reflex. The respirations became very rapid and shallow, pulse rapid and small. Surface cold, blue, and moist.

- 488.—F. About 17. Vigorous, well developed.
Jan., 4 p.m. Division of stenosis of os uteri.
C., on flannel. $\bar{\text{v}}$ iv. 10 mins.
The respiration became feeble, ace blanched, and pulse failed, but did not quite cease. On the head being lowered, these symptoms improved, and she sank into a profound sleep from which she could not be roused for more than half an hour. As she awakened she was seized with clonic convulsions, the right arm being rigid, and the eyes squinting. She had three or four such fits before consciousness returned. No sickness; she had had no food for 5 hours. This was a case in which the agony of dysmenorrhœa had previously produced convulsions when no anæsthetic had been used. Faint afterwards.

- 489.—M. 68. Cardiac murmurs.
Dec. Lithotomy.
C. $\bar{\text{v}}$ i. (Afterwards E.)
Commenced with C., but pulse failing, E. was given.
- 490.—M. 3. Good.
July, 10.30 a.m. For polypus of rectum.
C., on towel. One hour.
Pulse bad two or three times. Inversion. R. never stopped.
- 491.—F. 12. Tubercular mitral regurgitation.
Sept., noon. For necrosis of tibia.
C., on towel. $\bar{\text{v}}$ ss. 20 mins.
C. was well taken, but circulation was very feeble. After-effects—slight sickness, much collapse and shivering. Recovery from after-effects complete in 36 hours.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 2.—ETHER.

Cases in Class I.

Cases in B β I, Anæsthetic No. 2.

- 492.—M. 69. Fair.
Sept., 5 p.m. Prostatectomy.
E., with Clover. $\bar{\text{v}}$ ii. (Afterwards C.)
Commenced with E. Pt. became much cyanosed, and stopped breathing. Gave C. till end of O. AN.
- 493.—M. 21. Debility.
Sept. Scraping sinus of hip.
E., with Clover. $\bar{\text{v}}$ i. 20 mins.
Pt. stopped breathing. A.R. AN.
- 494.—F. Good.
Feb. Perineorrhaphy.
E., with Clover. (Afterwards C.)
E. caused spasm of glottis, and she twice stopped breathing. C. given instead. Very collapsed after. Brandy $\bar{\text{v}}$ i injected hypodermically. AN.
- 495.—F. 26. Fair.
Dec., 9 a.m. Dilatation of cervix.
E., with Clover. $\bar{\text{v}}$ iv. (Afterwards C.)
Laryngeal spasm (protracted) after half an ounce of E. Tongue pulled forward, with no relief. C. taken well; spasm slowly passed off. AN.
- 496.—M. 22. Good. Out-patient. No special preparation. No food for 3 hours.
Jan., 5 p.m. Dissection of glands.
E., with Clover. $\bar{\text{v}}$ ii. 20 mins. Same E. used for others without accidents.

Pt. did not take E. very well. Not a very good colour from the first. Two glands of neck were dissected out—then it was observed that he was bluer about face and ears. R. ceased. Mouth was forced open and tongue forcibly drawn outwards. The pharynx was sponged, and some viscid mucus removed. There seemed to be a spasm of the glottis. Condition not relieved. After a few turns of A.R., Pt. began to breathe. No more difficulty. Vomited after. AN.

- 497.—M. 52. Good.
May, 12.15 p.m. Radical cure of incarcerated inguinal hernia.
E., with Clover. $\bar{\text{v}}$ iv or $\bar{\text{v}}$ v. 75 mins.
Vomited three times during O. Pt. became bad colour, and breathed shallow twice during administration. Each time Liq. strych. $\bar{\text{M}}$ iv given, and relieved symptoms. After-effects—considerable vomiting. AN.

- 498.—F. 55. Healthy. Stout. Carcinoma mammæ.
Oct., 3 p.m. Removal of right breast.
E., with Clover. $\bar{\text{v}}$ ii. 20 mins.
Pt. was anæsthetised very rapidly—before "2" was reached. Half-way through O. pulse failed rather quickly, and a state of partial syncope ensued. Lips livid. Breathing shallow. The anæsthetic was discontinued. Hot cloths to head. Soon rallied. The syncopal attack much more resembled those seen under C. than under E. AN.

- 499.—F. 38. Good.
July. Ovariectomy.
E., with Clover. One hour.
Attack of bronchitis a day or two afterwards. AN.
- 500.—F. 47. Rather feeble.
Oct. Laparotomy.
E., with Clover. 50 mins.
Attack of bronchitis a day or two afterwards. AN.
- 501.—M. 29. Phthisical.
Feb. For fistula in ano.
E., with Clover. 31. 15 mins.
After-effect—slight bronchitis. AN.
- 502.—M. 10. Fairly good.
March, 2.30 p.m. Excision of knee.
E., with Clover. 33. 40 mins.
After-effect—slight bronchitis. AN.
- 503.—M. 65. Very good.
March, 4.40 p.m. Excision of epithelioma of lip.
E., with Clover. 34. 50 mins.
After-effect—slight bronchitis. AN.
- 504.—M. 50. Not satisfactory.
Jan. Radical cure of inguinal hernia.
E. with Clover. 35. One hour.
After-effects—no vomiting. Slight bronchitis. AN.
- 505.—F. 62. Not satisfactory.
May. For strangulated femoral hernia.
E., with Clover. 31. 20 mins.
After-effect—some bronchitis. AN.
- 506.—M. 59. Bad.
Sept., 5.40 p.m. Ligature of hæmorrhoids.
E., with Clover. 32. 15 mins.
After-effect—some bronchitis. AN.
- 507.—M. 16. Good.
Jan., 4.30 a.m. For mastoid abscess.
E., with Clover. 32. 25 mins.
After-effects—sick. Temperature 101° same evening.
Coughed a good deal. Fair amount of bronchitis next day.
Well in three or four days. AN.
- 508.—F. 45. Good.
Jan. Amputation of breast.
E., with Clover. 33. 30 mins.
After-effects—no vomiting. Bronchitis. Pt. had suffered from bronchitis previously. AN.
- 509.—F. 28. Good.
Jan., 8.30 a.m. Ovariectomy (double).
E., with Clover. 34. 45 mins.
After-effects—bronchitis. Very little vomiting. AN.
510. F. 41. Very good.
May, 9.30 a.m. Abdominal section.
E., with Clover. 35. 55 mins.
After-effects—had very bad bronchitis for first 48 hours. AN.
- 511.—M. 54. Moderate. Tendency to bronchitis.
Jan., 12.30 p.m. Excision of shoulder for old dislocation.
E., with Clover. 3ii, 3vi. One hour.
Very severe bronchitis followed. AN.
- 512.—F. 38.
July. Tumour excised from anus.
E., with Clover. 3½. 3 mins.
Pt. turned very blue at once. Tried four times to give it, but had to cease. AN.
- 513.—F. 37. Very anæmic, fleshy, ill-looking.
Jan., 4 p.m. For sloughing fibroid.
E., with Clover. 30 mins.
Breathing ceased just when lid reflex went. Tongue forceps used. Pressure on chest employed. Bladder very full, 364, and when emptied Pt. became weak. Pt. died two days later. AN. PT.
- 514.—F. 30. Fat, anæmic. Pulse during day 124. Temp. 101.6°. At O. pulse 140, temp. 101°. Has had pleurisy and complained of side pain.
Jan. Dilatation of cervix.
E., with Clover. 3ii. 26 mins.
Went under very rapidly. No coughing. About 10 mins. after leaving theatre her pulse began more feeble, and R. stopped a little. Hypo. of strychnine. AN. PT.
- 515.—M. 16. Very weak. (2nd administration.)
April, 11 a.m. Incision and scraping of abscess of knee joint.
E., with Clover. 3iiss. 20 mins.
Breathing stopped about 2 mins. after cessation of administration. Head was dropped over side of bed, tongue pulled forward and Howard's AR. used for 3 mins. Restored. AN. PT.
- 516.—M. 35.
Aug. For large ranula pressing on trachea.
E., with Clover. 3iii. 40 mins.
Just as Pt. was becoming anæsthetised, he was seized with rather an alarming spasm of his respiratory muscles; and he went very blue. But his symptoms were relieved by opening his jaw, and pulling the tongue forward. The swelling bulged into the larynx, and so aided in the temporary embarrassment of breathing. AN. PT.
- 517.—F. 42. Wasted.
April, 3.10 p.m. Excision of wrist.
E., with Clover. 34. 40 mins.
After-effects—vomiting. Some collapse, recovered after administration of stimulants. AN. PT.

Cases in Class II.

Cases in B β II, Anæsthetic No. 2.

- 518.—F. 20. Bad condition. Cerebral abscess. Pt. had 26 epileptic fits in the 12 hours preceding the O., and one just before being put under the influence of the E.
Feb., 9.45 a.m. Trephining.
E., with Clover. 3viii½. 80 mins.
Pulse was very poor during the latter half of the O. 3i½ of E. was injected into arm, and 3ii of brandy given per rectum.
- 519.—F. 49. Indifferent.
Aug. Hysterectomy.
E., with Clover. 35. 77 mins.
This Pt. took the anæsthetic well, but was extremely collapsed afterwards. Vomited afterwards. Although the E. was given very dilute ("1½" to "1"), with air up to 4 parts, there was a good deal of cyanosis.
- 520.—M. Good. Caries of spine with abscess.
Nov. Laminectomy.
E., with Clover. 32½. One hour.
After-effect—very marked shock. Temp. 94.2°. Pulse 168. Vomited frequently.
- 521.—M. 27. Has lost flesh.
Sept., 3.40 p.m. Amputation of leg. Seat of election.
E., with Clover. 34. 45 mins.
After-effects—slight sickness. Congestion of lungs. E. injection thought necessary.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 3.—“GAS AND ETHER.”

Cases in Class I.

Cases in B β I, Anæsthetic No. 3.

- 522.—M. 28. Good.
Oct., 2.15 p.m. For necrosis of femur.
G. and E., with Clover. E. \bar{v} ss. 10 mins.
Breathing ceased just after loss of consciousness. Cyanosis well marked. Head drawn over end of table. Tongue drawn out. A.R. Soon all right. AN.
- 523.—M. 65. Spare.
March, 2.45 p.m. Examination of knee.
G. and E., with Clover. G. 3 galls. E. \bar{v} i. 15 mins.
After breathing G. and E. mixed for a minute and a half he became suddenly asphyxiated. Tongue pulled out. A.R. Came round. AN.
- 524.—F. About 35. Good health. (4th administration.)
Feb., 10.50 a.m. Extraction of teeth.
G. and E. Method unstated. (Little E.)
Anæsthetic pushed. On removal of face piece, Pt. did not get any air in, but rapidly became cyanosed. Inversion and A.R. soon restored breathing. AN.
- 525.—M. 27. Good. Extremely nervous.
June. For hæmorrhoids.
G. and E. Meth. E., with Ormsby. \bar{v} iiiiss. 20 mins.
Cyanosis extreme. Cessation of R. Used hot tin in inhaler. AN.
- 526.—M. 24. Healthy.
June, 3 p.m. Exostosis of toe.
G. and E., with Clover. E. \bar{v} iii.
After-effects—general bronchitis one day later. AN.
- 527.—F. 29. Anæmic.
March. Vaginal hysterectomy.
G. and E., with Clover. E. \bar{v} iv. 137 mins.
Very little saliva. After-effects—vomited frequently for six or seven days from time of O. AN.
- 528.—M. 64. Very stout. High colour.
Jan. Lithotrixy.
G. and E., with Ormsby. Meth. E. \bar{v} 2. (Afterwards C.)
E. caused bronchial irritation, cyanosis, and difficulty in breathing. C. did not relieve cyanosis until tongue was weighted forwards; then breathing became regular and colour very good. O. could not have been completed under E. Pt. was anæsthetised on his side, on account of obesity. Respiratory troubles began when he was turned on his back. Very anxious case. After-effects—none. AN. PT.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 4.—THE A.C.E. MIXTURE.

Cases in Class I.

Cases in B β I, Anæsthetic No. 4.

- 529.—M. 62. Good.
Feb., 4.40 p.m. Suprapubic lithotomy.
ACE., on towel. \bar{v} i. (Afterwards E.)
Pt. stopped breathing for about a minute, under ACE., but came round on A.R. being done. E. was then employed. After-effects—not sick. AN.
- 530.—M. 7. Good.
Feb., 2 p.m. Suprapubic lithotomy.
ACE., on towel. \bar{v} x. 35 mins.
After-effects—bronchitis. AN.
- 531.—F. Fat. Weak, bronchitic.
June, 4 p.m. For strangulated femoral hernia.
ACE., with Clover. \bar{v} iv. 45 mins.
After-effects—bronchitis. AN. PT.
- 532.—F. 27. Delicate. Aortic regurgitation.
May, 3 p.m. Amputation of finger.
ACE., on mask. \bar{v} iii. 15 mins.
Rolling of eyes 25". Oscillation of pupil 60". Took anæsthetic well, no excitement or struggling. O. lasted 5 mins. Depression and flickering of pulse, and slight sickness, with perspiration. Ammonia to nostrils. Rapid rally, no ill effects. AN
PT.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 5.—MIXTURES OF CHLOROFORM AND ETHER
IN VARIOUS PROPORTIONS.

Cases in Class I.

Cases in B β I, Anæsthetic No. 5.

- 533.—F. 50. Fair. Pt. had been prepared by aperient previous night, followed next day by enema. An early breakfast and only a little beef-tea two hours before O.
Jan., 11 a.m. Amputation of breast.
- Mixture of C. 1 part and E. 7 parts, with Clover. \bar{v} iss. 30 mins.
R. during middle of O. became feeble, and Pt. cold and faint. Good deal of hæmorrhage. AN.

534.—F. In good health. Rather depressed and nervous.
Dec., 11 a.m. Perineorrhaphy.
Mixture of E. 1 part and C. 7 parts, with Clover. $\bar{\zeta}$ xxx.
49 mins.
No struggling whatever. After-effects—slight vomiting,
faint. Brandy required. AN.

535.—M. 49. Feeble health. Pt. had been prepared
by aperient the night before, followed next morning by an
enema. An early breakfast and only a little beef-tea two hours
before O.

Jan., 11 a.m. Erasion of knee.
Mixture of C. 1 part and E. 7 parts, with Clover. $\bar{\zeta}$ iv.
45 mins.
After-effects—slight bronchitis. Anæsthetic seemed to irritate
bronchial tubes. Had no bronchitis before. AN.

536.—F. 26. Good.
March, noon. Removal of double pyo-salpinx.
Mixture of C. 1 part, E. 2 parts, with Clover. $\bar{\zeta}$ iiss.
25 mins. Meth. E. and Meth. C.
Acute bronchitis supervened, with fever and quick pulse.
No abdominal symptoms. Never had bronchitis previously.
AN.

537.—F. 34. Feeble. Goitre. Mitral systolic bruit.
Oct. Ligature of isthmus of thyroid.
Mixture of C. 1 part and E. 7 parts, with Clover. $\bar{\zeta}$ i.
25 mins.
Pt. became very cyanosed. O. was stopped for a few mins.
AN.
PT.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 6.—A.C.E. FOLLOWED BY CHLOROFORM.

Case in Class I.

Case in B β I, Anæsthetic No. 6.

538.—F. 26. Good. A well-built young woman, with good
chest expansion and heart sounds. Dark hair. Not markedly
nervous.

Nov., 3 p.m. For glands in neck.
ACE., then C., on Skinner. About 20 mins.
At 3 p.m. administration begun by student under my super-
vision, ACE. on Skinner. Anæsthesia slowly came on. Pulse
good, full and regular. Breathing and colour good. Breathing
did not become deeper to any extent. Kept Skinner wet. After
3 to 4 mins. some expiratory noise, no struggling. Conjunctival
reflex present. Changed to C. at end of about 4 mins., as this
anæsthetic was asked for by operator. Same mask used.
Anæsthesia came on slowly; noise remained for 2 or 3 mins.
Moved into theatre; noise subsided. Incision made. No reflex
movement or effect on pulse (which I held). Pupils, I believe,
were rather large. No conjunctival reflex. Breathing good.

O. quite a superficial one. Pupils remained larger than usual.
Pulse once rather feeble, but got better with several breaths of
air. There was no good, soft snoring, neither was there any
obstructed sound. R. always good. Colour a trifle pale, but
nothing to excite alarm. I had just turned away for a few
seconds to get out of the way, and on looking back, saw Pt. very
pale, with inhaler still over her face. I told student to remove
it. No pulse at wrist. Breathing going on. No conjunctival
reflex. Pupils large, but ? size. I assisted the now feeble
breathing by pressing chest during expiration. No obstruction.
Tongue forceps and gag unnecessary. Head lowered. I
believe all would have gone well even with this simple assistance
to breathing, but as colour remained bad we performed A.R. by
Sylvester's method. In 1 or 2 mins. pulse and colour came
back and all was well. Some mucus ran from mouth. No
vomiting. AN.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 8.—ETHER FOLLOWED BY CHLOROFORM.

Cases in Class I.

Cases in B β I, Anæsthetic No. 8.

539.—M. 30. Good.
March, 2 p.m. Suprapubic operation.
E., with Clover. $\bar{\zeta}$ ii. 15 mins. Then C., on Skinner. $\bar{\zeta}$ xvi.
50 mins.
Abdominal movements embarrassed operator, so C. was used.
Breathing shallow and bad twice during administration, relieved
by opening mouth with tongue pushed well forwards. After-
effects—none. AN.

540.—M. 65. Alcoholic subject.
May. Removal of fibro-lipoma of nose.
E., with Clover, then C., on lint. Very small amount of both.
Only $\bar{\zeta}$ i.
Pt. struggled a great deal, becoming cyanosed almost at once.

C. was substituted, but after a few inhalations the Pt. left off
breathing. A.R. was successfully resorted to, and the O. was
performed without any anæsthetic. After-effects—headache,
vomiting. AN.

541.—F. 33. Anæmic.
June, 9 a.m. Laparotomy for removal of dilated Fallopian
tubes.

E., with Clover. $\bar{\zeta}$ iii. Then C., on Skinner. $\bar{\zeta}$ iv.
R. and pulse got very feeble, and A.R. had to be used, both
R. and pulse remained feeble throughout O., and $\bar{\mu}$ v of liq.
strych. were injected. After-effect—nausea, but no vomiting.

AN. $\left\{ \begin{array}{l} O. \\ PT. \end{array} \right.$

CASES IN CONNECTION WITH ANÆSTHETIC NO. 10.—GAS AND ETHER FOLLOWED BY CHLOROFORM.

*Cases in Class I.*Cases in B β I, Anæsthetic No. 10.

542.—F. 32. Thin. Good colour, not nervous. Sept., 3.30 p.m. Ovariectomy. G. and E., with Clover. Then C., on Skinner. (Afterwards E.) Took G. and E. well. Got her well under, and after 2 or 3 mins. of E. was asked to give C. This she breathed well at first, but R. soon got shallow and inaudible. Good conjunctival reflex. Rubbed lips. Gradually conjunctiva got insensible. At this point R. still very feeble. Pulse very slow and weak. Then withdrew C. and waited. Colour rather pale. No cyanosis. Put a few drops of E. on the Skinner, but no effect on R. Conjunctiva still insensible. Pupils moderate. Gradually lid reflex came back, but other symptoms much as before. Applied E. in an Ormsby's inhaler with air-hole open. This made R. gradually a little deeper. No cough. Pulse and R. gradually got better. But for rest of O. (30 mins.) R. not

exaggerated. Occasionally conjunctival reflex. Occasional soft snoring, but no E. stertor. Pupils usually rather large. Pulse and colour good. E. used most of time. AN.

543.—F. 33. Looks healthy. Very nervous. Good colour and pulse. Chest moves easily both sides, with deep breathing, but old pleurisy on right. Had bronchitis in January.

March, 2.30 p.m. Oöphorectomy.

G. and E., by Braine's method. E. \bar{v} iss. 80 mins. Then C., on Skinner, about \bar{v} iiiss. 25 mins. (Meth. E.)

A good deal of mucus, took E. badly. Quick breathing. Some wheezing for two days after. Then expectoration. Mucus in large tubes. She had sharp pain in side on morning of O and sent for operator, who could find nothing. ? Bronchitis commencing. (The catarrh in large tubes lasted three or four days, and then disappeared.) AN. PT.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 12.—CHLOROFORM FOLLOWED BY A.C.E. FOLLOWED BY ETHER.

*Case in Class I.*Case in B β I, Anæsthetic No. 12.

544.—F. 25. Feeble. Flushed face. May, 10.45 a.m. Abdominal section. Enterostomy. C., on lint. \bar{v} iv. Then ACE., on lint \bar{v} xii, then E. \bar{v} ii. 90 mins.

Turned very blue. Rapid R. Weak pulse under C. Purulent lymph in abdomen. AN.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 14.—CHLOROFORM FOLLOWED BY A.C.E. OR BY SOME SIMILAR MIXTURE.

*Cases in Class I.*Cases in B β I, Anæsthetic No. 14.

545.—M. 56. Good. Feb., 2.30 p.m. Inguinal colotomy. C., on towel. \bar{v} i. ACE., on towel. \bar{v} iii. 30 mins. Pt. stopped breathing for about a minute, but soon came round on A.R. being done. Not sick after. AN.

546.—F. 19. Good. May, forenoon. Thyroidectomy. C., on flannel. \bar{v} v. ACE., on flannel. \bar{v} vss. 100 mins. Good deal of hæmorrhage, followed by symptoms of asphyxia when tumour was being separated from trachea. Treatment—stoppage of anæsthetic, and two subcutaneous injections of brandy. \bar{v} xxx. AN. O.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 17.—MIXTURES OF CHLOROFORM AND ETHER
FOLLOWED BY CHLOROFORM.

Case in Class I.

Case in B β I, Anæsthetic No. 17.

547.—? Sex and age.
March. Excision of tongue, after preliminary tracheotomy.
Mixture of E. 2 parts and C. 1 part, with mask, then C.,
method unstated.

R. became very shallow at times. Once A.R. was necessary
R. very spasmodic. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 18.—GAS AND ETHER FOLLOWED BY A.C.E.

Case in Class I.

Case in B β I, Anæsthetic No. 18.

548.—F. 49. Indigestion. Spinal weakness and irritation.
June, 4.20 p.m. For hæmorrhoids.
G. then E., then ACE., methods unstated.
Proved a very "mucous" subject. Prone to salivation, and E.
induced such a flow that it was abandoned for ACE. The
lithotomy position was adopted, with crutch and shoulder-strap
round back of neck. O. was performed on the bed, and the

position hindered R., the lungs being already full of mucus.
R. became more and more feeble, and finally ceased. At once
the legs were let down, and tongue promptly drawn forward,
and A.R. performed. After six or eight movements, breathing
became again natural; a hypodermic of E. was given, and no
further bad results followed. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 25.—ETHER FOLLOWED BY CHLOROFORM,
FOLLOWED BY MIXTURES OF CHLOROFORM AND ETHER.

Case in Class I.

Case in B β I, Anæsthetic No. 25.

549.—M. Good.
Dec. Cholecystotomy.
E. 30 mins., then C. on lint, then mixture of E. 2 parts, C.
1 part. Altogether 140 mins.
Pt. took the E. well. It was changed to C. after half an hour,

because of abdominal movements being excessive. C. was
given on lint, and after a few breaths, the Pt. began to get
blanched, cold, and collapsed. Breathing shallow and slightly
irregular. C. was stopped and a mixture of 2 parts E. and 1 part
C. given, which he took well. AN.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 28.—NITROUS OXIDE.

Cases in Class I.

Cases in B β I, Anæsthetic No. 28.

550.—? Sex and age.
March, afternoon. Extraction of teeth.
G., from gasometer.
Stoppage of R. Came round by compressing the chest.
AN.

551.—F. ? Age.
May, afternoon. Extraction of teeth.
G., from gasometer.
Stopped breathing when face-piece was removed, but breathed
again after compression of chest. She was sick afterwards.
Had had no meal for three hours. AN.

CASES OF DANGER.

The cases of danger (B γ) are 153 in number, *i.e.*, 0.209 of the total cases in Division B. Of these 153 cases, 142 were placed in Class I and 11 in Class II.

In estimating the proportion of cases of danger that occurred in connection with the different anæsthetics, account must also be taken of the cases in the next subdivision (B δ) in which death resulted.

The following table enumerates all the cases in which danger occurred in connection with any anæsthetic, and also notes the absence of danger in connection with any anæsthetic which was administered in more than 100 cases.

TABLE V.

No. of Anæsthetic.	Total cases (A and B together).	Cases of Danger.		Total cases of Danger (B γ and B δ).	Ratio of Danger Cases (B γ and B δ) to Total Administrations (A and B).	Ratio of Recoveries (B γ) in all Cases of Danger (B γ and B δ).
		B γ (Recovered).	B δ (Died).			
1	13,393	120	18	138	1.030	86.956
2	4,595	8	6	14	0.304	57.143
3	2,071	6	1	7	0.338	85.714
4	678	3	0	3	0.442	100.0
5	418	3	1	4	0.956	75.0
6	59	1	0	1	1.694	100.0
7	208	6	0	6	2.884	100.0
8	225	4	1	5	2.2	80.0
9	155	0	0	0	—	—
14	275	1	0	1	0.36	100.0
19	37	0	1	1	2.702	—
28	2,911	0	0	0	—	—
29	597	0	0	0	—	—
38	11	0	1	1	9.09	—
41	23	1	0	1	4.347	100.0
All	25,896	153	29	182	0.702	84.066

The symptoms which led to the placing of cases in this subdivision were of an urgent character, immediately threatening life, and included such conditions as failure, or impending failure, of respiration or circulation, or both, during or after the administration.

The abstracts of all the cases of danger follow.

ABSTRACT OF CASES OF DANGER.

ANÆSTHETIC 1.—CHLOROFORM.

*Class I cases.*Cases in B γ I, Anæsthetic No. 1.

552.—M. 16. Debilitated.
Aug. 5 p.m. For necrosis of radius.
C., on towel. 7xii. (Afterwards E.)
R. ceased suddenly whilst under C., which, however, was not at that moment being administered. Brandy per rectum, E. hypodermically. A.R. Recovery. E. substituted as anæsthetic. AN.

553.—F. 62. Healthy.
Jan. For femoral hernia.
C., on towel. 40 mins.
R. stopped during O., tongue pulled out. A.R., head lowered.
After-effects—sickness. AN.

- 554.—M. 38. Good.
Oct., 10.30 p.m. Excision of knee.
C., method unstated. 40 mins. (Afterwards E.)
R. failed at first with C. Head lowered. A.R. Injection of E. Resuscitated. Anæsthesia continued with E. After-effects—sick. AN.
- 555.—M. 2. Good.
Jan., 2.30 p.m. "Plaster for leg."
C., on towel. $\bar{3}\frac{1}{2}$. 5 mins.
R. stopped for $\frac{1}{2}$ min. A.R. done. Easily brought round. After-effect—sick. AN.
- 556.—F. 57.
March, 4 p.m. Amputation of breast.
C., on towel. $\bar{3}$ viii. (Afterwards ACE.)
About middle of O. Pt. became cyanosed, and R. stopped. A.R. performed. Quickly brought her round. C. stopped, and ACE. substituted. AN.
- 557.—M. 4. Good. Out-patient.
March. Straightening knee.
C., on towel. $\bar{1}\frac{1}{4}$ 45. 5 mins.
R. failed. A.R. Recovery. AN.
- 558.—M. 45. Good. Fistula in ano.
July, 5 p.m. For fistula.
C., on flannel. 15 mins.
Pt. was rather deeply under, breathing well. Suddenly R. became fainter, and in $\frac{1}{2}$ min. ceased. A few vigorous squeezes of arms against chest wall started R. again. Some doubt as to whether due to C., or to cutting through the sphincter ani. AN.
559. M. 41. Healthy. Pulse good, 80. Short of stature, had lost one leg, and one arm so injured as to be useless. Ten times under anæsthetics before. Could get no history of any previous dangerous symptoms. Had a sunstroke in Australia some years ago. Epileptic fit nine years ago, since then in good health. No special preparation before O.
Feb., 11.25 a.m. Tenotomy of flexors of hand. Of a comparatively trifling nature. Hæmorrhage almost nil. Shock nil.
C., on Skinner. $\bar{3}$ v. 20 mins.
Slight struggling in 5 mins. Muscles relaxed in 9 mins. In 15 mins. R. suddenly ceased; inhaler at once removed. Lower jaw raised. A.R. (Sylvester). In a second or so, gave a gasp, then renewed breathing. Pt. recovered breathing 5 mins. after O. AN.
- 560.—F. 2. Good.
March. Laryngoscopy.
C., on towel. Given through a tracheotomy tube. 15 mins.
Just after examination concluded, and 2 mins. after cessation of anæsthetic, the breathing ceased. Inversion. A.R. Hot pack to chest. Brought round. AN.
- 561.—F. 5. Good. Out-patient.
Oct. For squint.
C., on towel. $\bar{3}$ ii $\frac{1}{2}$. 25 mins.
Pt. stopped breathing twice. A.R. performed (Sylvester's). Restored. AN.
- 562.—M. 9. Healthy.
Jan., 4 p.m. Sequestrotomy.
C., on corner of towel. $\bar{3}$ viii. 30 mins.
As he was getting under R. ceased. A.R. for 1 or 2 mins. Brought round. AN.
- 563.—M. 35. Old injury to elbow, weakly man, very irregular and slow heart.
April, 4.30 p.m. Breaking down adhesions.
C., on lint. $\bar{3}$ iii $\frac{1}{2}$. 5 mins.
Took C. very well and had so far recovered as to respond to slapping of face. Before long he began to strain at vomiting, but brought up nothing beyond a mouthful of frothy mucus. Suddenly he became quite pale, and was seized with a convulsive tremor. Pallor rapid succeeded by cyanosis, pulse was not to be felt, and R. ceased; A.R. at once begun. Battery to phrenics. In a few mins. R. and colour returned. AN.
- 564.—M. 25. Good.
June, 9.20 a.m. Lithotrity.
C., on corner of towel. 5 mins. (Afterwards E.)
After 5 mins. of C. administration, R. stopped. A.R. (Sylvester) for a few mins. R. restored, then E. used for half an hour. Pulse improved, and R. became deeper. AN.
- 565.—M. 32. Plethoric.
Nov., noon. Incision for abscess of groin.
C., on Allis's inhaler. 15 mins.
R. stopped for a few mins. A.R. and E. hypodermically. AN.
- 566.—F. 10. Good. Ganglion of wrist.
Nov. O. on wrist.
C., method unstated. $\bar{3}$ viii. 30 mins.
Pt. coughed considerably, and R. ceased just as she stopped coughing. A.R. for 3 mins. AN.
- 567.—M. 38. Good. ? Alcoholic.
Sept., 5 p.m. Exploration of knee-joint—gunshot wound.
C., method unstated. (Afterwards E.)
After first 10 mins. R. stopped. A.R. and partial inversion of body. Came round in about 4 mins., E. then substituted for C. R. remained good till end of O. AN.
- 568.—M. 6. Good.
Aug. Incision of abscess.
C., on towel. $\bar{3}$ ii. 15 mins.
Breathing became weak and shallow. A.R. performed (Sylvester's). Tongue pulled forward. Pt. inverted. Improved in 3 mins. AN.
- 569.—F. 10 months. Good.
Nov. Incision of abscess.
C., on towel. $\bar{3}$ i. 15 mins.
Pt.'s R., which was previously quite good, suddenly failed. Sylvester's A.R. Inversion. Injection of E. Pt. very slowly recovered in about 5 mins. AN.
- 570.—M. 6. Good.
July. Arthroctomy.
C., on towel. $\bar{3}$ iii. 30 mins.
Breathing suddenly stopped. Sylvester's A.R. Pt. revived in 5 mins. AN.
- 571.—M. 1 month. Good.
May. Examination of rectum.
C., on towel. $\bar{3}$ $\frac{1}{2}$. 5 mins.
Breathing ceased suddenly. A.R. performed with elevation, restored Pt. in 5 mins. AN.
- 572.—M. 6. Good.
April. Proposed O. (for abscess) was abandoned. Not begun.
C., method unstated. No other bad results with same C. in other patients.
R. stopped suddenly before the reflexes had completely disappeared. A.R. was immediately commenced and persisted in for some 20 mins., on and off. Three or four times R. commenced and again stopped before it was finally re-established. Pulse remained fair all through. AN.
- 573.—F. 31. Good.
March, noon. Exploratory incision.
C. Meth., on towel. $\bar{3}$ viii. 35 mins. (Afterwards mixture of C. and E.)
Commenced with C. Pt. got very cyanosed, and breathing ceased. Mixture of C. and E. used to continue with. AN.
- 574.—M. 9 months. Healthy, strong. Heart normal.
Feb., 3.25 p.m. Circumcision.
C., on lint. $\bar{3}$ $\frac{1}{2}$. 5 mins. Same C. used in other cases without similar symptoms.
Rapidly became unconscious. After 5 mins. R. ceased, before

pulse, which became feeble. Amyl. nitrite capsule ℞ii was used. Brought it round. Administration discontinued. Child recovered. AN.

575.—F. 22. Weak.

April, 11.40 a.m. Re-section of knee.

C., on towel. ℞ii. 5 mins. (Afterwards E.)

After 5 mins. of C., R. stopped and pupils dilated. Tongue pulled forward. Administration stopped for 7 mins. After that E. was given and pulse was weak and fast throughout. After-effects—shock. AN.

576.—M. 58. Good. Castor oil; light breakfast. Woollen clothing. Temp. 69°. Lying on back.

Intended suprapubic lithotomy. O. postponed. No hæmorrhage or shock.

C. Meth., on towel. ℞ii. 4 mins.

No struggling. Feeble pulse and R. failed first, pupil reflexes absent. Tongue pulled forwards. A.R. (Sylvester). Nitrate of amyl. Liq. strych. hypod. Pt. restored. AN.

577.—M. 37. Out-patient. Health bad, flabby, and anæmic. Alcoholic. Morphia suppository used.

Passing catheter in retention. No hæmorrhage.

C. Kept in dark, with towel and drop-bottle. 10 mins. Large quantity. In other Pts. no unusual symptoms from same C.

C. taken well at first. Pupil slightly dilated. No reflexes. Anæsthesia complete. R. failed first. Head and shoulders placed in dependent position. A.R. (Sylvester). With good results quickly. Much after-vomiting. AN.

578.—F. 28. Powerful build. Of alcoholic habit. Prostitute. Third time of taking C. Health very bad. Under Hg. two months in Lock ward. Preparation as usual. Oi Ricini. Pulse normal. Morphia suppository used.

Amputation of labia.

C. Kept in dark, with towel and drop-bottle. 30 mins. In other Pts. no unusual symptom from same C.

C. badly taken; held her breath some time, and struggled going off; but had been off for 20 mins. before dangerous symptoms occurred. R. became stertorous, then ceased. Pulse was intermittent. (Before and after O. it was normal.) Pupil contracted. No reflexes. Anæsthesia complete. R. failed first. Head and shoulders placed in dependent position. A.R. (Sylvester). With good results quickly. Vomiting for two days after. AN.

579.—M. 45. Out-patient. Muscular. Health good. Invalided from Navy for rupture. Morphia suppository used. Alcoholic.

Reduction of strangulated hernia by taxis.

C. Kept in dark, with towel and drop-bottle. 10 mins. Large quantity. In other Pts. no unusual symptoms from same C.

C. taken well at first. Pulse afterwards intermitted. Pupil slightly dilated. No reflexes. Anæsthesia complete. R. failed first. Head and shoulders placed in dependent position. A.R. (Sylvester). With good results quickly. Much after-vomiting. AN.

580.—M. 58. Apparently healthy. Heart sounds not very distinct. No murmur detected. First time of taking anæsthetic. Temperate man. Recumbent, head on one pillow.

March, 3.40 p.m. For necrosis in neighbourhood of elbow joint. Hæmorrhage, slight.

C. Not above a month or two old, kept from exposure to light. On Skinner. Sprinkled on. ℞iv. 20 mins.

C. given free diluted with air. At first R. free, then struggling stage, which lasted some time. O. commenced before Pt. fully under, as movement occurred on making incision. Pupils small throughout—react to light. Slight moaning sounds. Then R. stopped. Pulse still felt, then also stopped. Tongue pulled forward. A.R. (Sylvester). Battery to chest. Three E. injections—℞xx each. Hot brandy and beef-tea enema. Pt. gradually rallied. Not sick afterwards. Collapsed for some time, but all right next day. AN.

581.—M. 15. Strong, healthy.

May, 5 p.m. Division of thyroid isthmus. Very little bleeding.

C., on corner of towel. ℞viii. 45 mins.

Pt. went under anæsthetic fairly well. O. had begun when he started to vomit before reflexes returned. On continuing C. to prevent vomiting R. ceased quite suddenly. The heart was beating regularly. Tongue pulled forward. Pt.'s feet raised by lifting end of table. A.R. was performed for about 1 min. Pt. commenced to breathe and O. was continued. AN.

582.—M. 30. Healthy.

Nov. Internal urethrotomy.

C., on Allis's inhaler. 15 mins.

During administration R. ceased after violent struggling, during which time Pt. became very livid. A.R. for few mins. Recovery. No after-effects. AN.

583.—M. 6. Good.

April, 5.15 p.m. Examination of strumous ankle.

C., on flannel. ℞ii. 15 mins.

R. ceased (from over-dose). Pulse continued. A.R. Interrupted current to phrenics. Hypodermic injection of E. Tongue pulled forward, and jaw lifted forward. Face livid, pupils dilated. After above means had been tried for a few mins. R. commenced again, and steadily improved. Some vomiting on recovery. AN.

584.—F. 4. Weak, necrosed bone (femur). Examined under C. the day before; took it well.

Nov., 4 p.m. Removal of necrosed bone.

C., on covered frame. ℞xii. 30 mins.

During administration the breathing ceased and the face became livid. Head thrown back. Oxygen given by tube in nostril. A.R. Enema of brandy. In about 3 mins. R. was restored. The pulse was weak but perceptible. Recovery followed. O. finished without difficulty. AN.

585.—M. 19. Healthy. (1st administration.)

Aug., 9.10 a.m. Arthrectomy.

C., on Skinner. ℞vi. 20 mins. (Afterwards E.)

Pt. took C. very badly, pupil becoming dilated and breathing stopping, while face was well coloured, lips red, and pulse regular, full, and fairly strong. A.R. for 4 or 5 mins. caused R. to be resumed, and Pt. then took E. from Clover's inhaler, with no bad symptoms, recovering from anæsthesia with no sickness. AN.

586.—M. 4. Good.

Feb., 2.30 p.m. Radical cure. Not begun.

C., on lint. 5 mins.

R. ceased after 5 mins. administration, Pt. having previously vomited, and passed feces. The pulse continued. Pt. became cyanosed, and remained so for several mins. after. A.R., which lasted 3 to 4 mins., on the inverted Pt. O. postponed. Seven days after O. successfully performed under ACE., given freely throughout, on modified Junker and flannel mask. AN.

587.—F. 15. Very anæmic. On previous day C. was given for introduction of tents. ℞iii. 14 mins. Vomiting. On the morning of the day of this O., C. given for same purpose. ℞iv. 22 mins. Vomiting afterwards.

April, 9 p.m. Examination and curetting of uterus.

C., on Skinner. ℞v. 20 mins.

R. stopped. Pulse got irregular. A.R. for 5 mins. Tongue kept forward. Pt. then breathed naturally, but narcosis continued profound for about 10 mins. without more C., then slight effort at vomiting and gradual recovery. Administrator an experienced practitioner, but Pt. had an overdose. AN.

588.—F. 44. Very feeble. Had taken C. three weeks previously not well but with no ill effects.

May, 11 a.m. Scraping abscesses.

C., on towel. ℞ii. 8 mins.

Anæsthesia came on slowly at first; afterwards rapidly, when C. was pushed. Pt. became cyanosed. R. suddenly stopped.

Radial pulse and heart beat became imperceptible. Sylvester's A.R. at once, ammonia to nostrils. Brandy enema. After 5 mins. feeble spontaneous breathing took place. In 10 mins. Pt. was breathing freely and out of danger. AN.

589.—F. 26. Anæmia with systolic mitral murmur. First time of taking anæsthetic. No medicine previously. Temperate habits. Middle finger gangrenous after crush of hand a week previously. Recumbent posture. Head slightly raised.

Sept., 8.15 p.m. Amputation of finger.

C., on lint.

Took C. well to begin with. After 7 or 8 mins. pupils dilated and R. ceased suddenly. Then heart ceased. Pupil reflex noted just previous to cessation of R. Struggling stage slight, only $\bar{5}$ had been given. Considerable pallor. A.R. (Sylvester) for 10 mins. before voluntary R. produced. Injections of E. (\mathbb{M}_{xx}) at short intervals. Powerful battery to chest. Brandy per rectum. Hot sponges to chest. Gradual return of pulse and R. Collapse and pallor for some time afterwards. No vomiting afterwards. AN.

590.—M. 9. Very weak.

March. Excision of hip joint.

C., on towel. 45 mins. (E. used after recovery.)

Just after Pt. was under, before O. commenced, cessation of R., pulse remaining fairly good. Head hung over edge of table, Sylvester's A.R., tongue dragged forward, E. hypoderm., hot cloths to heart. After 10 mins. he began to show signs of returning life. Colour never completely left his face. After recovery O. proceeded with under E. without further catastrophe. The accident seemed to be due to a paralysis of the respiratory centre, the heart being comparatively unaffected. AN.

591.—M. 19. Good. Compound fracture of tibia.

Oct., 12.30 a.m. Putting up fracture.

C., method unstated. 40 mins.

After 6 mins.' administration, corneal reflex was absent, but some rigidity of muscles remained. C. pushed till pupils became dilated. Rigidity not, however, overcome. Suddenly R. ceased, and pulse became weak. A.R. was employed for about 1 min. Brandy $\bar{5}\frac{1}{2}$ subcutaneously. Man not improving, the head was brought over side of bed, and the legs were elevated. Tongue drawn forwards with forceps. A.R. continued. Face then became somewhat cyanosed. Some muscular spasm for a few seconds, most marked in face. R. being evidently embarrassed in this position, Pt. was once more laid flat on his back. Face then resumed natural colour, and R. commenced again, remaining natural until O. was completed, C. being continued with. The pulse, though weak while R. was absent, could be easily felt at wrist all the time. Dangerous symptoms lasted for about 3 mins. AN.

592.—M. 6. Naso-pharyngeal growths.

May. For removal of growths.

C., on towel.

After 10 mins., before O. had commenced, child suddenly ceased breathing, became blue, heart beating feebly. Pupils not very widely dilated. Tongue pulled forward immediately, and A.R. commenced. No improvement being observed after about 1 min., A.R. was momentarily suspended for the performance of mouth-to-mouth inflation, and then A.R. resumed. The face gradually resumed its natural colour, and within 2 mins. of the stoppage, Pt. again was breathing spontaneously, and O. proceeded with. AN.

593.—M. 44. Smash of left arm. Condition good. Fair amount of hæmorrhage before admission, but none after. Very little shock.

Feb., 2.45 p.m. Amputation of arm.

C., on towel. 35 mins.

Took C. very well for 20 mins., then R. suddenly ceased. Pupil reflex gone. Pulse good. He was quite blue, and did not breathe for 15 secs. Left arm being off, A.R. done by compression of chest wall. Four ribs and right clavicle were then found to be broken. $\bar{5}$ ii brandy enema. E. hypoderm., still

no R. Lungs then inflated by mouth-to-mouth. After first inflation, Pt. breathed quite well. O. completed. No after-vomiting. AN.

594.—F. 21. Fairly good.

May, 9.20 a.m. Nephrectomy.

C., on corner of towel. 10 mins. (Afterwards E.)

Put under C. Did not take it well. Pupils remained widely dilated after consciousness lost. After 10 mins., during which time R. was somewhat shallow though regular, R. ceased. Pulse had been rather shabby. Jaw pulled forward, tongue pulled out with forceps. R. not resumed. A.R. for some mins. R. then resumed. Colour fairly good. E. was then proceeded with. Pulse improved and R. became deeper. Finished with E. Pt. in quite satisfactory state. AN.

595.—M. 20. Fairly strong. No previous anæsthetic. Very fair health. No food for 4 hours. Previous laxative.

Nov., 2 p.m. Excision of wrist.

C., on towel. $\bar{5}$ xvi. 70 mins. No dangerous symptoms with other Pts.

Anæsthesia considerably delayed (13 mins.) Administration slightly pushed. Pt. just insensible (15 mins.), when became cyanosed, R. stopped, pulse imperceptible, pupils widely dilated. Not observed whether pulse or R. failed first. Head over table. A.R. (Sylvester), tongue drawn forward. Pharynx sponged out. Ammonia to nostrils. In about 2 mins. shallow natural R. was present, with evidence of pulse perceptible. R. returned first. In 5 mins. all danger was over. O. proceeded with, and successfully completed in 70 mins. AN.

596.—M. 10. Healthy. A brother died under C.

Sept. Circumcision.

C., on towel.

Difficulty with R. and circulation. R. stopped. Syncope. AN.

597.—F. 33. Anæmic. Rather fat. Pt. in poor condition from profuse losses due to co-existing pyo-salpinx. Pt. of large physique. No food for 14 hours. Room chilly, a cold windy day.

April, 12.30 p.m. Repair of perineum.

C. Meth., on one thickness of towel. $\bar{5}$ vi. 20 mins. The same symptoms have been noticed in its previous administration in other cases, but not unusually frequently.

Took about 5 mins. to go off; no struggling or excitement during administration. Before O. commenced, R. became very shallow, then lips pale, and finally blue. Pupils dilated widely. R. then ceased. Conjunctival reflexes remained till heart began to fail. A.R. and inversion, *i.e.*, holding up by legs. Inversion at once caused colour of lips to improve. Pt. restored, and during O. she became very pallid several times. No bad after-effects. A.R. (Sylvester) was applied for twenty respirations, during which cyanosis disappeared before R. recommenced. R. distinctly failed first. AN.

598.—M. 32. Good.

August, 10.15 a.m. For ischio-rectal abscess.

C., on corner of towel. 7 mins. (Afterwards E.)

After 5 mins.' administration, and when the Pt. seemed to be under, arms began to move about, and muscles were somewhat rigid. Pupils up to now had been active and moderately contracted; now dilated. Rigidity and movements of arms continuing, more C. was given. In 2 mins. R. stopped and colour became very white. Pupils widely dilated, no pulse at wrist. A.R. (Sylvester) for 1 min. or so. Tongue drawn out. R. became re-established. Pulse was very weak, so hot sponge was applied to præcordium. O. concluded with E. After-effects—sick and faint for some hours. AN.

599.—F. 5. Healthy.

Oct., 12.30 p.m. Iridectomy.

C., on Skinner. $\bar{5}$ i. 25 mins.

R. stopped after 5 mins.' administration. Also pulse stopped. Forehead and lips blue. A.R. for 5 mins. Recovered. AN.

600.—M. 58. Labourer, not fat, sallow, and perhaps anæmic. The day before he had the femoral artery ligatured for popliteal aneurism. Had before O. $\frac{1}{2}$ gr. morphine hypodermically; before that brandy \bar{v} i. Milk and beef-tea freely through forenoon and mid-day. O. at 3. (2nd administration.)

Oct., 3 p.m. Amputation through middle of thigh for gangrene. Little hæmorrhage.

C., on Skinner. \bar{v} iv. 25 mins. C. used in O. on previous day was half from previous bottle, and half from that used now. In this, the second O., C. was from new bottle kept for (?) some months in complete darkness, unpacked.

Very difficult to get under. Noisy, resisting, no vomiting, no spasm. At middle of O., R. and apparently heart's action ceased. Pallor. Pupils not remarkable, but eyes lost all brightness. Tongue drawn forward, neck extended horizontal. A.R. long maintained and vigorously (Sylvester). Nitrite of amyl 3 capsules. E. hypodermically \mathbb{M} xx three times. Faradism. Complete recovery, resuscitation, and ultimate good reaction. Temperature fell to normal in 6 hours and continued so. No after-effects. AN.

601.—M. 6. Very good; healthy, robust. Had C. four years ago for division of plantar fascia. No drugs previous to O., but purgative night before. Half-pint beef-tea 7 a.m.; O. at 11 a.m. No spray used. Pt. recumbent, warm.

March, 11 a.m. For talipes equino-varus. No shock; hardly any bleeding.

C., on towel. \bar{v} xvi. 45 mins. C. exposed to light for 3 hours. Two Pts. had somewhat similar symptoms the day before, after using C. from same source.

Went under in 4 mins.; no struggling and nothing peculiar, except that bowels moved just after administration of C. was begun. No spasms, convulsions, or vomiting. Pulse was very good all through, and R. failed first. Pulse was quite good till R. failed, as I had my finger on it all the time till then. Not able to say whether pulse ever stopped, as I let it go to do A.R. Reflexes abolished early. He moved a very little when tendo Achillis was divided. Dangerous symptoms occurred after 10 mins.' administration, when second part of O. had begun. (Excision of astragalus.) Tongue well pulled forward. A.R. (Sylvester) for 5 mins. Breathing re-established and O. completed without further trouble. AN.

602.—M. 7 $\frac{1}{2}$. Delicate.

Sept., 4.50 p.m. For adenoids.

C., on lint. \bar{v} i. 8 mins.

Pt. got very faint and R. bad, so O. was postponed. AN.

603.—M. 65. Good. Bowel ruptured.

July, 5.35 p.m. O. as for inguinal hernia.

C., on Skinner. \bar{v} iv. 35 mins.

Pt. in first stage of collapse. Condition not aggravated by O. At one stage Pt. got overdose, became pale, breathing with very long intervals, and pulse of about 56; looked very bad. Administration stopped. Recovery followed. Very little more given. After-effects—nil. AN.

604.—F. 8. Very anæmic. Had had C. seven times.

Sept., 1 p.m. For hip disease.

C., on towel. \bar{v} ii. 12 mins.

Thirty secs. to go under. Pupils widely dilated. No reflexes. Pulse quickly went up from 80 to 120. Breathing became very shallow. Left off C. for 5 mins. Began, after C. recommenced, to get a very blue tint of lips, and gradually faint. Pulled round after bathing her face in hot water. Sickness afterwards. AN.

605.—F. 6. Well nourished. Pulse rather weak before anæsthetic commenced. Heart normal. Said to suffer much from cold feet and hands. No history of any previous anæsthesia. Breakfast as usual. Beef-tea at 12, ditto at 3 p.m. O. at 5 p.m.

Oct., 5 p.m. For large abscess in thigh, extending into pelvis.

C., on lint. Rather less than \bar{v} ii. 8 mins. (about). Same C. used for other Pts. without bad effects.

Took C. quietly, no struggling. R. was shallow at first; deeper as anæsthesia progressed. Pulse suddenly became weak during examination of limb, prior to O. Conjunctival reflex had disappeared; limbs flaccid; but some movements of legs during manipulation. C. was immediately stopped; but pulse became weaker still, and in $\frac{1}{2}$ min. was imperceptible at wrist (no irregularity of action). Breathing became shallow, but remained regular. Colour remained fair; rather pale, but no cyanosis. Ammonia applied to nostrils. A few drops of brandy from a spoon were poured down the throat; this caused some choking and cyanosis. R. stopped for a few seconds, but recommenced on lowering Pt.'s head and raising feet. Brandy enema \bar{v} $\frac{1}{2}$ was then given. Pulse then became again perceptible and improving. Slow recovery (15 mins.). O. abandoned. AN.

606.—F. 23. Plethoric, fat. Prolapse of anus.

May. For prolapse.

C., method unstated. \bar{v} iii. 15 mins.

Immediately after being deeply anæsthetised Pt. became very faint and cyanosed, pulse almost imperceptible, and R. shallow. The anæsthetic was at once stopped. Brandy rubbed inside the mouth. Pt. gradually recovered. AN.

607.—F. 33. Weak. Extremely nervous. Suffering from uterine fibroids.

Sept., 10 a.m. C. given for diagnostic purposes.

C., on towel. 15 mins.

Pulse suddenly became imperceptible, face extremely pale, and R. almost, if not quite, ceased. Pulse failed certainly before R. Nitrite of amyl \mathbb{M} iii, diluted with water, was in readiness and was at once injected subcutaneously. In a few seconds, face began to flush, and pulse could be felt at wrist. After-effects—very sick for days. AN.

608.—M. 21. Good. Pt. had not been prepared.

Aug, 11.30 a.m. Amputation of finger.

C., on lint. \bar{v} viii. 40 mins.

Took anæsthetic very quietly. Just before conclusion of O., pulse suddenly failed; no impulse over præcordium. Pt. livid. R. did not stop. Applied battery over heart, and at root of neck. Injected \bar{v} ii E. Pulse came back again in about 5 mins. AN.

609.—M. 2 months. Pale and anæmic. Mother had just been suckling it.

July. For phimosis.

C., on towel. \bar{v} i $\frac{1}{2}$. 10 mins.

Pt. stopped breathing, lips very pale, and had a faint three times in O. Inversion brought it round. No vomiting. AN.

610.—M. 2 months. Good.

Nov., 12.20 p.m. Circumcision.

C., on lint. \bar{v} i $\frac{1}{2}$. 10 mins.

R. suddenly stopped, and pulse became imperceptible just as child became anæsthetised, before O. commenced. Inversion. Hot cloths to abdomen. Amyl nitrite. Recovery. AN.

611.—M. 3 weeks. Good. Healthy-looking.

March, 4.25 p.m. Circumcision.

C., on lint. \bar{v} i. 15 mins.

Towards finish of O. pulse became interceptible. Heart sounds inaudible. Very pale and bluish-white. R. continued for quite a minute. Inversion. Amyl nitrite. Hot cloths to head. Came round. AN.

612.—M. 4 $\frac{1}{2}$. Fairly strong.

Jan. Enucleation of eyeball.

C., on towel. \mathbb{M} xlvi. 15 mins.

O. lasted about 10 mins. Pt. collapsed suddenly while eye was being bandaged. R. ceased, face became pallid, no pulse at wrist. Inversion, with pressure on abdomen and external stimulation. R. returned slightly and then ceased. Second inversion. R. returned. Pt. put to bed with hot water bottles. Pulse feeble and intermittent afterwards. Pt. soon rallied. After-effects—sickness, prostration, and pallor. AN.

- 613.—F. In fair health.
Feb., 9.20 a.m. Excision of mamma and axilla.
C., method unstated. 60 mins. (Afterwards E.)
Very feeble pulse when C. was first administered. She got under the influence of C., and O. was just commenced, when pulse became imperceptible, pupils dilated, lips livid, and R. ceased. Table elevated, warm sponges to præcordium. A.R. After a short time R. was restored. E. then substituted for C. No other serious symptoms. AN.
- 614.—F. 13. Good.
Nov., 1 p.m. Scraping small cervical glands.
C., on towel. \bar{v} . 15 mins.
Pt. took the anæsthetic extremely badly. Heart and R. both stopped. Heart undoubtedly stopped first; case apparently being one of sudden cardiac syncope. Pt. was inverted; tongue drawn forward. A.R. and mechanical squeezing of heart performed; full dose of E. hypoderm. Good recovery in a few mins. Heart resumed beating. Pt. apparently at one period quite moribund. No after-effects. AN.
- 615.—M. 37. Healthy. (1st administration.)
July, 9.20 a.m. Removing piles.
C., on modified Skinner. \bar{xiv} . 45 mins.
On recovering from C., Pt., on being placed on back, suddenly became pale. Pulse unappreciable. R. very shallow. A.R. E. hypoderm. Pt. made a few abortive attempts at vomiting, but did not appear to be able to vomit. Recovery in 15 mins. AN.
- 616.—M. 46. Tubercular. (2nd administration.)
Jan., 9.20 a.m. Excision of shoulder.
C., on Skinner. \bar{xii} . 20 mins. (Afterwards E.)
R. became very feeble. Pulse disappeared at wrist, pupils dilated. A.R. Recovery, and E. substituted. AN.
- 617.—M. 44. Healthy, but enfeebled.
Jan., 11 a.m. Scraping ulcers of thigh.
C., on modified Skinner. \bar{xii} . 25 mins.
R. became feeble, pupils dilated, and pulse seemed to cease. A.R., with tongue drawn forwards, brought him round. AN.
- 618.—M. 7. Apparently perfectly healthy.
Oct. For cleft palate. (Abandoned.)
C., on lint. \bar{i} . to \bar{v} iss. 5 mins.
Pt. went under quietly in 3 or 4 mins. Just as O. was about to begin, pulse suddenly failed, and soon became imperceptible. Then, and not till then, did the R. become affected, and became feeble and shallow. Face pale. C. was stopped at first bad symptom, head lowered, and body and legs raised. R. never stopped completely, and the chest only had to be compressed two or three times before R. was good again; but pulse remained imperceptible for about 2 mins., then gradually returned, and was as good as ever in 5 mins. Systolic murmur was then heard at base and apex (? congenital). O. abandoned. After pulse was re-established, Pt. very soon came round from effects of C. AN.
- 619.—M. 15 months. Good.
July, 2 p.m. Circumcision.
C. Meth., on flannel. \bar{i} . 15 mins.
Failure of heart and blanching. C. withdrawn and A.R. Recovery. AN.
- 620.—F. Good.
May, 4 p.m. Amputation of breast.
C., on towel. \bar{vi} . 20 mins.
Went pale. Lips livid. Pulse perceptible. R. ceased. A.R. Wet flipping. Hypodermic E. Recovery. AN.
- 621.—F. 1. Rickety. Congenital cataract.
March, 1.30 p.m. For cataract.
C., on towel. \bar{ii} . 15 mins.
In middle of O. child went very pale. Lips lost colour. R. ceased. Child inverted. Brief A.R. Soon began to breathe again, soon all right. AN.
- 622.—M. 6. Good.
Sept., 9.30 a.m. For genu valgum.
C., method unstated. 30 mins.
Pt. became faint and R. ceased. A.R. performed. Soon restored. AN.
- 623.—M. 13. Florid, good physique. First time of taking anæsthetic. No previous drugs. No previous preparation. Food 3 hours before. No purgative.
April, 12.30 p.m. Circumcision.
C. (Meth., not exposed to light), on double fold of lint. Given with plenty of air. \bar{v} . 15 mins. No bad symptoms with others.
Not much struggling. No spasm. Went off readily. Anæsthesia deep. Pulse at wrist could not be felt, after which eight or ten Rs. occurred. R. then ceased. Inversion. A.R., rectal injection of brandy. Subcutaneous of E. Came round. AN.
- 624.—M. 9. Apparently healthy.
March, 3 p.m. Sounding bladder.
C., on lint. 10 mins.
Sounding was begun. Pt. became pale, and pupils dilated, and were insensible to light. Impulse of heart barely to be felt. R. shallow, sighing. Failure of R. and pallor noticed at same time. Brandy subcutaneously; head lowered, A.R. Recovered in about 11 mins. AN.
- 625.—F. 1½. Poorly nourished, weak.
Feb., noon. For cyst over shoulder.
C., on towel. \bar{ii} . 30 mins.
Pt. became very pale and cold. Stopped breathing. Was brought round by A.R. A second time R. and circulation stopped. A.R. tried without effect. Intermittent compression of præcordium brought her round. AN.
- 626.—M. 18 months. Good.
Nov., 10 a.m. Examination of, and scraping abscess about, hip.
C., method unstated. 12 mins.
After-effects—vomited for several hours to such an extent as to become collapsed. AN.
- 627.—M. 24. Good.
April, 11.15 a.m. Reduction of dislocated shoulder.
C., on towel. \bar{xxxii} . 90 mins.
R. ceased after 15 mins.' administration; pulse beating feebly; pupils semi-dilated; tongue forcibly pulled out; no effect. A.R. for 1 min. R. became restored. AN. (? O.)
- 628.—M. 3 weeks. Feeble.
Oct., 10.30 a.m. For cleft palate.
C., from mask and Junker with catheter.
Took C. badly from the first, holding breath for long intervals. Difficult to get under. When nearly insensible, Junker with catheter in mouth was substituted for mask. Two or three whiffs given, and Smith's gag applied. This caused interference with R., and had to be removed. Child showed signs of coming round, and a few more whiffs were given. Gag re-applied, R. again ceased. Gag removed, but child did not breathe and turned ashy in colour. A.R. (Sylvester's) at once commenced, tongue being pulled forward by forceps. Natural breathing was gradually re-established, but child remained collapsed for some time. Ammonia was applied to nostrils during A.R. "Child probably got a full dose of C., and the stopping of R. by gag caused it to accumulate in system." AN. O.
- 629.—F. 7. Good.
Aug., 9.30 a.m. For talipes equinus.
C., on Esmarch's inhaler. \bar{ii} . 20 mins.
Vomit passed into larynx. Child asphyxiated for a short time. Used nitrite of amyl capsules. Pt. revived at once. Sick afterwards. AN. PT.

- 630.—M. 3 weeks. Debilitated.
April, 4.50 p.m. For hare lip.
C., on towel. \bar{v} ii. 20 mins.
Child stopped breathing. Inversion and cold flipping. R. restored. AN. PT.
- 631.—F. Debilitated.
May, 4.45 p.m. For uterine polypus (fibroid).
C., on towel. \bar{v} viii. 30 mins.
Pt. stopped breathing. Went pale. A.R. and wet flipping.
Recovery. AN. PT.
- 632.—M. 46. Debilitated. Bronchitic.
April, 4 p.m. Opening perineal abscess.
C., on towel. \bar{v} viii. 10 mins.
Stopped breathing. A.R. AN. PT.
- 633.—F. 16. Very anæmic. Spinal abscess.
Aug. Opening spinal abscess.
C., on towel. \bar{v} iii. 25 mins.
Soon went under. After abscess opened grew very faint.
First, breathing became very shallow; secondly, pulse went in one hand. Could just feel it in other, then it became smaller. R. ceased. A.R. brought her round. AN. PT.
- 634.—F. 71. Old, feeble. Little sleep for some nights on account of pain. \bar{v} $\frac{1}{2}$ brandy, in water, before O.
Jan., 2.30 p.m. Enucleation of eyeball.
C., of Skinner. \bar{v} iii. 8 mins. (Afterwards E.)
After $2\frac{1}{2}$ mins. R. became very rapid and shallow. Inhaler removed further from face. In another $\frac{1}{2}$ min. R. entirely ceased. Pulse continued, but was feeble. After waiting 30 secs. for R., A.R. was begun. One min. later a natural gasp was taken. \bar{v} $\frac{1}{2}$ E. was placed on inhaler, and anæsthesia was continued with it. O. finished as quickly as possible. AN. PT.
- 635.—M. 30. Heart weak and cavity at one apex of lung.
May, 12.30 p.m. Amputation of forearm.
C., method unstated. \bar{v} viii. (Afterwards E.)
Ten minutes after anæsthesia was produced, *i.e.*, 20 mins. after beginning C., Pt. became cyanotic and R. ceased; pulse rapid and feeble; conjunctival reflex absent; tongue was forcibly drawn out, and A.R. (Sylvester) adopted for 2 mins. Then R. recommenced and the administration was continued with E. AN. PT.
- 636.—F. 36. Suffering from myxœdema.
April, 2 p.m. Restoration of old ruptured perineum.
C., on flannel mask. \bar{v} xii. 30 mins.
R. unsatisfactory throughout. Towards end of O., even with the greatest care and watchfulness, R. ceased. Head pulled over edge of table. A.R. (Sylvester) for a few mins. Recovered. No after-effects. AN. PT.
- 637.—M. 52. Good. Alcoholic.
May, 9.20 a.m. Castration.
C., on corner of towel. 10 mins. (Afterwards E., then C.)
Took some time to go under. Struggles and spasms. Had only been under C. for 10 mins. when R. suddenly ceased. Tongue drawn out, jaw brought forward, no effect. Then A.R. for 3 or 4 mins., then natural R. resumed. E. then substituted. Pt. was moaning and struggling pretty forcibly and did not go under E. After 15 mins. of this, C. was resumed, and continued till end without bad symptom. AN. PT.
- 638.—M. 2. Poor in development. No food for 3 hours. Room rather cold.
Feb. Enucleation of eye. Very little bleeding.
C., on mask. 30 mins.
Child became very pale and pulseless just before removal of globe, and constantly relapsed into same state. R. very shallow, but remained regular, although pulse was absent at wrist. Mucous membrane became excessively pale. Enema of brandy \bar{M} x given, ammonia to nostrils, warmth to body. Pulse disappeared again, when he was apparently quite recovered, on head being moved to put a bandage on. Ammonia on cotton wool put to nostrils. AN. PT.
- 639.—F. 2. Strumous, weak, anæmic.
Oct., 9 a.m. Abscess at knee opened and drained.
C., on covered frame. \bar{v} $\frac{1}{2}$. 10 mins.
After the administration of the C. was concluded, the child suddenly lost all colour, the pupils dilated, the pulse was imperceptible, and R. ceased. The child was held up by the legs, oxygen was passed through the nostrils by a tube, and the lips were moistened with brandy. Breathing commenced in about $2\frac{1}{2}$ mins., and the child recovered. AN. PT.
- 640.—F. 30. Anæmic. Alcoholic. Slight bronchitis. Purgative before O. Temp. 56° to 60° . Pt. flat on back. Brandy \bar{v} i before O.
Nov. Enucleation of eye.
C., on towel. \bar{v} iii $\frac{1}{2}$. 16 mins.
Long excitement stage. Struggled considerably and vomited a little. Pulse became weak. Then pallor and cessation of R. Bleeding ceased when R. stopped. Inversion, tongue pulled forward. A.R. (Sylvester). Recovery soon. AN. PT.
- 641.—F. Cardiac presystolic bruit. Defective circulation. Repair of perineum.
C. Meth., on towel. \bar{v} viii. 25 mins.
Nearly died under C. Heart failed; skin and lips became blue; R. failed; pupils dilated. A.R. Recovery. AN. PT.
- 642.—M. 5. Very weak and ill.
May, 4.40 p.m. Excision of hip.
C., on towel. \bar{v} iv. 30 mins.
Child stopped breathing. A.R. Wet flipping. Recovery. Vomited curdy milk afterwards. (9 hours after food.) AN. PT. O.
- 643.—M. 19. Anæmic, after first O. (12 days ago). Mist sennæ on previous evening, and enema in morning; one pint beef-tea 6 a.m. O. at 11.50 a.m.
March, 11.50 a.m. Secondary amputation through shoulder-joint.
C., on Skinner. \bar{v} vi. 40 mins.
Pt. took C. quietly and well; went under in 5 mins. Took it well until O. almost finished, when suddenly R. failed, but pulse still felt in facial and radial arteries. E. \bar{M} xxx injected subcut. A.R. at once with success. Pt. again breathing after space of 1 min. Plenty of fresh air allowed to enter room. C. not again administered, as O. almost concluded. Two further injections of E. (\bar{M} xv) at intervals of a few mins. Tongue was pulled forward and head well lowered. After-effects—none. AN. PT. O.
- 644.—F. 38. Bad. Subject to fainting attacks. Has mitral murmur.
Jan., 5.30 p.m. Cyst of antrum opened.
C., on towel. \bar{v} $\frac{1}{2}$. 20 mins.
R. stopped. Became livid. Pupils widely dilated. Flipping with wet towel. A.R. Injection of brandy per rectum. E. subcutaneously. Recovery. AN. $\left\{ \begin{array}{l} O. \\ PT. \end{array} \right.$
- 645.—F.
Sept. For tumour of upper jaw.
C., with Junker. \bar{v} viii. 40 mins.
Pt. stopped breathing soon after start of O., from pieces of growth falling through glottis. Laryngotomy was performed and the tube sucked, blood clots and masses of growth being got away through the tube. A.R. brought Pt. round. O. finished. Did well subsequently. O. AN.
- 646.—M. 66. Emaciated. Carcinoma of rectum.
Feb., 3 p.m. Excision of lower part of rectum.
C., on towel. \bar{v} xiii $\frac{1}{2}$.
During O., pulse and R. both steady and regular. Became blue whenever chin was not pulled forcibly forwards. Towards close, when \bar{v} xii of C. had been inhaled, he was becoming pale, but pulse was fairly strong, and quite regular. On completion of O., whilst being cleaned up, he became faint. Pt. was completely covered up, and as soon as possible was taken down

from the lithotomy position. Pulse was feeble, but still regular, and R. steady and deep. After being moved up on to table, the pulse became imperceptible at wrist. Brandy and E. hypoderm. Nitrite of amyl capsule inhaled. After 20 secs. R. ceased. A.R. was set up. In a few seconds he breathed naturally again, but pulse remained imperceptible. Further injection of E., and kept warm. Recovery. O. $\left. \begin{array}{l} \text{AN.} \\ \text{PT.} \end{array} \right\}$

647.—F. 18. Not good.

July, 11.30 a.m. Amputation at lower third of leg.

C., on sponge. $\text{℥}80$. 17 mins.

Collapse. Pulseless after removal from O. table. Brandy $\text{ʒ}ii$. by rectum. Strong ammonia. O. $\left. \begin{array}{l} \text{AN.} \\ \text{PT.} \end{array} \right\}$

648.—M. 63. Weak.

Feb., noon. Abdominal section.

C., on towel. 37 mins. (Afterwards E.)

R. stopped during O. Tongue pulled forward. Inversion. Pressure on ribs. Recovery. During O. he had several gushes of vomiting. After-effects—slight vomiting. PT. AN.

649.—M. Hard drinker for many years. It was anticipated that he would be a bad subject for an anæsthetic.

June. Removal of lipoma from back.

C., on lint. Administered with great care. $\text{ʒ}i$. 5 mins.

C. administered with great care. After a few inhalations R. ceased. Deep cyanosis. Pupils widely dilated. He was almost pulseless. Tongue dragged forward. A.R. performed. Only with great difficulty was normal breathing restored. O. performed without an anæsthetic. PT. AN.

650.—M. 55. Nearly suffocated from laryngeal obstruction. (Tertiary syphilitic.) Breathing had been obstructed for 24 hours. Quite exhausted.

July. Tracheotomy.

C. Few drops from drop-bottle.

After a few whiffs of C. he fell back motionless, and without any pulse. Trachea at once opened. Tube inserted. A.R. immediately. Heart mechanically pressed upon. In 7 or 8 mins. he came round. No bleeding when incision was made for tracheotomy. Made good recovery. PT. AN.

651.—F. 48. Debilitated.

March, 4 p.m.. Amputation of breast for cancer.

C., on towel. $\text{ʒ}iii$. One hour.

Marked collapse and lividity. Patient very fat. Heart feeble. Vomited afterwards. PT. O. AN.

652.—M. 4. Croup. Bad. Much dyspnœa, and retraction of chest.

July, 8.30 p.m. Tracheotomy.

C., on lint. $\text{ʒ}i$. 15 mins.

Much venous congestion after incision into the trachea, tube could not be introduced at first. Consequently child became much cyanosed, and finally ceased breathing. Tube was then introduced easily, and A.R. continued for 5 mins., at the end of which time recovery ensued, with easy tracheal R. PT. $\left. \begin{array}{l} \text{AN.} \\ \text{O.} \end{array} \right\}$

653.—F. 45. Healthy. Cystic enlargement of right lateral lobe of thyroid.

Trachea probably compressed by enlarged thyroid.

March, 3.15 p.m. Incision of cyst and then packing with gauze.

C., on towel. $\text{ʒ}i$ $\text{℥}xx$. 25 mins.

Pt. completely anæsthetised in 8 mins. Pt. then laid on her back, with neck elevated by cushion, as for tracheotomy. O. commenced. After 17 mins., Pt. ceased to breathe. The heart was still beating strongly; pupils dilated; corneal reflex gone, skin livid. A.R. commenced. Brandy enema. E. $\text{ʒ}i$ hypodermically. Then mouth-to-mouth inflation; but it was A.R. which, in 5 mins., restored normal breathing. O. finished

in 25 mins. "In this case it was thought that pressure on the trachea in packing with gauze, which might have been somewhat increased by a tendency to hæmorrhage, had much to do with the apnœa." AN.

O.

654.—M. 40. Good. Castor oil. No breakfast. Woollen clothing. Temp. 65° . Lying on back.

For epithelioma of lip. Profuse hæmorrhage.

C. Meth., on towel. $\text{ʒ}xi$. 49 mins.

For 5 mins. struggled violently. Pulse and R. good; not profoundly under; pulse failed first. Immediately on cessation of anæsthetic Pt. collapsed, evidently fainting; no vomiting; shock. Tongue kept pulled forward from beginning of O. Head lowered. A.R. (Sylvester) and squeezing chest. Nitrite of amyl. Pt. came round. AN.

O.

655.—F. 39. Bronchitic, and old for her age. Pt's. hair nearly white, though only 39. No cardiac murmur. Never had anæsthetic previously. No food for 14 hours. Room at comfortable temperature. Purgative previous evening.

April, 10.30 a.m. Removal of appendages for myoma.

C. Meth. (same as used for case 597), on towel. $\text{ʒ}vi$. 25 mins.

Pt. was very excited in taking C. and struggled a little at first; then quiet with full Rs. Everything went well till after abdomen was opened and the adherent appendages were being dragged up. Then sudden blanching of lips, wide dilatation of pupils, and insensitive conjunctiva. R. became gasping and slow. A.R. (Sylvester) at once commenced, and head depressed over end of table. O. temporarily suspended. Slowly recovered, and O. recommenced. Pt. again collapsed. A.R. recommenced. Pt. recovered somewhat, but O. was concluded during performance of A.R. for the greater part. Whenever either of the pedicles were pulled on, pupils dilated widely, lips blanched, and R. became laboured. Very sick afterwards. AN. $\left. \begin{array}{l} \text{O.} \\ \text{PT.} \end{array} \right\}$

656.—M. 52. Poor. Pt. had an enormous collection of pus on the left side.

July. For empyema.

C., on flannel. 5 mins.

Breathing bad. C. had to be stopped, owing to embarrassed breath movements, even before he was under. O. completed without any anæsthetic. AN.

PT.

657.—M. 8. Good (*sic*).

June, 12 a.m. For prolapsed iris.

C., on single fold of towel. (Afterwards ACE.)

Immediately on starting pupils became very widely dilated, the iris almost nil. Pulse feebler, although it was very feeble before O. Colour very pale. Breathing shallow. The anæsthetic was given very slightly, and then changed for ACE. Pt. was bad all through. On coming round he vomited a considerable quantity of curdled milk and grumous matter. "In my opinion the symptoms were due to child being very feeble, and badly nourished, and also stomach being full. The anæsthetic was probably not to blame." AN. PT.

658.—M. 24. Accident—blanched from loss of blood.

May, 1.30 p.m. Tying brachial artery and vessels in front of elbow, etc.

C., on one fold of towel. 1 hour.

Bleeding stopped—breathing stopped—no pulse—lips blue—seemed quite dead. Intermittent compression of præcordium was kept up for some time, and he came round. Three days afterwards amputation through upper third of humerus was performed with no ill effects under C. AN.

PT.

659.—M. 60. Enormously stout and florid. Well marked dyspnoea.

Feb. Tracheotomy.

C., on Skinner. $\bar{\text{v}}$ iv. 20 mins.

Became very cyanosed. Pulse at wrist imperceptible just before opening the trachea. C. discontinued at once. Pulse at once improved, and cyanosis faded away. Assistant pronounced Pt. dead. No after-effects. AN.

PT.

660.—M. 7. Weakly. Pt. on hot water bed. Lying on face with pillow below chest and neck.

Nov., 10 a.m. Laminectomy for disease.

C., by open method. 25 mins.

Took C. well at first. 25 mins. after beginning, R. began to be very shallow. C. at once removed; child laid on back; heart became very feeble in its action. Pupils moderately dilated. R. was now as if there was some laryngeal obstruction; short croupy inspirations. Tongue pulled well forward. A.R. Brandy per rectum. Child gradually improved. AN.

O.

PT.

661.—M. 2. Very weak.

June. Amputation through thigh.

C., on towel. 30 mins.

Child extremely collapsed both during and after administration. At one time quite pulseless, with sudden stoppage of R. Brandy enemata administered. Quickly revived. AN.

O.

PT.

662.—M. 6. Good.

Nov., 11.25 a.m. For old left empyema.

C., on lint. $\bar{\text{v}}$ vii. 29 mins.

C. having been discontinued, and pupils contracted, whilst child only just under its influence, cavity was being washed out with warm lot. boric., child's pulse and R. suddenly ceased with cyanosis. Tongue pulled forward. A.R. (Sylvester). Injection of E. Hot towels to head and epigastrium. Child recovered. "Attack of syncope, due probably to washing out pleural cavity." AN.

O.

PT.

663.—F. 17. Bad. Cervical caries.

Dec., 11.30 a.m. Scraping glands in neck.

C. Method unstated. 25 mins.

Pt. lost a good deal of blood, and fainted during O. A.R. Recovery. AN.

O.

PT.

Cases in Class II.

Cases in B γ II, Anæsthetic No. 1.

664.—M. 59. Greatly collapsed. Severe railway accident. Two ribs also broken.

Nov., 12.30 p.m. Amputation through thigh.

C., method unstated. 25 mins.

When under C., A.R. had to be performed, and E. given four times hypodermically. Afterwards hypodermics of E., strophanthus, and brandy.

665.—M. 10. Good.

Dec. For whitlow of thumb.

C., method unstated. $\bar{\text{v}}$ i.

R. stopped about 2 mins. after commencement. A.R. Brandy $\bar{\text{v}}$ i hypodermically. Pt. recovered.

666.—F. 10. Diphtheria. Exhaustion.

Dec., midnight. Tracheotomy.

C., method unstated. $\bar{\text{v}}$ i. 5 mins.

R. ceased. A.R., etc., restored Pt.

667.—F. ? Age. Feeble.

Plastic for hare lip.

C., method unstated. $\bar{\text{v}}$ i $\frac{1}{2}$.

A.R. (No symptoms recorded).

668.—M. 33. Moderate.

Oct., 3 p.m. For necrosis of jaw.

C., on towel. $\bar{\text{v}}$ v. 35 mins.

Laryngotomy necessary for hæmorrhage.

669.—M. 40. Big. Anæmic-looking. Pulse 55. Atheromatous. Tendency to dilated heart.

Dec., noon. For varicose vein.

C., method unstated. $\bar{\text{v}}$ iv. 35 mins.

Everything went well until surgeon unluckily opened vein. In about 20 secs., as I was feeling his pulse (beating then at 90) it suddenly disappeared at temporals and wrists. Table was raised at foot. Strychnine injected. All this time R. continued quietly. Breathing after 1 min. began to fail. A.R. E. given. Then pulse began to come full and strong (40 to the min.). R. began again (35 to the min.).

670.—M. 13. Good.

May, 11 a.m. Enucleation of bulbus.

C., on one fold of towel. $\bar{\text{v}}$ iii. 30 mins.

Pulse stopped shortly after division of optic nerve; then R. stopped. Pupil of good eye widely dilated. A.R. tried for a time and given up. Boy brought round by intermittent compression of præcordium.

671.—Child. 9. Collapsed.

July. Reduction of intussusception.

C., method unstated. 45 mins.

Very much collapsed after O. Inversion. Brandy per rectum. Pulse improved. Vomited afterwards.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 2.—ETHER.

Cases in Class I.

Cases in B γ I, Anæsthetic No. 2.

672.—M. 14. Fair condition.

April, 1.30 p.m. Amputation of thigh.

E., method unstated. $\bar{\text{v}}$ iv. 45 mins.

Pt. became very collapsed and ceased breathing, was very blue all the time under the E. On stopping the anæsthetic and clearing out the fauces (in which there was a great quantity of mucus) Pt. gradually recovered. AN.

673.—F. 28. Good. Suppurating axillary glands.
Jan., 10.45 a.m. Scraping and excising glands.
E., with Clover. \bar{v} iv. 50 mins.
R. stopped after cessation of administration, whilst arm was being bandaged to side. A.R. resorted to for 10 mins. Poles of galvanic battery applied to phrenics. R. recommenced after 10 mins. Pulse felt throughout. AN.

674.—F. 40. Good.
July. For hæmorrhoids.
E. Meth., with Clover. \bar{v} iii. 35 mins.
Sudden depression 10 mins. after E. taken away. Tongue drawn out. A.R. (Howard's, etc.) for one hour. AN.

675.—M. 57. Cachectic appearance. Emphysematous chest.

March, 3.25 p.m. Castration for encephaloid testis and cord.
E., with Clover. \bar{v} i½. 25 mins.

Went under well, with the exception of an attack of coughing lasting 1 min. After O. had been continued for about 15 mins. and he had lost \bar{v} v or \bar{v} vi of blood, and before cord was divided, he became very blue and rather collapsed. Brandy administered by rubbing gums with lint soaked in it. This caused improve-

ment in condition, which, however, remained critical until sutures were introduced. He was well under E. when symptoms arose. During last 10 mins. no more E. was given. Brandy \bar{v} i½ used in all. No after-sickness. AN. PT.

676.—F. 16. Weak. Whole of left side of face and gums was practically a huge nævus.

Oct., 10 a.m. Extraction of teeth.

E., with Clover. \bar{v} i. 15 mins.

Very severe hæmorrhage. Blood entered larynx. Laryngotomy for hæmorrhage. O. AN.

677.—M. 60. Suffers from repeated attacks of angina. Hæmorrhoids and fistula.

Nov., 10 a.m. Ligaturing internal piles.

E., with Clover. \bar{v} ii½. 20 mins.

Cyanosis. R. irregular and suspended for some time during administration. Consciousness soon returned after removing the anæsthetic. The immediate effects of the E. passed off satisfactorily, but an hour or two afterwards he was seized with severe angina, which continued for 48 hours or more. His life for some time was in a critical state. He was bathed in a clammy sweat, with an almost imperceptible pulse. PT. AN.

Cases in Class II.

Cases in B γ II, Anæsthetic No. 2.

678.—F. 24. Weak and anæmic. Typhoid previously.
June, 4.30 p.m. Amputation through lower third of thigh.
E., with Clover. \bar{v} iii. 45 mins.
After-effects—sickness. Collapse and profuse sweating.
Transfusion of saline solution. With beneficial effect.

679.—F. 29. Fair.

March. Disarticulation of shoulder for tumour.

E., with Clover. 30 mins.

About middle of O. pulse became very feeble. Given two enemata of brandy. Head lowered. Stitching of flaps postponed till next day. O. completed next day under E.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 3.—“GAS AND ETHER.”

Cases in Class I.

Cases in B γ I, Anæsthetic No. 3.

680.—M. 24. Good. First anæsthetic.
Jan. Excision of eyeball.
G. and E., method unstated. Meth. \bar{v} ii. 10 mins.
R. ceased suddenly. Became cyanosed. A.R. used, and ammonia inhalations. Tongue pulled forward. Presently was all right. AN.

681.—M. 30. Good.
March. For fistula.
G. and E., with Ormsby. \bar{v} ii½. 30 mins.
Ceased breathing. Pulse good. A.R. for about 5 mins. AN.

682.—F. 29. Raynaud's disease.
May. Syme's amputation.
G. and E., with Clover. (Pure E.) \bar{v} iii. 40 mins.
Just as anæsthesia was complete, R. stopped. Pulse weak. Head drawn over top of table. A.R. continued. After a time R. was restored. Only \bar{v} iii E. for O. lasting 40 mins. AN. PT.

683.—? Sex. 36. Red face. Very fat. Double chin. Heavy.

July. For fistula.

G. and E., with Clover. 20 mins.

Had a good deal of air, but towards the end became bluish.

Only at “2” (Clover) got very blue and black. A.R. Tongue

pulled out. Head over end of table. Vomited once afterwards.

AN. PT.

684.—F. 34. Bad. Pulse 120. Temp. 103.6°.

Nov. Enucleation of fibroid.

G. and E., with Clover. \bar{v} ii. 30 mins.

Took anæsthetic badly, becoming very blue. Then, few moments later, suddenly R. ceased. A.R. Pt. came round. Pulse remained fairly good. AN. PT.

Case in Class II.

Case in B γ II, Anæsthetic No. 3.

685.—F. Anæmic.
Aug. Abdominal section.
G. and E., with Clover. (Afterwards C.)

Took G. and E. very well, and very little. Then in 5 mins. became cyanosed. Head on one side. A.R. Came round. Continued with C. Vomited slightly once afterwards.

CASES IN CONNECTION WITH ANÆSTHETIC No. 4.—THE A.C.E. MIXTURE.

*Cases in Class I.*Cases in B γ I, Anæsthetic No. 4.

686.—F. 24. Good.

July, 10 a.m. For stenosis of cervix uteri.

ACE., with Rendle's mask. Quantity not known. \bar{z} ii were put in bottle at start, but bottle was upset. About 10 mins.

Pt. very nervous, laughing during early part of administration, which could not be controlled. O. was just commenced when slight cyanosis came on. Took pulse and found it extremely slow and failing. Then pulse at wrist could not be felt, and R. almost immediately ceased. Tongue was well forward, pupils widely dilated, and conjunctiva insensitive. Commenced A.R. by simple pressure on both sides of chest, air entered freely. This was continued for over 5 mins. Colour rapidly improved, and pulse at wrist returned, and increased gradually in strength. Then Pt. commenced breathing herself. Symptoms appeared to be those of syncope or chloroform poisoning. O. was abandoned, though I desired to continue with E. I think sufficient air did not enter through air-holes in Rendle's mask, on account of sponge being pushed in too far, and that an overdose was administered. AN.

687.—M. Fat, alcoholic man. Very nervous. Had brandy \bar{z} i before O. (3rd administration.)

Aug., 9.30 a.m. Amputation of first toe.

ACE., method unstated. \bar{z} ss. (afterwards E.) \bar{m} xxx of ACE. had been given, the Pt. struggling and fighting, having to be held down, when the pulse stopped, and Pt. became cyanosed. Heat was applied to the cardiac region and A.R. used for a few mins. The pulse was felt at the wrist, and in 5 mins. R. was voluntary. E. was substituted, and the O. finished. Pt. was sick afterwards. AN. PT.

688.—M. 70. Recovering from influenza. Subject all his life to severe fainting fits, followed by copious action of the bowels. No valvular disease.

Feb. Extraction of teeth.

ACE., from cone with sponge. \bar{z} ii. 20 mins.

He took the anæsthetic well, and was under in about 10 to 15 mins. He was sat up in the chair for the teeth to be extracted, and a few stumps had been removed when his pulse failed altogether and he became cyanosed. He was put in a recumbent position and two capsules of nitrite of amyl were broken and held to his nose. He gradually recovered, but remained faint for over an hour. As soon he came to he had a copious action of the bowels. AN. PT.

CASES IN CONNECTION WITH ANÆSTHETIC No. 5.—MIXTURES OF CHLOROFORM AND ETHER
IN VARIOUS PROPORTIONS.*Cases in Class I.*Cases in B γ I, Anæsthetic No. 5.

689.—F. 47. Good.

Dec. For scirrhus of breast.

Mixture of E. 7 parts and C. 1 part, with Clover. \bar{z} i $\frac{1}{2}$. 45 mins.

After 10 mins. pulse stopped, and then R. A.R. was immediately started, with battery (Faradic) and ammonia to nostrils. Tongue pulled forward. After one min. R. and pulse became normal. O. resumed and finished. AN.

690.—F. 28. Anæmic.

Nov. Removal of appendages.

Mixture of C. (Meth.) 1 part and E. (Meth.) 2 parts, with Clover. \bar{z} i $\frac{1}{2}$. 35 mins.

Sudden heart failure, blanching, and sudden and extreme dilatation of the pupil. R. ceased. Had been pale for a few

mins., and administration had been suspended. Then rapidly worse. A.R. Rapidly came round. No more bother. AN.

691.—M. 41. Feeble. No valvular lesion. Aperient previous night, enema in morning. Early breakfast and only a little beef-tea 2 hours before O.

Sept. Amputation of poisoned finger.

Mixture of E. 7 parts and C. 1 part, with Clover, \bar{z} $\frac{1}{2}$. 10 mins.

R. ceased directly Pt. was under. Pulse could not be felt. Faradic battery, amyl nitrite, and A.R. at once set to work. Pt. came round in about 3 mins., but lapsed again as soon as A.R. stopped. O. was finished without anæsthetic. Fainted when wound was dressed next day. AN. PT.

CASE IN CONNECTION WITH ANÆSTHETIC No. 6.—THE A.C.E. MIXTURE FOLLOWED BY CHLOROFORM.

*Case in Class I.*Case in B γ I, Anæsthetic No. 6.

692. M. 65. Weak.

June, 3 p.m. Gastro-enterostomy.

ACE. first, then C. Methods unstated. (Afterwards E.)

Pt. stopped breathing when not fully under, and was brought

round by A.R. Pupils dilated widely, and pulse and R. stopped entirely, pulse first. C. was being used at the time, and dangerous symptoms were coincident with opening of peritoneal cavity. AN.

CASES IN CONNECTION WITH ANÆSTHETIC No. 7.—CHLOROFORM FOLLOWED BY ETHER.

Cases in Class I.

Cases in B γ I, Anæsthetic No. 7.

693.—M. 45. Spare, thin; weak pulse. Heart sounds weak.

June, noon. Radical cure of hernia.

C., pure, on towel. $\bar{5}i$. Then E., on towel. $\bar{5}i\frac{1}{2}$. Duration 45 mins.

Pt. did not take C. well, struggling when it was first applied. When under, pulse became very weak, so E. was substituted for C. After 20 mins. Pt.'s face blanched, and he stopped breathing. No pulse at wrist. Head drawn over edge of table, tongue pulled out. A.R. at once begun. E. also injected hypoderm. A.R. continued for 2 mins., when Pt. gave gasp, and gradually breathing again became normal. O. was concluded without further incident of note. AN.

694.—F. 3. Strumous.

May, 5 p.m. For strumous sinus.

C., on towel. $\bar{5}ii$. Then E., with Clover. $\bar{5}i$. 40 mins. in all. Child became livid, stopped breathing. A.R. Wet flipping. E. injected. AN. PT.

695.—M. 30. Heart weak. Cavity at one apex of lung.

May, 12.30 p.m. Amputation of forearm.

C., method unstated. $\bar{5}viii$. Then E., method unstated. $\bar{5}vi$. 50 mins. in all.

Induction of anæsthesia took 10 mins., and after another 10 mins. of C. administration, E. was substituted (in consequence of troublesome symptoms under C.). 5 mins. after the change to E., Pt. had a syncopal attack, R. ceasing. E. stopped; tongue drawn out; gag introduced. Nothing further of interest occurred. AN. PT.

696.—F. 8. Temp. 103° . C. seven times before. Very ill.

Dec., noon. Amputation at hip joint.

C., method unstated. $\bar{5}ii$. Then E., method unstated. $\bar{5}v$. 40 mins. in all.

Very anæmic in going under. Pulse ran down during O., and then breathing failed. E. was at this time being administered. Strychnine and E. injected. Breathing first

returned, then pulse at wrist throughout O. Hot douchings and rubbings to the face alternating with cold douchings were adopted. Acted wonderfully. AN.

O.
PT.

697.—F. 7. Very anæmic. Had had C. seven times.

May. Amputation of hip joint.

C., on towel. $\bar{5}iii$. Then E. 35 mins. in all.

Very anæmic in going under. Took about 1 min. to go under. During O. the pulse ran down very much, and then breathing began to fail. Pupils dilated. We were giving E. when breath failed. She had liq. strych. $\text{M}xv$ injected. A.R.; alternate hot and cold douches all over the face with marked benefit. AN.

O.
PT.

698.—M. 40. Big, stout, cyanosed appearance. Congestion of head veins. Tendency to fatty heart and dilatation. Emphysematous.

Oct., 12.30 p.m. For cancerous growth in neck, connected with thyroid, touching carotid sheath.

C., on towel. $\bar{5}xii$. Then E., method unstated. 35 mins.

He took $\bar{5}i$ to begin with, slight excitement; pushed anæsthetic at this stage. Did not breathe well at times, and got great congestion and cyanosis of countenance. They were working and disturbing carotid sheath and vagus nerve. As I was feeling his pulse at the wrist it entirely disappeared in the right hand, occasionally could be felt in the left. His eyeballs were turned upwards. O. stopped. Injection of strychnine and ether. Then his pulse began to come back, first 20 beats to the minute, then 40; 8 mins. after O. stopped. All this time R. continued harder and louder than ever. Probably due to interfering with vagus nerve, or to air getting into a vein. No convulsions. AN.

O.
PT.

CASES IN CONNECTION WITH ANÆSTHETIC No. 8.—ETHER FOLLOWED BY CHLOROFORM.

Cases in Class I.

Cases in B γ I, Anæsthetic No. 8.

699.—M. 45. Good.

Nov. Radical cure of congenital hernia.

E. $\bar{5}iv$. Then C. $\bar{5}xvi$. Methods unstated. 55 mins. in all. Took E. very badly. Under C., directly the corneal reflex disappeared, the pupils began to dilate, and he became cyanosed. AN.

700.—F. ? Age.

Sept. Ovariectomy.

E. Then C. Methods unstated.

After commencing inhalation of C., breathing became very slow and ceased, and A.R. had to be performed, but Pt. came round. Was not sick afterwards. AN.

701.—? Sex and age.

Sept. Nephrectomy.

E. Then C. Methods unstated.

After commencing inhalation of C., the R. became very slow, and ceased. A.R. had to be performed, but Pt. soon came round. After-effects—sick. ("The same thing took place in the out-patient department, so I think the chloroform was to blame.") AN.

702.—F. 44. Debilitated.

June, 9 a.m. Cholelithotomy.

E., with Clover. $\bar{5}v$. Then C., on towel. $\bar{5}ii$. (Afterwards E.)

Anæsthesia induced by E. Pt. all right. Owing to respiratory movements surgeon asked for C. As soon as anæsthesia was fully induced Pt. stopped breathing, became very pale, and pupils became wide and fixed. A.R. Wet flipping. E. hypoderm. Recovery. E. was then again resorted to, and Pt. breathed naturally. A.N.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 14.—CHLOROFORM FOLLOWED BY A.C.E. OR SOME SIMILAR MIXTURE.

Case in Class I.

Case in B γ I, Anæsthetic No. 14.

703.—F. 43. Fairly good. March, 12.25 p.m. Abdominal section for ovarian tumour. C., then ACE., both on Skinner. Pt.'s pulse at commencement was 72 per min. and feeble. Conjunctiva insensible in 12 mins. No struggling. Moved from bed to table. Breathing ceased for a few seconds, tongue drawn forward, head lowered. Pt. then recovered. ACE. substituted for the C. Pulse improved, but still small; pupils dilated. Slight vomiting at 12.55 p.m. Breathing ceased at 1.5 p.m. A.R. for 5 mins. Whisky subcutaneously. Pt.

resuscitated. O. continued till 1.30 p.m., when Pt. ceased breathing. A.R. for 40 mins., and nitrite of amyl in two separate doses. E. subcutaneously. Sinapism to chest, hot bottles to feet and body. Pt.'s head lowered off the table. Window of room thrown open. Heart continued to beat feebly for some time, though no radial pulse could be felt, but a slight pulsation of carotid could be detected. After continued efforts for 40 mins., Pt. gave a slight sigh, and eventually began to breathe fairly well. Recovered. Breathing ceased first, before pulse at wrist was affected. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 41.—CHLOROFORM WITH A FEW DROPS OF ETHER OCCASIONALLY.

Case in Class I.

Case in B γ I, Anæsthetic No. 41.

704.—M. 61. Alcoholic. Unprepared for O., had a heavy dinner 2 $\frac{3}{4}$ hours before.

July, noon. Attempts at reduction of dislocated shoulder (three months).

C., on Skinner, \bar{v} iss, with E. added occasionally. \bar{v} ii of E. used.

Pt. did not get well relaxed, although conjunctival reflex was absent. Struggled violently in going under. After taking the anæsthetic for 15 mins. (he had then had about \bar{v} vss C., with E. \bar{m} (30), the breathing became shallow, the lips blue, and the pulse feeble (the shoulder had been manipulated for about 8 mins.). A.R. and manipulation over cardiac region were

carried on for the next 3 mins. (the inhalation having been stopped) after which the colour returned to the lips, R. slowly became deeper and more natural, and the pulse stronger; and in about 2 mins. later the inhalation of E. on the wire frame, with the addition of C. (a little) afterwards, was begun. When A.R. was started there was only a very slight attempt at spontaneous R., and the pulse was very feeble. I had pushed the C. in order to get perfect relaxation, for the conjunctival reflex had long gone, and there was still muscular rigidity, and it appears to me that Pt. got an overdose. He was kept lightly under after this. AN.

CASES OF DEATH.

As will be seen by reference to Table V, p. 46, there were 29 cases of death due partly or entirely to the anæsthetic. Of these cases 24 were capable of exact classification (Class I), while 5 could only be approximately classified (Class II). The details of all these cases are here appended.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 1.—CHLOROFORM.

Cases in Class I.

Cases in B δ I, Anæsthetic No. 1.

705.—M. 59. Master builder. Spare, healthy man. Epithelioma of jaw, involving inside of cheek. Organs examined and found healthy. Duly prepared for O. No

psychic fear or dread of anæsthesia or of O. P.M.: Myocardium firm; aortic valves some thickening; arteries healthy. Lungs: Old pleuritic adhesions, old cicatrix right apex.

Bronchi stained and contained some fluid blood; no clots, and certainly not enough blood to have caused obstruction. Other organs apparently normal.

Nov. Removal of jaw and growth. Not begun.

C., by open method on lint. Syme and Simpson's plan. Lint kept wet with C. throughout. Held a little distance from face. Same C. had been used for two cases before, without let or hindrance.

Man quietly submitted, no struggling. No fresh supply of C. added before dangerous symptoms arose. No apparent impediment. No gasping. No unusual symptoms. Short stage of excitement. Then breathing in about 5 mins. regular and even. Conjunctival reflex abolished. Then wheeled into theatre, chloroformist giving his entire attention to Pt., who appeared to be in every way in a satisfactory condition. Then lifted carefully on operating table by four corners of sacking. R. grew shallow. R. watched with utmost vigilance throughout. R. and colour had been so satisfactory that no regard was had to pulse until trouble came on. Tongue at once drawn forward. C. removed and not again re-applied. R. ceased. Action of heart noted to persist. A.R. carefully and thoroughly carried out (Howard and ? Sylvester). Head fully extended, and although tongue drawn out, stridor was noticed. Laryngotomy. Partial inversion. Considerable venous hæmorrhage from wounded vein, probably increased by elevation of trunk. Hahn's tube inserted, which stopped hæmorrhage. Blood cleared from mouth, and body placed horizontal. Tube sucked and some blood removed. Oxygen administered through tube. Pt. gave a few sighing breaths. Regular R. never resumed. A.R. steadily kept up in such way as to assist occasional sighing breaths which Pt. gave. A.R. in such a way as rather to assist than to compel R. Heart stopped short time after R. ceased. AN.

706.—M. ? Age. Healthy, fine fellow. Mill injury. Not much shock. Bruised about head, but no symptoms of brain trouble. P.M.: Skull cap removed and clot of blood found, although there was not the slightest symptom of intracranial mischief.

Aug., 4 p.m. Primary amputation of thigh.

C., on Skinner. \bar{v} iv. 30 mins.

Pt. was under quickly with little struggling. The thigh was nearly off when Pt. was observed to be gasping, with shallow R. and of a leaden-white hue. A.R. done at once, but Pt. gasped and died. Pulse could not be felt from the time symptoms of danger were observed. Battery and prolonged A.R. of no avail. AN.

707.—M. 22. Greengrocer. Good health. Necrosis of jaw, following an injury. P.M.: Heart rather large, 14 oz., excess of fat on surface; right cavities distended with fluid blood; tricuspid and pulmonary valves healthy; left side of heart empty; muscle hypertrophied. No fatty change. Aortic and mitral valves both thickened and opaque. Lungs: Lower lobes engorged with blood and full of air: upper lobes emphysematous. Other organs healthy.

March, 1.40 p.m. Removal of dead bone from jaw.

C., on lint. \bar{v} x. 15 mins.

Took 10 mins. to go under. Went under quite naturally. Anæsthesia being complete, the O. was commenced, and at this moment lint was removed. The moment the gouge was applied, R. and pulse ceased; pupil dilated. Tongue was drawn forward. A.R. (Sylvester, modified by Howard). Throat and air passages found to be clear. Head lowered and legs raised. Subsequently Nélaton's inversion. Several voluntary Rs. occurred, but no radial pulse, nor could heart be heard or felt. Venesection. Nitrite of amyl. E. hypodermically. Hot water to præcordium. Ice in rectum. A.R. kept up for half an hour. Air entered and left chest freely (heard to do so). No response. AN.

708.—M. 73. Intestinal obstruction. Very stout. Extremely emphysematous chest. Very large amount of tympanites. R. was embarrassed. Pulse fair. Had taken very little food for three or four days. Constipation nearly one week. Very slight

vomiting. Condition critical. Cause of obstruction was cancerous stricture of sigmoid flexure.

Jan., 8.45 p.m. Laparotomy.

C., on Skinner. About \bar{v} viii. 20 mins.

Took C. badly. Struggling a good deal, which made him get blue. Was not under when the scalpel touched his abdomen, immediately after which he vomited a small amount of mucus, and R. became embarrassed and ceased simultaneously with or just before pulse. A.R. and inversion of no avail. All who witnessed the case agreed that R. failed first. AN. PT.

709.—F. 31. Pleurisy and effusion. Hectic. Extremely nervous. No bruit. \bar{v} xxxv fluid drawn from chest three weeks before. Having refilled, \bar{v} xxiv pus withdrawn two days before, and then it was decided to drain. Purge and enema. Beef-tea 11 a.m., O. 4 p.m. Pt. extremely nervous. Room warm. Heart rapid, weak, regular. No bruit. P.M.: Heart loaded with fat, pale and flabby; containing only small amount of blood; aortic and pulmonary valves bright red colour, but no endocarditis; pericardium contained fluid. Left lung collapsed and airless. Pleura $\frac{1}{4}$ in. thick. One pint pus still in cavity. Right lung normal. Liver fatty. Fatty degeneration of other organs.

May, 4 p.m. For empyema.

C., on folded lint. \bar{v} ii, approximately. 17 mins.

Pt. was taking it fairly well, R. and pulse being regular, when (17 mins. after beginning) suddenly (Pt. not being thoroughly under its influence) she gave two gasps. Pupils widely dilated. Pulse inappreciable. Head over table, tongue pulled forward. E. injected. Amyl nitrite capsules. Hot towels to heart. Faradism. A.R. (Sylvester) for half to three-quarters of an hour. No sign of animation. Chest was opened to let out pus immediately after cessation of R. AN. PT.

710.—M. 45. Extremely exhausted. Very great suffering.

May, 8.30 p.m. External urethrotomy. First incision only just made.

C., on flannel. \bar{v} ii. 5 mins.

A violent convulsion came on just as insensibility was complete, pulse suddenly ceased, although R. continued for a min. or more. The first incision had only been made. A.R. Injection of E. Heat to the chest. All unavailing. Note by the recorder:—"In this case death was due not to the anæsthetic, but to the exhaustion of a neglected urinary extravasation." AN. PT.

711.—M. 11. Pale and anæmic. Suffering from adenoids. Chest and heart examined before O., but nothing abnormal discovered. No food since 7.30 a.m. Clothing, blanket and pair of trousers. No P.M.

May, 1.15 p.m. Removal of adenoids by Loëberg's forceps and curette. Position, head extended over end of table. O. just completed. Hæmorrhage not excessive.

C., on lint, two folds. \bar{v} ii. 5 to 10 mins. C. not exposed to light. No other ill effects from the same C. in other Pts.

Took slowly at first. No struggling. Corneal reflex absent. Administration of C. ceased upon introduction of gag before O. Only slight degree of anæsthesia produced. When O. commenced pupils were slightly contracted. The O. was just finished, with little coughing or hæmorrhage. Breathing ceased for a second, when sponging out pharynx. No cyanosis at this time. After completion of O. slight cyanosis noticed about the eyes, and pulse was found to be imperceptible, and heart sounds inaudible. Gag at once removed. Amyl nitrite injection. E. subcutaneously. Hot towels to heart and head. Partial inversion. R. continued for 3 to 5 mins. after loss of pulse and then ceased. A.R. kept up for three-quarters of an hour (Sylvester's). Only produced one or two short gasps. AN. PT.

712.—M. 56. Had been admitted three days previously with compound comminuted fracture of jaw. Drunk when admitted. During first 24 hours R. was stertorous. Apparently addicted to drink. Heart healthy. Chest rigid and somewhat emphysematous. No marked bronchitis. P.M.: Organs healthy, except lungs, which were emphysematous, and there was an old

pleural adhesion over lower part of right lung. Liver rather fatty. Trachea and left bronchus free from blood. Clot in left (? right) bronchus and subdivision.

Aug., 5.30 p.m. Wiring fractured jaw.

C., on lint, four folds. About $\bar{3}\frac{1}{2}$ to $\bar{3}1$. 15 mins.

Pt. never deeply under C. Took it fairly well, without violent struggling. Face rather cyanotic most of the time. He breathed well, and the pulse was good. Once or twice during manipulations of jaw the breathing became rather embarrassed until the tongue was dragged forward and the throat mopped out. There was slight hæmorrhage from seat of fracture and also from holes drilled in the bone (which rendered the latter measure necessary from time to time). O. nearly completed and administration had been suspended for about a min. when R. was noticed to be very laboured and shallow for two or three breaths, and then to cease. Tongue at once pulled forward. Throat cleared. Head lowered. A.R. Pulse was at this time not noticeably altered. As there was no improvement, trachea was opened rapidly. Blood sucked out by means of catheter. A.R. for half an hour. Efficiency of A.R. much hindered by rigidity of chest. Just at first, until some blood in trachea had been got rid of, air entered badly, afterwards pretty free entry. E. injected. Hot cloths to chest. No voluntary R. after first cessation. AN. $\left. \begin{array}{l} O. \\ PT. \end{array} \right\}$

713.—F. 7. Child was brought in with extreme dyspnœa and cyanosis, due to diphtheria.

Sept. Tracheotomy.

C., on lint. 10 mins.

Pt. was given a few whiffs of C. to restrain struggling, but this did not have much effect in relieving any of the spasmodic element in the dyspnœa. R. became shallow, so all C. was withheld, and a few mins. later, when the O. was nearly completed, it ceased altogether. The O. was, however, rapidly completed, and a silver tube was introduced into the trachea, but in spite of A.R., hypodermic injection of E., hot flannels, etc., no attempt was made to breathe. AN. $\left. \begin{array}{l} O. \\ PT. \end{array} \right\}$

714.—F. 5. Well developed. General health good. Morbus coxæ. Had taken C. well several times before. No food for 5 hours previously. No effective aperient or purge had been given. Temp. 60°. Supine, kept warm.

March. Barker's excision of hip. Only slight hæmorrhage.

C., on flannel inhaler. $\bar{5}x$. $1\frac{1}{2}$ hours. Not exposed to light. One month old. No similar symptoms with other patients. Inhaler occasionally removed during induction of anæsthesia.

No struggling, spasm, convulsion, or vomiting during administration. Pulse became weak and rapid towards close of O., and almost inappreciable at its completion. Pupil variable all through. R. and reflexes normal. Pallor was noticeable. Anæsthesia not profound during last half-hour, when slight scraping and irrigation were proceeding. After the O. Pt. was very faint and exhausted, wandering, and suffered from repeated and uncontrollable vomiting. Pulse became weak and rapid (over 200) before R. affected. R. only became rapid and weak a few hours before death. Gradually sank, and died 32 hours after completion of O. Death to all appearance due to shock from prolonged anæsthesia, and O., and vomiting. O. AN.

715.—M. 9 months. Weakly. P.M.: Organs anæmic; left ventricle empty, little fluid blood in right.

Dec., 3.30 p.m. Removal of rectum and part of left colon.

C., on one fold of towel. 40 mins.

Died 45 mins. after the O. was over. "Death due to shock and effects of chloroform also." O. PT. AN.

716.—M. 3. Impending asphyxia.

June, 9 a.m. Tracheotomy.

C., on mask with drop-bottle. $\bar{7}ss$. 2 mins.

Pt. died from asphyxia before under anæsthetic. Tracheotomy failed to relieve obstruction. PT. AN.

717.—F. 42. Very critical condition. Exophthalmos, large thyroid pressing on trachea, causing urgent dyspnœa, with spasmodic attacks threatening life several times a day. Heart feeble, very rapid, and irregular in action. Much œdema of both lungs with cough. Atropine injected before O.

March, 10 a.m. Proposed O., to divide isthmus to relieve pressure, not begun.

C., on single fold of lint, kept from mouth with finger. $\bar{7}iiss$ 10 mins. Not long kept. Not exposed to light. Other Pts. had had same C. with no ill effects.

Pt. took C. badly. Breathing was difficult, trachea and bronchi seemed choked with secretion. Before fully under, heart and R. ceased suddenly together. The moment before, Pt. was moving lips, hands, etc. Corneal reflex was not abolished, and she appeared to be far from under. Tongue pulled out. A.R. (Sylvester) commenced at once. E. injected. Battery used. Amyl nitrite held to mouth. No beneficial results. PT. AN.

718.—M. 32. Fair physique, but debilitated health. Average working man. Had C. twice before. Perineal sinus. No food for $6\frac{1}{2}$ hours. P.M.: Heart flabby and uncontracted; blood fluid and watery. Lungs: Tuberculous nodules scattered throughout both organs. Consolidation and cavity in right apex. Both kidneys contained tuberculous abscesses. Other viscera normal.

Sept., 4.30 p.m. To scrape sinus. Not begun.

C., on corner of towel folded twice. $\bar{7}i\frac{1}{2}$. 10 mins. Kept in dark. Used directly after without ill effect.

Pt. first talked, then struggled. 10 mins. from start Pt. had a convulsive seizure, apparently epileptiform, with marked lividity. Pulse good up to time of seizure, then suddenly failed. Opisthotonos. As soon as Pt. became convulsed, pulse stopped. Head lowered. A.R. at once, and inversion before R. ceased. Not the slightest obstruction to passage of air into chest. E. hypodermically. Brandy per rectum. Abdomen flipped with wet towel. R. continued with slow occasional sobs, for fully 5 mins. after heart had ceased to beat. Pupils widely dilated and fixed. Anæsthesia was never deep. A.R., etc., done with care and deliberation, and continued for half an hour. No response to efforts. PT. AN.

719.—M. 48. Fairly good. Very large and stout. Emphysematous and enormously fat. Strong alcoholic history. In December, 1889, anterior part of tongue and portion of jaw removed for cancer. Took C. well. Recurrence of disease in tongue and floor of mouth. P.M.: Heart dilated, full of clot, no valvular disease, but fatty infiltration and degeneration. Lungs greatly congested, considerable amount of blood in all divisions of the bronchi. Liver hob-nailed, large, and very cirrhotic. Kidneys healthy. Enormous amount of fat in parietes, omentum, etc.

Jan., 2.45 p.m. For growth on tongue and floor of mouth. O. not begun.

C., first on lint, second with Junker.

Administration begun on lint, and continued with Junker. Did not take C. well. Strained a good deal. Soon after changing to Junker, about 10 mins. from start, R. became shallow. Cyanosis very marked. C. stopped for a few mins. R. and colour improved. Pt. now only half under C. Anæsthetic again given with Junker, and Pt. taken into the theatre. R. again became difficult, with straining, struggling, slight stertor, and marked cyanosis. Hands tied down. Very rapidly R. ceased altogether, and Pt. had very blue appearance. Pulse felt in temporal artery after R. had ceased. Root of tongue pulled forwards, chin drawn up. Back of throat sponged out and cleared of some blood and mucus. A.R. Legs raised. Laryngotomy performed 10 mins. after A.R. begun. Pt. still very blue. Venesection of jugular vein ad $\bar{7}xiv$. No response at all. A.R. continued for 40 mins. Probably some blood from growth got into larynx at beginning of serious symptoms; followed by failure of R. AN.

PT.

720.—M. 6. Weak. Empyema. Critical condition. Apex beat under right nipple. Dyspnoea. Irregular pulse. Dulness to apex on left side, back and front.
Sept. Resection of rib.
C., on towel. 10 mins.

Piece of rib resected under C. Just as pus was evacuated, Pt. noticed to have stopped R. Sylvester's A.R. Inversion. Faradism. Injection of E. A.R. kept up for 45 mins. No avail. AN.
PT.
? O.

Cases in Class II.

Cases in B δ II, Anæsthetic No. 1.

721.—M. 20. Very bad. Opening empyema.
C., on towel. 3iv. 20 mins.
Very much collapsed. Died 2 hours afterwards.

722.—M. 72. Weak. May, noon. Litholapaxy.
C., on towel. 3xxiv. 45 mins.
Vomiting and hiccough till death, 72 hours later.

CASES IN CONNECTION WITH ANÆSTHETIC NO. 2.—ETHER.

Cases in Class I.

Cases in B δ I, Anæsthetic No. 2.

723.—M. 52. Strangulated hernia. In extremis. Cold. Pulse scarcely to be felt. Scarcely conscious. Pulse about 50.
Oct., 1 p.m. Herniotomy.
E., with Clover. 3vi. Pure E.
Gave him as little as possible. O. very hurried. 5 mins. after O. commenced, began to sink. Pulse ran down. Became faint, and then vomiting of the most fetid fluid came on, some getting into larynx. It was pumped out in pints at a time. He succumbed in about 6 mins. Note by administrator:—"We should have pumped out the stomach." PT. AN.

724.—F. 58. Fair. Jan. For strangulated hernia.
E., with Clover. 3iv. 45 mins.
Vomited stercoraceous matter during anæsthesia, small amount was cleaned out by sponge on holder. Had vomited previously to anæsthetic. Went under in 2 mins. easily. Breathing at first deep, but towards end of O. shallower. Died apparently of respiratory failure 2 hours after O. Pulse good at end of O. and up to death fairly good. Lungs were intensely congested, and there was stercoraceous material in small bronchial tubes. PT. AN.

725.—F. 53. Weakly, anæmic, and thin. Heart and lungs apparently healthy. Swelling of doubtful nature in right loin. (3rd administration.) P.M.: Much fat on surface of heart; heart muscle pale and flabby; cavities empty; valves normal. Lungs normal. No evidence of asphyxia. Cancer of cæcum found with abscess cavity behind it in the loin. Death from syncope.

May, 4.10 p.m. For tumour in the loin.
E., with Clover. 3i. 12 to 15 mins.
Pt. went under anæsthetic easily, breathing well. When the O. was proceeding, the Pt. was also breathing deeply and well, though lying on her left side. No cyanosis. After from 12 to 15 mins., when kidney was being manipulated, she vomited a small amount of greenish liquid, and R. suddenly ceased, pulse also stopping at the same time. From the commencement pulse had not been good. Pt. was immediately turned on her back, tongue held forward, throat cleared out, and A.R. kept up for 15 mins. or more, legs and body raised, but without effect. AN.
O.

726.—M. 40. Extremely bad. Extreme and exhausted condition. Suffering from impermeable stricture with attacks of retention for twenty years. During day had vomited several times. No instruments could be passed, but urine came away drop by drop. Said he felt sick.

Dec. O. not commenced.
E., given very slowly, with Clover. 3j, exactly. 10 mins.
Pt. took E. well, without struggle or murmur. Corneal reflex was not quite abolished, as Pt. was taken from anæsthetising room to the theatre. Pulse became imperceptible, and he gave two or three gasps at short intervals. In less than a minute he was dead. A.R. Injection of brandy. Inhalation of amyl nitrite. Faradism to phrenics. No success. AN.
PT.

Cases in Class II.

Cases in B δ II, Anæsthetic No. 2.

727.—F. 64. Poor. Chronic Bright's disease. Nov. Strangulated femoral hernia reduced.
E., with Clover.
A small hæmorrhage probably took place into the brain during the administration of the anæsthetic, and a larger one,

from which she died, followed three days after, as shown by the P.M. Recovery from the anæsthetic was only partial, with hæmiplegia. The hæmorrhages were seen at P.M. to be of different dates.

728.—M. 69. Poor condition. Had been in poor health for some time, having chronic Bright's disease. Had never shown uræmic symptoms.
Oct. Herniotomy.

E., with Clover. 30 mins.
Uræmia was precipitated, from which Pt. died in 10 days' time, the wound having healed perfectly. Immediately after the O. the amount of urine sank to 10 and 4 oz. per diem.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 3.—"GAS AND ETHER."

Case in Class I.

Case in B δ I, Anæsthetic No. 3.

729.—F. 69. Extreme prostration. Acute obstruction had lasted six days. Weather extremely cold. Temp. 20°, and dense fog. Before O., Pt. was collapsed and cold, pulse 130, thready. Vomiting of stercoraceous liquid at intervals. Abdomen greatly distended. Pt. otherwise very thin. Brandy, $\bar{3}\frac{1}{2}$, given before anæsthetic. E. given on bed, as Pt. too ill to be moved on table.

Jan., 6.30 p.m. Inguinal colotomy for intestinal obstruction. G. and E., with Clover. E. purus. $\bar{3}\frac{1}{2}$. 20 mins. Anæsthetic very carefully given, and Pt. closely watched throughout. Quickly anæsthetised, 5 mins. Then carefully moved on sheet, in horizontal posture, to table. Pulse variable under E., being at first improved in quality, about 140 per min. Then pulse became intermittent, feeble, and scarcely to be felt.

Pt. vomited (probably half-pint) brown coloured fluid. R. became shallow. Pulse revived again for 2 or 3 mins., and became less irregular, but afterwards less and less appreciable, until (in less than 20 mins. from commencement of administration) the heart and R. ceased together. Brandy injected subcutaneously. At moment of death, a second act of vomiting (of quite a quarter of a pint of fluid) occurred. Some of this fluid possibly ran into the larynx, and expedited the end. "This case shows pointedly the advisability of the stomach being washed out by a stomach-pump and emptied of its contents before the anæsthetic is used in cases of abdominal distension and intestinal obstruction with loaded stomach."
PT. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 5.—MIXTURES OF CHLOROFORM AND ETHER
IN VARIOUS PROPORTIONS.

Case in Class I.

Case in B δ I, Anæsthetic No. 5.

730.—M. 57. Very bad. A man with an irreducible hernia (oblique) on the left side, with symptoms of strangulation, and suffering from acute peritonitis. Before O. he was in a very collapsed state, his pulse very slow and feeble and wiry.
March. For hernia.
Mixture of C. 5 parts and E. 3 parts, method unstated. $\bar{3}\text{viiss}$.
75 mins.

After Pt. had been under the mixture for 20 mins. his pulse got feeble and E. M_{xx} was hypodermically injected. His heart gradually got feebler, and, 5 mins. after O., Pt. died. E. M_{lxxx} was injected during O., but only improved the pulse slightly. PT. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 8.—ETHER FOLLOWED BY CHLOROFORM.

Case in Class I.

Case in B δ I, Anæsthetic No. 8.

731.—M. 29. Good. Strong physique. Out-patient. No special preparation. No food for 3 hours. Right lower jaw much swollen, with doubtful fluctuation. P.M.: Organs and viscera—viz., kidneys, liver, heart, arteries, and brain—quite healthy and normal.
Dec., 4 p.m. For periostitis of jaw.
E., with Clover. $\bar{3}\text{ii}$. 20 mins. Then C., on cone of towel.

$\bar{3}\text{iii}$. 7 mins. This latter amount exceeds the quantity inhaled by the Pt., as the nature of the O. caused the impregnated cone to be several times removed.
Pt. struggled violently under E., great difficulty being experienced in producing anæsthesia on the one hand, and in avoiding cyanosis on the other. After 15 mins. corneal reflex disappeared for a few moments only. O. was attempted, but

had to be postponed. After 20 mins. C. was substituted, complete anæsthesia, apparently normal, rapidly taking place. O. was then proceeded with. Mouth opened, and a right atrophied second molar tooth extracted. Very little bleeding. Gag removed, but reinserted for few secs. just before completion of O. Incision now made externally and bare bone found. \bar{v} iii of pus evacuated. Drainage tube inserted. C. stopped at this stage. R. good, no cyanosis, corneal reflex just perceptible. During following 2 mins. wound was syringed, and dressings were being applied when sudden collapse was noticed. Actual O. lasted 6 mins. The dangerous symptoms were sudden stoppage of breathing and cyanosis. The radial and carotid pulses were imperceptible. It is impossible to say whether R. or pulse stopped first. The head was immediately hung vertically downwards over the end of the table, the mouth

gagged open, tongue drawn forwards, and back of the throat cleared, by sponges on handles, of a small quantity of mucus. The finger, passed to the epiglottis, detected no obstruction. Sylvester's A.R., aided by an assistant compressing the thorax, was commenced and continued without interruption for upwards of half an hour, air not entering the thorax very freely. After 10 mins. laryngotomy was performed and oxygen administered through the tube. Some small attempt at spontaneous R. took place at this point. Ammonia on a towel was given at intervals. After half an hour Pt. was completely inverted, and positive ventilation was performed by the mouth through the tube. Finally the strongest Faradism was applied, the electrodes being placed in various parts. Very strong muscular reactions only resulted. It is impossible to say when death actually took place. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 19.—ETHER FOLLOWED BY THE A.C.E. MIXTURE.

Case in Class I.

Case in B δ I, Anæsthetic No. 19.

732.—M. 18. Good. Not subject to bronchitis.
Nov., 4.40 p.m. Excision of knee.
E., with Clover. \bar{v} i $\frac{1}{2}$. Then ACE. on towel. \bar{v} viii. 50 mins.
in all.

Free oozing from wound, difficult to arrest, necessitating longer duration of anæsthesia than usual. Death on the tenth day from double broncho-pneumonia and pleurisy. Wound aseptic. Affection of bronchial tubes came on at once, and the death was distinctly referable to the anæsthetic. AN.

CASE IN CONNECTION WITH ANÆSTHETIC NO. 38.—MORPHINE AND ATROPINE FOLLOWED BY
"GAS AND ETHER."

Case in Class II.

Case in B δ II, Anæsthetic No. 38.

733.—F. 62.
Aug., 10 a.m. Abdominal section for cystic disease of ovaries.
Preliminary hypodermic of morphine gr. $\frac{1}{4}$, and sulph. atrop. gr. $\frac{1}{150}$, then G. and E., method unstated. 170 mins.
The morphine quieted the Pt. wonderfully, so that compara-

tively little E. was required, and for the second 20 mins. no E. was given at all, the Pt. being under the influence of the morphine and the E. as at first given. After-effects—suppression of urine took place after O., and Pt. died 30 hours after, of uræmic poisoning. There was no peritonitis, though the wound was opened and flushed out.

Summary of Analysis.—The following table gives a complete summary of the cases from the record books, arranged according to the classification of the Committee :—

TABLE VI.—SUMMARY OF CASES FROM THE RECORD BOOKS.

'Anæsthetics.	A.—Uncomplicated.		B.—Complicated cases.										Total B I and II.	Totals A and B.
	Class I.	Class II.	Class I.					Class II.						
			α	β	γ	δ	Total B I.	α	β	γ	δ	Total B II.		
1	12,517	438	128	84	112	16	340	70	18	8	2	98	438	13,393
2	4,415	40	90	26	6	4	126	6	4	2	2	14	140	4,595
3	2,026	—	28	7	5	1	41	3	—	1	—	4	45	2,071
4	660	—	9	4	3	—	16	2	—	—	—	2	18	678
5	406	—	3	5	3	1	12	—	—	—	—	—	12	418
6	57	—	—	1	1	—	2	—	—	—	—	—	2	59
7	196	—	5	—	6	—	11	1	—	—	—	1	12	208
8	216	—	1	3	4	1	9	—	—	—	—	—	9	225
9	148	—	7	—	—	—	7	—	—	—	—	—	7	155
10	72	—	3	2	—	—	5	—	—	—	—	—	5	77
11	4	—	—	—	—	—	—	—	—	—	—	—	—	4
12	37	—	—	1	—	—	1	—	—	—	—	—	1	38
13	18	—	—	—	—	—	—	—	—	—	—	—	—	18
14	270	—	1	2	1	—	4	1	—	—	—	1	5	275
15	15	—	—	—	—	—	—	—	—	—	—	—	—	15
16	12	—	—	—	—	—	—	—	—	—	—	—	—	12
17	10	—	—	1	—	—	1	—	—	—	—	—	1	11
18	2	—	—	1	—	—	1	—	—	—	—	—	1	3
19	36	—	—	—	—	1	1	—	—	—	—	—	1	37
20	3	—	1	—	—	—	1	—	—	—	—	—	1	4
21	13	—	1	—	—	—	1	—	—	—	—	—	1	14
22	3	—	—	—	—	—	—	—	—	—	—	—	—	3
23	2	—	—	—	—	—	—	—	—	—	—	—	—	2
24	1	—	1	—	—	—	1	—	—	—	—	—	1	2
25	1	—	—	1	—	—	1	—	—	—	—	—	1	2
26	1	—	—	—	—	—	—	—	—	—	—	—	—	1
27	—	—	—	—	—	—	—	—	—	—	—	—	—	—
28	2,888	—	21	2	—	—	23	—	—	—	—	—	23	2,911
29	596	—	1	—	—	—	1	—	—	—	—	—	1	597
30	2	—	1	—	—	—	1	—	—	—	—	—	1	3
31	—	—	—	—	—	—	—	—	—	—	—	—	—	—
32	1	—	—	—	—	—	—	—	—	—	—	—	—	1
33	1	—	—	—	—	—	—	—	—	—	—	—	—	1
34	4	—	—	—	—	—	—	—	—	—	—	—	—	4
35	2	—	1	—	—	—	1	—	—	—	—	—	1	3
36	5	—	—	—	—	—	—	—	—	—	—	—	—	5
37	8	—	1	—	—	—	1	—	—	—	—	—	1	9
38	8	—	2	—	—	—	2	—	—	—	1	1	3	11
39	1	—	—	—	—	—	—	—	—	—	—	—	—	1
40	3	—	—	—	—	—	—	—	—	—	—	—	—	3
41	21	—	1	—	—	—	2	—	—	—	—	—	2	23
42	1	—	—	—	—	—	—	—	—	—	—	—	—	1
43	1	—	—	—	—	—	—	—	—	—	—	—	—	1
44	1	—	—	—	—	—	—	—	—	—	—	—	—	1
45	1	—	—	—	—	—	—	—	—	—	—	—	—	1
	24,685	478	306	140	142	24	612	83	22	11	5	121	733	25,896

INFLUENCE OF VARIOUS FACTORS UPON THE PHENOMENA OF ANÆSTHESIA.

With the object of discovering whether the usual phenomena of anæsthesia were modified by any of the different factors of which notes were made in the record books, each of such factors has been separately investigated.

TIME OF YEAR.

The following table shows all the cases irrespective of the kind of anæsthetic used, in which the month was recorded, and also the percentage frequency in each month of cases attended by complications and dangers. Deaths for the purposes of this table are included in the latter class.

MONTHS.

TABLE VII.

Month.	Uncomplicated cases (A).	Complicated cases (B).	Total cases (A and B).	Percentage ratio of B to total cases.	Cases of danger.		Total of danger cases (B γ and B δ).	Percentage ratio of danger cases to total cases (A and B).
					B γ	B δ		
January	1,867	67	1,934	3.464	10	5	15	0.77
February	2,308	65	2,373	2.739	11	0	11	0.46
March	2,714	80	2,794	2.863	19	4	23	0.82
April	2,366	59	2,425	2.433	13	0	13	0.53
May	2,323	81	2,404	3.369	15	5	20	0.83
June	2,128	41	2,169	1.890	8	1	9	0.41
July	1,798	56	1,854	3.020	15	0	15	0.80
August	1,709	39	1,748	2.231	7	2	9	0.51
September	1,828	49	1,877	2.610	12	3	15	0.80
October	1,952	61	2,013	3.03	12	2	14	0.69
November	2,034	67	2,101	3.189	17	3	20	0.95
December	1,598	35	1,633	2.143	6	3	9	0.55
Totals	24,625	700	25,325	2.764	145	28	173	0.693

The slight discrepancies between the totals in this table and those given in Table VI, p. 64, arise from the fact that the month is not always stated in the record books.

Tables have also been prepared on the above lines for each of the principal anæsthetics.*

An examination of these tables reveals the following facts:—

Dealing with all anæsthetics collectively, in the six winter months (October to March), the percentage frequency of complicated cases and of danger cases was 2.918 and 0.716 respectively, against 2.604 and 0.649 in the six summer months (April to September). But there was no regular gradation from winter to summer or *vice versa*, as the highest percentages of "complicated" cases (B) were in January (3.464) and in May (3.369), whilst the lowest were in June (1.890) and December (2.143). Again, the highest percentages of "danger" cases (B γ and B δ), were in November (0.95) and May (0.83); the lowest in June (0.41) and February (0.46).

With regard to Anæsthetic I (chloroform), 12,947 records, the winter percentages of "complicated" and "danger" cases were respectively 3.573 and 1.094, against 3.088 and 0.950 for the summer months. The

* These, with a large number of other tables not embodied in this Report, have been deposited in the Library of the British Medical Association.

highest proportion of "complicated" cases occurred in January (4.36) and October (3.95); the lowest in months as widely separated as December (2.05) and June (2.23); whilst the highest percentages of "danger" cases were in January (1.45), and March (1.44); the lowest in June (0.53), and December (0.57).

With Anæsthetic II (ether), 4,554 records, the difference between the winter and summer months was greater. The winter percentages of "complicated" and of "danger" cases respectively were 3.385 and 0.413, against 2.673 and 0.281 for the six summer months. The highest "complication" averages were in January (5.26), and February (4.5); the lowest in June (1.44), and October (1.69). The highest "danger" averages were in October (0.72), and January (0.52); the lowest in August and September, when they sank to *nil*.

With Anæsthetic III ("gas and ether"), 2,071 records, the percentage of "complicated" cases in the winter months was 2.41, against 1.93 in the summer, and the percentage of "danger" cases was 0.38 in the winter, to 0.29 in the summer. The highest "complication" percentage was in March (3.80); the lowest in December (0.75). The highest "danger" percentage was in January (1.15), when the single fatal case occurred, and in six months, viz., February, April, June, September, October, and December, no "danger" cases were recorded.

With Anæsthetic IV (A.C.E.), 653 records, the summer averages of "complication" cases (3.08), and of "danger" cases (0.56), slightly exceeded those of the winter six months, which were 2.36 and 0.33 respectively.

In regard to the other anæsthetics, the tables are unreliable for statistical purposes, either because the cases were unevenly distributed throughout the year (as with anæsthetic 28, nitrous oxide gas), or because the cases recorded were too few in number.

The only conclusion to be drawn from these facts is that, especially with ether, the tendency for cases of complication and danger to arise is rather greater in the winter months.

TIME OF DAY.

In 17,626 of the 25,920 cases in the record books the *time of day* of the administration was noted. These 17,626 cases have been arranged in the following tables in 4 series, one for each quarter of the day. In the first quarter are comprised cases occurring between midnight and 6 a.m.; in the second, the cases between 6 a.m. and noon; in the third, those from noon to 6 p.m.; in the fourth, all cases after 6 p.m. In the first table all cases are included, irrespective of the anæsthetic used. In succeeding tables the chief anæsthetics are dealt with separately, on similar lines. In all the tables the percentage frequency in each quarter of the day of "complication" cases and of "danger" cases is noted; and deaths are included in the latter class.

TIME OF DAY, IN PERIODS OF SIX HOURS.

Quarters of day.	Uncomplicated cases (A).	Complicated cases (B).	Total cases (A and B).	Percentage of B in A and B.	Danger cases.		Total danger cases (B γ and B δ).	Percentage of danger cases in all cases (A and B).
					B γ .	B δ .		

TABLE VIII.—ALL ANÆSTHETICS.

1st	109	4	113	3.54	1	1	2	1.77
2nd	6,712	199	6,911	2.86	34	1	35	0.50
3rd	9,298	303	9,601	3.15	62	13	75	0.78
4th	985	16	1,001	1.59	2	3	5	0.49
All	17,104	522	17,626	2.96	99	18	117	0.66

Quarters of day.	Uncomplicated cases (A).	Complicated cases (B).	Total cases (A and B).	Percentage of B in A and B.	Danger cases.		Total danger cases (B γ and B δ).	Percentage of danger cases in all cases (A and B).
					B γ .	B δ .		

TABLE IX.—ANÆSTHETIC 1 (CHLOROFORM).

1st	73	4	77	5'19	1	1	2	2'59
2nd	3,507	122	3,629	3'36	28	1	29	0'79
3rd	4,702	173	4,875	3'54	51	8	59	1'21
4th	636	10	646	1'54	2	2	4	0'62
All	8,918	309	9,227	3'35	82	12	94	1'01

TABLE X.—ANÆSTHETIC 2 (ETHER).

1st	24	0	24	0'0	0	0	0	0'0
2nd	768	40	808	4'82	3	0	3	0'37
3rd	1,969	59	2,028	2'91	3	2	5	0'24
4th	209	4	213	1'87	0	0	0	0'0
All	2,970	103	3,073	3'35	6	2	8	0'26

TABLE XI.—ANÆSTHETIC 3 (GAS AND ETHER).

1st	0	0	0	—	0	0	0	—
2nd	272	3	275	1'09	0	0	0	—
3rd	771	22	793	2'77	1	1	2	0'25
4th	47	0	47	0'0	0	0	0	—
All	1,090	25	1,115	2'24	1	1	2	0'18

TABLE XII.—ANÆSTHETIC 4 (A.C.E.).

1st	1	0	1	0'0	0	0	0	—
2nd	147	4	151	2'64	2	0	2	1'32
3rd	258	9	267	3'37	0	0	0	—
4th	31	0	31	0'0	0	0	0	—
All	437	13	450	2'8	2	0	2	0'4

TABLE XIII.—ANÆSTHETIC 28 (GAS).

1st	1	0	1	0'0	0	0	0	—
2nd	1,402	13	1,415	0'91	0	0	0	—
3rd	1,077	10	1,087	0'92	0	0	0	—
4th	16	0	16	0'0	0	0	0	—
All	2,496	23	2,519	0'91	0	0	0	—

These several tables show certain facts. Under all anæsthetics, taken collectively, 93·6 per cent. of the tabulated operations took place between 6 a.m. and 6 p.m., less than 1 per cent. between midnight and 6 a.m., the remaining 5·4 per cent. after 6 p.m. The incidence of complications wholly or in part traceable to the anæsthetic is considered under the tables relating to each anæsthetic in turn. It must be remembered, however, that the cases of different parts of the day are not absolutely on a parallel. Thus, only cases of urgency are under operation before 6 a.m.; "gas" cases at the dental hospitals swell the records of the second and third quarters; the major operations at the large metropolitan hospitals usually occur in the third quarter. Many small operations performed by resident hospital officers are done after 6 p.m. These differences probably tend to vitiate deductions which might otherwise be drawn from these tables.

Anæsthetic 1 (chloroform), was the agent used in 9,227 (52·37 per cent.), of the 17,626 cases, and was employed in no less than 94 of the 117 cases of danger recorded in the tables, and in 12 of the 18 tabulated cases of death. It was used in 77 of the 113 cases that occurred before 6 a.m., and in every one of the four cases of complication recorded in this quarter of the day. The percentage of cases of complication (5·19), in this small group of cases was much higher than the corresponding rate in either the second or third quarter, and more than treble the complication rate of the fourth quarter of the day (1·54).

The danger rate before 6 a.m.—based, however, upon only 2 cases—was $2\frac{1}{2}$ times higher than that in either of the next two quarters, and 4 times higher than the danger percentage of the last quarter of the day.

The percentage of deaths was 1·3 in the first quarter, 0·027 in the second, 0·16 in the third, and 0·31 in the fourth. After the first quarter (of which the number of cases (77) is too few for fair comparison with cases of other quarters), the percentage of deaths rose quickly from the second to the fourth quarter. Another fact comes out in strong relief. In the 12 night hours (6 p.m. to 6 a.m.), of 6 cases classified under danger, 3 (*i.e.*, 50 per cent.), died; but of the 88 danger cases that occurred during the 12 hours of the day from 6 a.m. to 6 p.m., 9 (10·2 per cent.) died.

Anæsthetic 2 (ether), was given in 3,073 cases; of which 24 were before 6 a.m., and these were all without complication. The highest percentage of complicated cases (4·82) was between 6 a.m. and noon; the corresponding rate in cases of the third quarter of the day was 2·91; and it sank to 1·87 in the cases of the fourth quarter. The danger percentage only expressed itself in cases occurring between 6 a.m. and 6 p.m., being for those 12 hours 0·28. This rate contrasts well with the "danger" percentage of chloroform cases occurring also between 6 a.m. and 6 p.m., which was 1·03. But, whilst 79 of the 88 danger cases under chloroform (*i.e.*, 89·8 per cent.) in these two quarters of the day recovered, only 6 of the 8 danger cases (*i.e.*, 75 per cent.) under ether did well. The 2 fatal cases recorded under ether both occurred in the third quarter of the day.

Under anæsthetic 3 (gas and ether) 1,115 cases were tabulated. There were no cases before 6 a.m., nor complication after 6 p.m. The third quarter of the day, in which were 793 cases, furnished the chief number of complications, and the only 2 cases of danger.

Under other anæsthetics the cases are too few for any useful comment.

To summarise, the great majority of cases were recorded as occurring between 6 a.m. and 6 p.m. Under chloroform, in the few cases that took place before 6 a.m., there was a high rate of complications and dangers; and of the cases occurring in the night which showed symptoms of danger half died. The death rate was much the lowest in the second quarter, and subsequently rose as the day advanced. Under ether, danger was only recorded in cases that occurred between 6 a.m. and 6 p.m. But it must be remembered that the differences in the complication and danger rates given in the tables may be explained by other influences than the time of day.

SEX.

The following table shows all the cases, irrespective of the anæsthetic used, in which the sex was recorded, and also the percentage frequency for each sex of cases attended by complications or dangers:—

TABLE XIV.

	Totals under all anæsthetics (A and B).	Total complicated cases (B).	Percentage frequency of complications.	Danger cases (γ).	Death cases (δ).	Total number of danger cases (B γ and B δ).	Percentage frequency of danger cases.
Males ...	10,815	417	3·856	91	20	111	1·026
Females ...	11,184	292	2·611	59	9	68	0·608

From this table it is seen that the percentage of complicated cases was greater in males than in females in the ratio of 3·856 to 2·611, *i.e.*, 1·477 to 1; and the percentage of danger cases was greater in males than in females in the ratio of 1·026 to 0·608, *i.e.*, 1·687 to 1.

The following table shows the total number of administrations in **MALES**, and the percentage frequency of complicated and danger cases, in connection with the principal anæsthetics:—

TABLE XV.

Anæsthetic.	Total administra- tions (A and B).	Uncomplicated cases (A).	Complicated cases (B).	Danger cases (B γ and B δ).	Percentages of	
					Complicated cases (B) in total cases.	Danger cases (B γ and B δ) in total cases.
i.	6,168	5,907	261	91	4·23	1·475
ii.	2,427	2,344	83	6	3·42	0·247
iii.	858	835	23	2	2·68	0·205
iv.	342	332	10	2	2·92	0·585
v.	142	139	3	2	2·11	1·408
vii.	103	95	8	3	7·77	2·991
viii.	117	112	5	2	4·27	1·709
ix.	99	93	6	0	6·06	0·0
xiv.	160	157	3	0	1·87	0·0

The following table shows the total number of administrations in **FEMALES**, and the percentage frequency of complicated and danger cases, in connection with the principal anæsthetics.

TABLE XVI.

Anæsthetic.	Total administra- tions (A and B).	Uncomplicated cases (A).	Complicated cases (B).	Danger cases (B γ and B δ).	Percentages of	
					Complicated cases (B) in total cases.	Danger cases (B γ and B δ) in total cases.
i.	6,433	6,261	172	46	2·674	0·710
ii.	2,007	1,952	55	8	2·74	0·398
iii.	1,148	1,127	21	4	1·83	0·348
iv.	292	286	6	1	2·05	0·385
v.	256	247	9	2	3·516	0·781
vii.	99	96	3	3	3·030	3·030
viii.	77	74	3	2	3·896	2·597
ix.	50	49	1	0	2·0	0·0
xiv.	109	107	2	1	1·835	0·917

From these tables it is seen that the danger rate was greater for males than for females under chloroform in the proportion of

2'071 to 1,

and under the A.C.E. mixture in the proportion of

1'519 to 1.

But the danger rate was less for males than females under ether, in the proportion of

0'621 to 1,

and under gas and ether in the proportion of

0'589 to 1.

The ratio of the danger rates under Anæsthetics I, II, III, and IV, was as follows, the danger rate under gas and ether being taken as the unit.

1. Amongst males :

I. Chloroform	...	...	...	...	...	...	7'107
II. Ether	...	...	...	...	...	...	1'205
III. Gas and ether	...	...	...	...	...	...	1
IV. A.C.E. mixture...	...	...	...	...	...	...	2'854

2. Amongst females :

I. Chloroform	...	...	...	...	...	...	2'040
II. Ether	...	...	...	...	...	...	1'144
III. Gas and ether	...	...	...	...	...	...	1
IV. A.C.E. mixture...	...	...	...	...	...	...	1'191

In males the percentage of danger cases under chloroform was nearly six times the percentage of danger cases under ether, more than seven times the percentage of danger cases under gas and ether, nearly two and a half times the percentage of danger cases under the A.C.E. mixture.

In the female cases the percentage of danger cases under chloroform was nearly twice the percentage of danger cases under ether, more than twice the percentage of danger cases under gas and ether, nearly twice the percentage of danger cases under the A.C.E. mixture.

The frequency with which cases of danger occurred was as follows :—

1. In males :

- With chloroform, one in every 68 administrations.
- „ ether, one in every 406 administrations.
- „ gas and ether, one in every 488 administrations.
- „ A.C.E., one in every 171 administrations.

2. In females :

- With chloroform, one in every 141 administrations.
- „ ether, one in every 251 administrations.
- „ gas and ether, one in every 287 administrations.
- „ A.C.E. mixture, one in every 260 administrations.

It is noteworthy that of the 83 complicated cases in males (Table XV), under Anæsthetic II (ether) 62 were cases of minor complications.

Minor complications (B a) are notably more frequent in males than in females under ether, the figures being for males 2,427 cases with 62 cases of minor complication, *i.e.*, 2'55 per cent.; for females 2,007 cases with 32 cases of minor complication, *i.e.*, 1'59 per cent.

AGE.

The following table shows the age of the patient, irrespective of the anæsthetic employed, in its relation to the incidence of complications and of danger:—

TABLE XVII.

Age Period.	No. of cases.				Percentage incidence.	
	Division A (uncomplicated).	Division B (complicated).	Total (A and B).	Danger cases (B γ and B δ).	Of complications (B).	Of danger (B γ and B δ).
0 to $\frac{1}{2}$	33	3	36	3	8'333	8'333
$\frac{1}{2}$ to 1	732	19	751	9	2'529	1'198
1 to 5	2,464	49	2,513	17	1'949	0'676
6 to 10	2,585	76	2,661	27	2'856	1'014
11 to 15	1,985	39	2,024	7	1'926	0'345
16 to 20	2,128	53	2,181	11	2'430	0'504
21 to 30	3,676	123	3,799	22	3'237	0'579
31 to 40	2,580	101	2,681	22	3'767	0'820
41 to 50	1,726	98	1,824	23	5'372	1'260
51 to 60	1,179	63	1,242	17	5'072	1'368
61 to 70	653	36	689	11	5'224	1'596
71 to 80	181	6	187	3	3'208	1'604
81 to 90	23	1	24	0	4'166	—
91 to 100	1	0	1	0	—	—
	19,946	667	20,613	172	3'235	0'834

Discarding the figures for the lowest age period by reason of their insufficient number, the above table shows a low complication rate, but a moderately high danger rate up to the age of 10. After 10 there is a sudden drop, and in the age period "11 to 15" the complication and danger rates are the lowest recorded. From this age there is a steady rise for each decennial period until the age of 50 in the complication rate, and until 80 in the danger rate.

The following tables show the percentage of complicated cases (Division B), and of danger cases (B γ and B δ), in the different age periods, under the first four anæsthetics.

NOTE.—The age period in the four following tables do not quite correspond with those of Table XVII owing to slightly different methods employed.

TABLE XVIII.—ANÆSTHETIC I.

Age period.	No. of Cases.				Percentages.	
	Division A.	Division B (complicated).	B and A together.	B γ and B δ (danger).	Of complications (B).	Of danger (B γ and B δ).
0 to $\frac{1}{2}$	33	3	36	3	8'333	8'333
$\frac{1}{2}$ to 1	650	19	669	9	2'781	1'345
1 to 5	2,173	46	2,219	16	2'074	0'721
5 to 10	2,014	64	2,079	25	3'085	1'203
10 to 15	1,270	33	1,303	8	2'530	0'614
15 to 20	1,028	34	1,062	9	3'202	0'847
20 to 30	1,540	52	1,592	11	3'326	0'691
30 to 40	1,045	53	1,098	17	4'827	1'548
40 to 50	748	55	804	18	6'965	2'238
50 to 60	551	34	584	10	5'651	1'541
60 to 70	339	16	355	4	4'507	1'113
70 to 80	100	6	106	3	5'650	2'830
80 to 90	16	1	17	0	0'588	0'000

Age Period.	No. of Cases.				Percentages.	
	Division A.	Division B (complicated).	A and B together.	B γ and B δ (danger).	Of complications (B).	Of dangers (B γ and B δ).

TABLE XIX.—ANÆSTHETIC II.

0 to $\frac{1}{12}$	0	0	0	0	—	—
$\frac{1}{12}$ to 1	19	0	19	0	0'000	0'000
1 to 5	83	3	86	0	3'488	0'000
5 to 10	305	3	308	0	0'974	0'000
10 to 15	375	5	380	1	1'316	0'264
15 to 20	567	9	576	1	1'562	0'174
20 to 30	949	37	986	3	3'850	0'304
30 to 40	707	27	734	2	3'678	0'272
40 to 50	492	20	512	0	3'906	0'000
50 to 60	291	16	318	5	5'031	1'572
60 to 70	132	8	143	2	5'606	1'398
70 to 80	29	0	31	0	0'000	0'000
80 to 90	0	0	0	0	—	—
90 to 100	1	0	1	0	0'000	0'000

TABLE XX.—ANÆSTHETIC III.

0 to $\frac{1}{12}$	0	0	0	0	—	—
$\frac{1}{12}$ to 1	0	0	0	0	—	—
1 to 5	16	0	16	0	0'000	0'000
5 to 10	75	2	77	0	2'602	0'000
10 to 15	115	1	116	0	0'862	0'000
15 to 20	228	3	231	0	1'298	0'000
20 to 30	495	13	508	4	2'559	0'787
30 to 40	447	10	457	2	2'188	0'438
40 to 50	234	6	240	0	2'500	0'000
50 to 60	165	3	168	0	1'785	0'000
60 to 70	75	3	78	1	3'848	1'282
70 to 80	16	0	16	0	0'000	0'000
80 to 90	5	0	5	0	0'000	0'000

TABLE XXI.—ANÆSTHETIC IV.

0 to $\frac{1}{12}$	0	0	0	0	—	—
$\frac{1}{12}$ to 1	51	0	51	0	0'000	0'000
1 to 5	122	2	124	0	1'611	0'000
5 to 10	87	3	90	0	3'333	0'000
10 to 15	47	0	47	0	0'000	0'000
15 to 20	40	0	40	0	0'000	0'000
20 to 30	61	3	64	1	4'687	1'562
30 to 40	35	1	36	0	2'778	0'000
40 to 50	39	1	40	0	2'500	0'000
50 to 60	21	2	23	0	8'739	0'000
60 to 70	13	1	14	0	7'143	0'000
70 to 80	14	1	15	1	6'667	6'667
80 to 90	1	0	1	0	0'000	0'000

The above tables show that the percentages of cases of death or danger were:—

(1) *In the case of chloroform* above 1 in the $\frac{1}{12}$ to 1, 5 to 10, 30 to 40, and following periods; below 1 in the 1 to 5, 10 to 15, 15 to 20, and 20 to 30 periods. The highest percentage occurred in the 70 to 80 period

(2830); the second highest in the 40 to 50. It is notable that the percentage in the first ten years of life is distinctly higher than in the second and third.

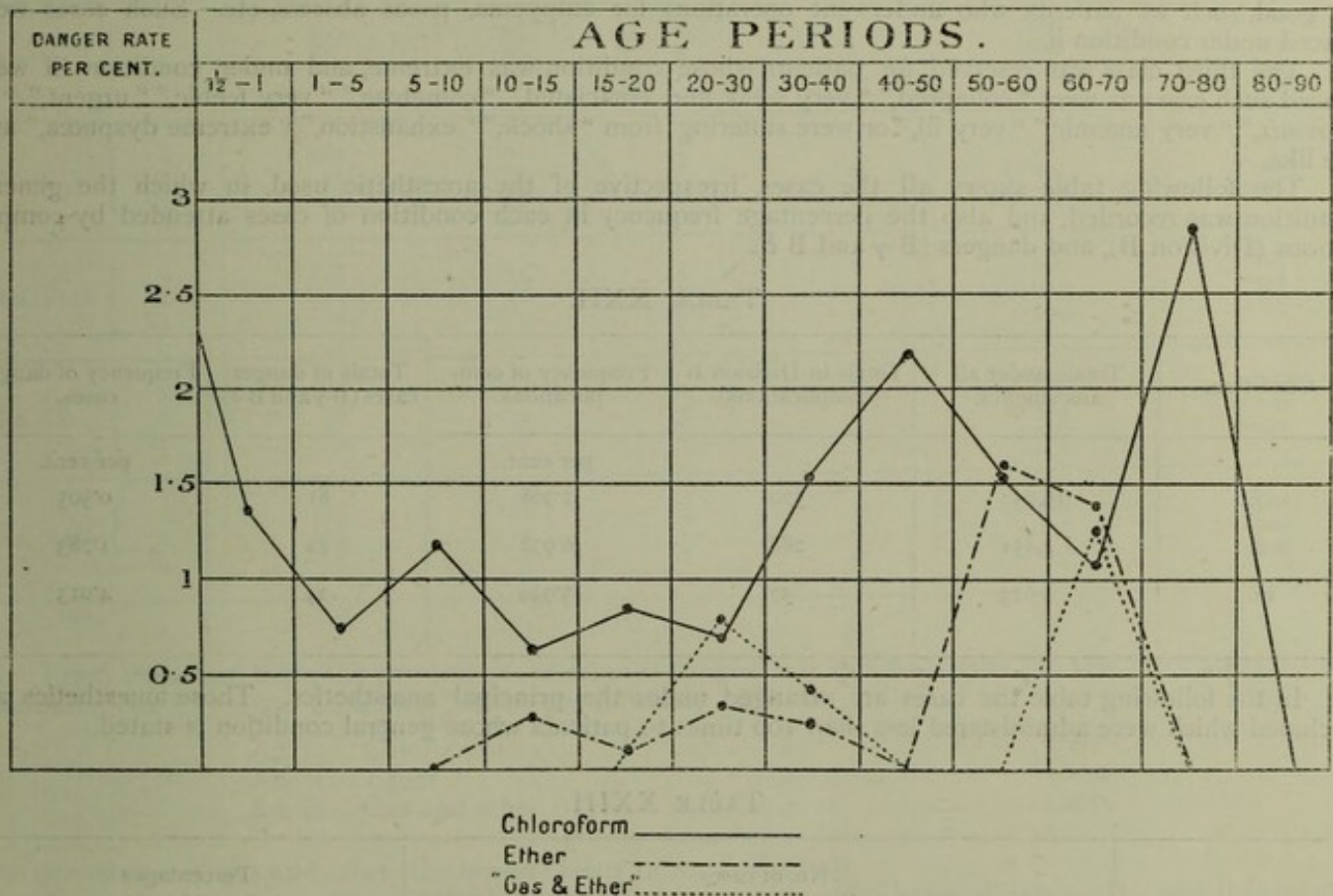
The 0 to $\frac{1}{2}$ period (with 33 cases), and 80 to 90 (with 16), must be excluded because of small numbers; but it is remarkable that out of 36 administrations to children under one month there were three cases of danger (cases 611, 628, 630).

Ether and Gas and Ether.—The tables show that the percentages of cases of danger are generally much lower than those of chloroform, the highest in the case of ether being in the 50 to 60 and 60 to 70 periods; in the case of gas and ether in the 20 to 30 and 60 to 70 periods.

The administrations of the remaining anæsthetics distributed over the different age periods give such small numbers that no reliable generalisations can be drawn from them.

CHART,

Showing the percentages of cases of danger (including death) for the different age periods in connection with anæsthetics 1, 2, and 3.



GENERAL CONDITION.

Notes upon the patient's condition of health were made in 20,806 cases, out of the total number of 25,896. In the 25,163 uncomplicated cases the patient's condition was recorded 20,111 times, while in the 733 complicated cases notes were made in 623 instances.

The cases in which special pathological states were recorded are dealt with at p. 76. The

statements made in regard to the condition of the patient's health were so various that it was considered expedient to treat this question as a whole upon broad lines, and for that purpose all cases in which the general condition of health, or the particular pathological state, was noted were placed in one of three comprehensive classes called conditions of health 1, 2, and 3, or *good*, *not good*, and *very bad* conditions of health respectively. The first condition includes all patients who were in good or average health. As an instance of some of the notes which led cases to be placed in this class may be mentioned "average," "fair," "sound health," "satisfactory," and the like.

Sometimes a note such as "tall" or "thin" justified the placing of a case in this first division, since nothing was said against the patient's health; but where no such negative evidence of ill health was available the case was excluded from the tables.

Condition ii may be shortly defined as including all patients who are not in good health, provided that their condition was not extremely bad.

As instances of observations which led to the classification of cases under this condition may be cited:—"Indifferent," "unhealthy," "senile," "wasted," "syphilitic," "anæmic," "alcoholic," "athéromatous," "bronchitic," "cardiac disease," "hectic," "tubercular," "jaundiced," "empyema," "delirious," etc.

Many cases were noted as being in fair condition when the operation showed that their health could not be good, such as patients who underwent operations for empyema, psoas abscess, etc. Such cases were placed under condition ii.

The third class was reserved for patients whose condition was extreme, and under condition iii were placed such cases as were "collapsed," "very weak and emaciated," "comatose," "very feeble," "urgent," "*in extremis*," "very anæmic," "very ill," or were suffering from "shock," "exhaustion," "extreme dyspnœa," and the like.

The following table shows all the cases, irrespective of the anæsthetic used, in which the general condition was recorded, and also the percentage frequency in each condition of cases attended by complications (Division B), and dangers (B γ and B δ).

TABLE XXII.

Condition.	Totals under all anæsthetics.	Totals in Division B (complications).	Frequency of complications.	Totals of danger cases (B γ and B δ).	Frequency of danger cases.
			per cent.		per cent.
i.	16,032	370	2'308	81	0'505
ii.	4,151	288	6'938	74	1'783
iii.	623	37	5'939	25	4'013

In the following table the cases are arranged under the principal anæsthetics. Those anæsthetics are excluded which were administered less than 100 times to patients whose general condition is stated.

TABLE XXIII.

Conditions.	No. of cases.				Percentages	
	Divisions A and B together.	Division A (uncomplicated)	Division B (complicated).	B γ and B δ (danger).	Of complicated cases (B).	Of danger cases, B γ and B δ .
An. I. {						
i.	9,186	8,953	233	68	2'536	0'740
ii.	2,595	2,418	177	52	6'820	2'003
iii.	407	384	23	17	5'651	4'177
An. II. {						
i.	3,323	3,248	75	5	2'257	0'150
ii.	771	719	52	7	6'746	0'929
iii.	97	91	6	2	6'185	2'062

TABLE XXIII—*continued.*

Conditions.	No. of cases.				Percentages	
	Divisions A and B together.	Division A (un-complicated).	Division B (complicated).	B γ and B δ (Danger).	Of complicated cases (B).	Of danger cases (B γ and B δ).
An. III. {						
i.	1,668	1,645	23	2	1'379	0'119
ii.	208	190	19	4	9'135	1'823
iii.	42	39	3	2	7'143	4'762
An. IV. {						
i.	441	431	10	1	2'268	0'227
ii.	153	148	5	2	3'266	1'307
iii.	22	21	1	0	4'545	0'000
An. V. {						
i.	269	264	5	1	1'860	0'372
ii.	115	109	6	2	5'218	1'739
iii.	8	7	1	1	12'500	12'500
An. VII. {						
i.	103	101	2	0	1'942	0'000
ii.	53	45	8	4	15'094	7'547
iii.	17	15	2	2	11'765	11'765
An. VIII. {						
i.	118	114	4	2	3'389	1'695
ii.	43	40	3	1	6'977	2'326
iii.	5	5	0	0	0'000	0'000
An. IX. {						
i.	106	104	2	0	1'887	0'000
ii.	37	32	5	0	13'513	0'000
iii.	3	3	0	0	0'000	0'000
An. XIV. {						
i.	185	181	4	1	2'162	0'540
ii.	78	77	1	0	1'136	0'000
iii.	7	7	0	0	0'000	0'000

From the above table the percentages of cases of danger (B γ and B δ) under the first three anæsthetics in Condition No. i. ("Good Condition") show the following ratio:—

An. i.	Chloroform ...	...	...	...	...	6'217
An. ii.	Ether ...	...	...	...	...	1'260
An. iii.	Gas and ether ...	...	...	...	...	1'000

the percentage of gas and ether (the lowest) being taken as the unit.

From the data it may be calculated that the frequency with which cases of danger (B γ and B δ) occurred in patients in good condition with the first three anæsthetics was as follows:—

With	chloroform	one	in	every	133	administrations.
"	ether	"	"	"	654	"
"	gas and ether	"	"	"	834	"

The comparatively high danger rate of chloroform in healthy patients is further emphasised by the following facts:—Adding together the figures for anæsthetics 1, 4, 5, 8, and 14, in all of which chloroform was used alone or in mixture, either throughout or after anæsthesia had been induced by ether (anæsthetic 8), a total is obtained of 10,199 patients in "Condition I," with 73 cases of danger, giving a ratio of 0'716 per cent. This contrasts strongly with the danger rate amongst patients in "Condition I" under ether, when

employed throughout and when employed after the induction of anæsthesia by chloroform, A.C.E., or gas. Adding together the figures for anæsthetics 2, 3, 7, and 9, a total of 5,200 patients in good condition is obtained, with 7 cases of danger, giving a rate of 0·135 per cent, which is less than one-fifth of the danger rate in the former group of anæsthetics.

The figures under Conditions "II" and "III" are much smaller than those under "Condition I" but the tendency for cases of danger, due wholly or in part to the anæsthetic, to occur in patients of "Condition II" is much more marked than in those of "Condition I."

To compare chloroform with ether in patients of "Condition II," the danger rates are as follows:—

Chloroform.	Ether.
2·003	0·929

And comparing the two groups of anæsthetics that were contrasted in patients of good condition, it appears that for "Condition II" these are the danger rates:—

In the Chloroform group. (Anæsthetics 1, 4, 5, 8, and 14.) (2,984 cases)	1·910	In the Ether group. (Anæsthetics 2, 3, 7, and 9.) (1,070 cases)	1·402
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In patients of "Condition III" there is a marked increase of the tendency for danger to occur upon those in "Condition II."

For patients of "Condition III" the danger rates are as follows:—

Chloroform.	Ether.
4·177	2·062
Chloroform group. (449 cases)	Ether group. (159 cases)
4·009	3·773

Thus the relative dangers of chloroform and ether appear to become more equal as the patients' condition becomes worse.

As regards the percentage frequency of the complicated class as a whole in patients of the three conditions, the tables show no striking difference between the different anæsthetics.

PATHOLOGICAL STATES.

In addition to the notes in column 4 of the record books as to the patient's general state of health, notes were often recorded respecting some definite disease or pathological state from which the patient was suffering. Although there was a presumption in many cases that some definite disease or lesion existed, such cases were excluded from this section when no definite evidence was contained in the notes.

Of the total number of 25,896 cases in the record books, 4,126—that is, almost one-sixth—were mentioned as showing some definite pathological state. Of these, 3,849 occurred in Division A, and 277 in Division B. In 16,680 cases there was no note of any definite pathological state, although the general condition was recorded, and in the remaining 5,090 cases no note was made as to the patient's condition of health.

The following table shows the percentages of uncomplicated and complicated cases (Divisions A and B) in which pathological states were noted, under all anæsthetics, and under the first five anæsthetics separately. The number of cases being so small, it was thought inadvisable to carry the table farther.

TABLE XXIV.

Anæsthetic.	1. Total cases in Division A.	2. No. of cases in Division A in which pathological state was noted.	Proportion of col. 2 to col. 1.	3. Total cases in Division B.	4. No. of cases in Division B in which pathological state was noted.	Proportion of col. 4 to col. 3.
			per cent.			per cent.
All (1 to 45)	25,163	3,849	15.25	733	277	37.79
1	12,955	2,423	18.70	438	167	38.13
2	4,455	667	14.97	140	42	30.00
3	2,026	239	11.79	45	22	48.8
4	660	166	25.15	18	7	38.8
5	406	44	10.84	12	9	75.00

Although a marked difference seems to occur in the incidence rate of complications in the healthy and in the pathological, yet it must be remembered that the observers were specially requested to mention any pathological state present in cases in which complications appeared, and further that there is no doubt that the tendency to record a pathological state is greater when the course of anæsthesia shows some departure from the normal than when no complication occurs. In spite of this reservation, it is noteworthy that the table shows a distinctly different ratio of complications in healthy and in pathological subjects.

It must also be borne in mind, in considering the above table, that the choice of a particular anæsthetic was doubtless often determined by the presence of a particular pathological condition.

Regarding particular pathological states, mention was made by the observers of the following conditions:—

General States.—Coma, emaciation, pyrexia, hectic, pyæmia, septicæmia, typhoid state, erysipelas, cellulitis, amyloid disease, tuberculosis, lupus, shock, collapse, rickets.

General Diseases.—Ague, exophthalmic goitre, malignant disease, myxœdema, deformities.

Nervous System.—Alcoholism, delirium, delirium tremens, locomotor ataxy, morphinomania, lunacy, cerebral and cerebellar disease, epilepsy, tetanus, paralysis, hydrocephalus, "neuroses."

Alimentary Tract.—Jaundice, cirrhosis of the liver, abscess of liver, ascites, peritonitis, acute intestinal obstruction, glycosuria.

Circulatory System.—Anæmia, hæmophilia, cachexia, cyanosis, valvular and other diseases of the heart, atheroma of vessels.

Respiratory System.—Asthma, diphtheria, dyspnœa, laryngeal obstruction, thoracic growths, bronchitis, pneumonia, pleurisy, pleuritic effusion, empyema, emphysema, pulmonary phthisis.

Urinary Tract.—Albuminuria, hæmaturia, acute nephritis, abscess of kidney, scrofulous kidney, lardaceous kidney, retention of urine.

Under most of the headings the numbers recorded were few, and in some instances cases were placed in Division A, but no corresponding cases occurred in Division B, so no comparison was possible. The following tables show the numbers recorded in Divisions A and B, and the ratio of instances of complications and dangers in such pathological states as gave sufficient numbers to make percentages of any value. Conditions of which less than 20 records were available have not been included, and only anæsthetics 1, 2, 3, 4, 5, and 14 are dealt with separately.

The totals obtainable from the record books irrespective of the anæsthetic used are given in each case at the head of the table, and it is necessary to bear in mind that these figures are often larger than the totals of those anæsthetics which are given separately below.

TABLE XXV.—EMACIATION.

Anæsthetic.	Total Records in A (uncomplicated).	Cases in B (complicated).	Cases in B γ and B δ (danger).	Ratio of B to total.	Ratio of B γ and B δ to total.
All	67	8	2	10.66	2.6
1	31	5	1	13.8	2.7
2	20	3	1	13.04	4.35
3	4	—	—	—	—
4	—	—	—	—	—
5	—	—	—	—	—
14	1	—	—	—	—

Anæsthetic.	Total records in A (uncomplicated).	Cases in B (complicated).	Cases in B γ and B δ (danger).	Ratio of B to total.	Ratio of B γ and B δ to total.
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TABLE XXVI.—SHOCK AND COLLAPSE.

All	82	8	7	8.8	7.7
1	42	5	4	10.64	8.51
2	22	1	1	4.35	4.35
3	2	1	1	33.3	33.3
4	1	0	0	0.0	0.0
5	1	1	1	50.0	50.0
14	2	0	0	0.0	0.0

TABLE XXVII.—ANÆMIA.

All	579	39	12	6.31	1.94
1	369	23	7	5.87	1.79
2	67	5	1	6.94	1.39
3	76	3	1	3.79	1.26
4	11	1	0	8.3	0.0
5	10	2	1	16.6	8.3
14	6	0	0	0.0	0.0

TABLE XXVIII.—PYREXIA.

All	111	2	1	1.77	0.88
1	65	1	0	1.52	0.00
2	30	0	0	0.0	0.00
3	8	1	1	11.1	11.1
4	2	0	0	0.0	0.0
5	—	—	—	—	—
14	—	—	—	—	—

TABLE XXIX.—PYÆMIA.

Including septicæmia, sapræmia, erysipelas, cellulitis.

All	76	2	0	2.56	0.0
1	51	1	0	1.92	0.0
2	12	1	0	7.69	0.0
3	3	0	0	0.0	0.0
4	2	0	0	0.0	0.0
5	1	0	0	0.0	0.0
14	—	—	—	—	—

TABLE XXX.—MALIGNANT DISEASE.

Including cancer, whether general or local, and cases designated "malignant" by the observers.

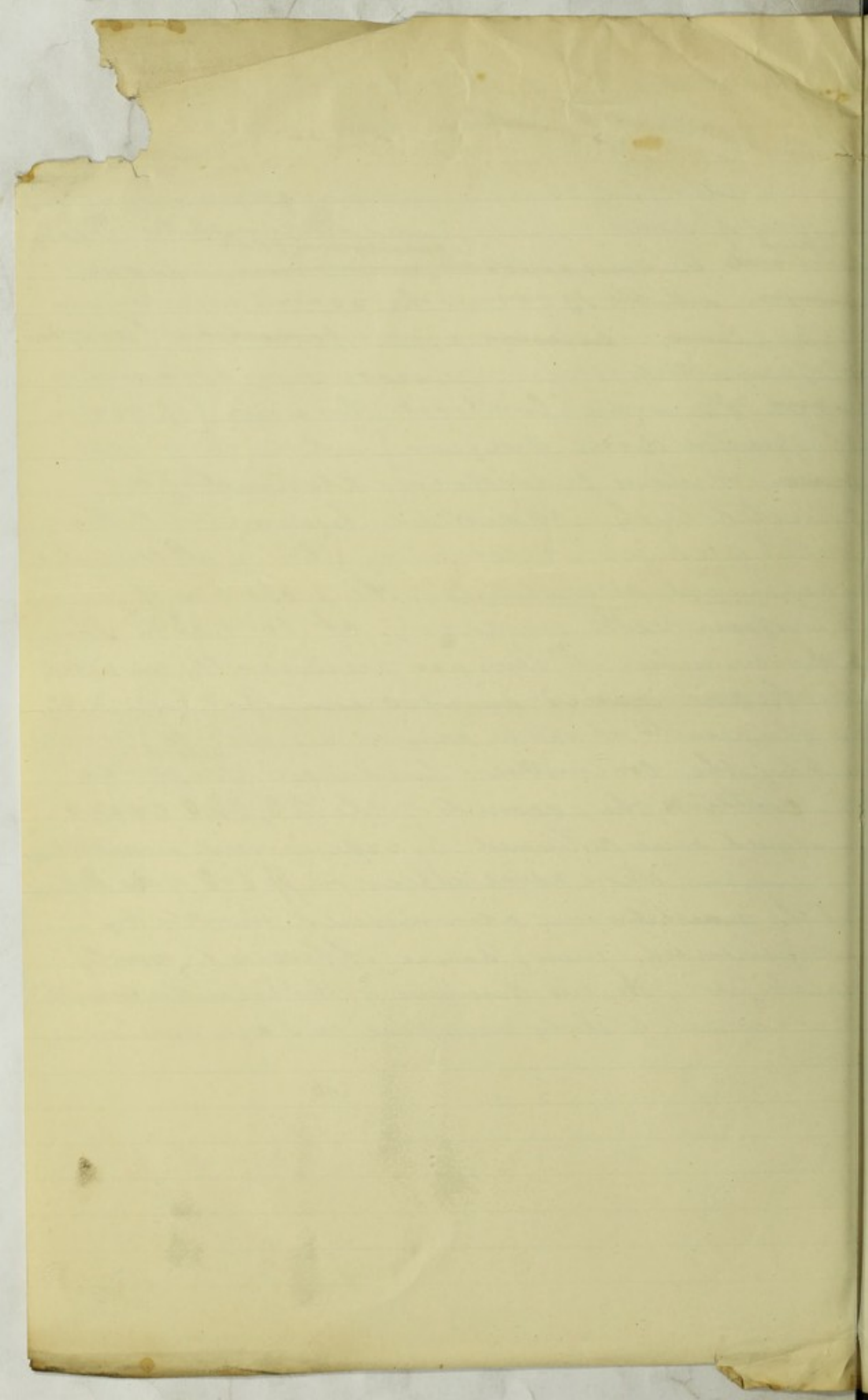
All	503	23	0	4.37	0.0
1	216	14	0	6.09	0.0
2	148	5	0	3.26	0.0
3	56	1	0	1.76	0.0
4	24	1	0	4	0.0
5	5	1	0	16.6	0.0
14	24	0	0	0.0	0.0

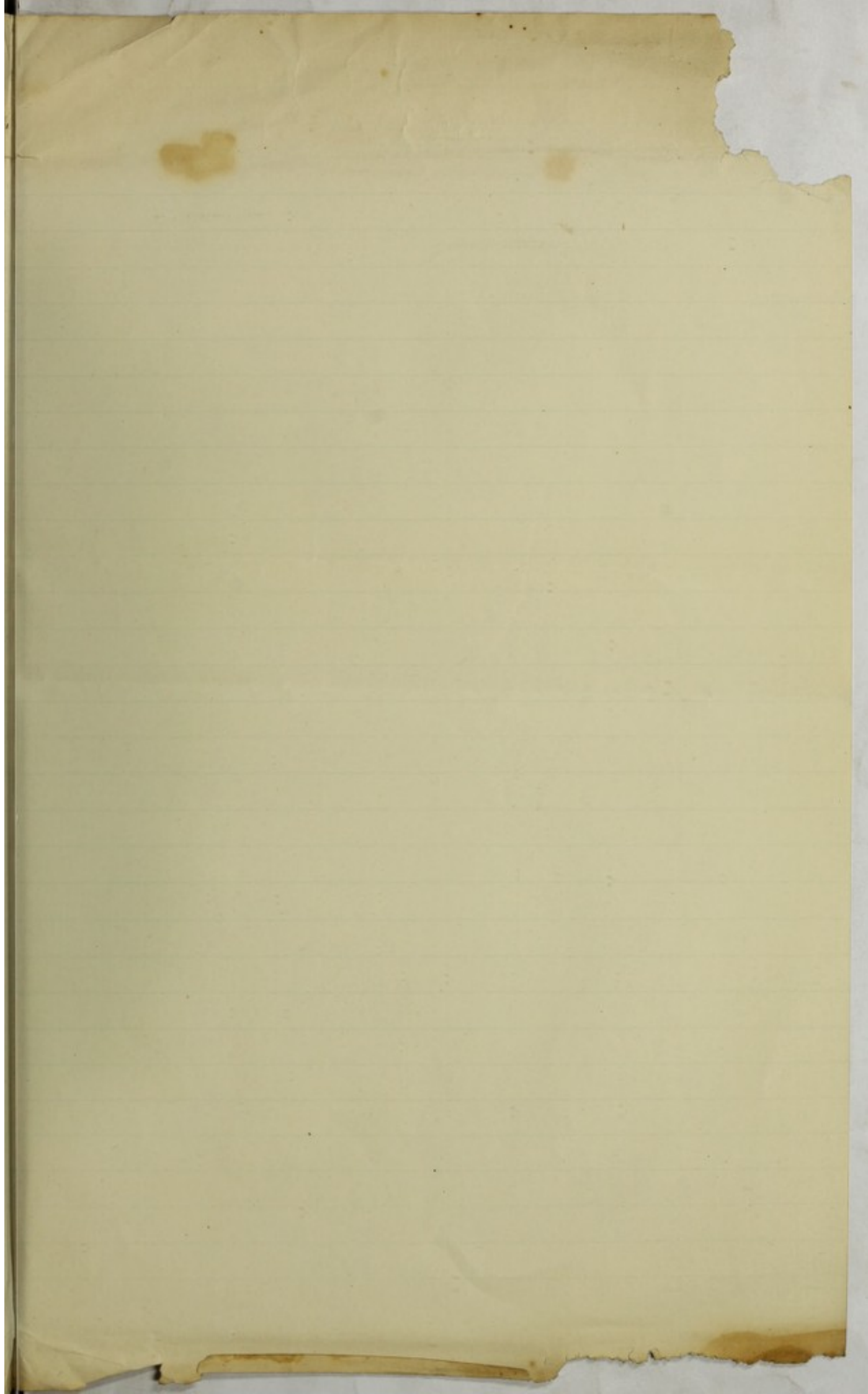
Death rate under Chloroform.

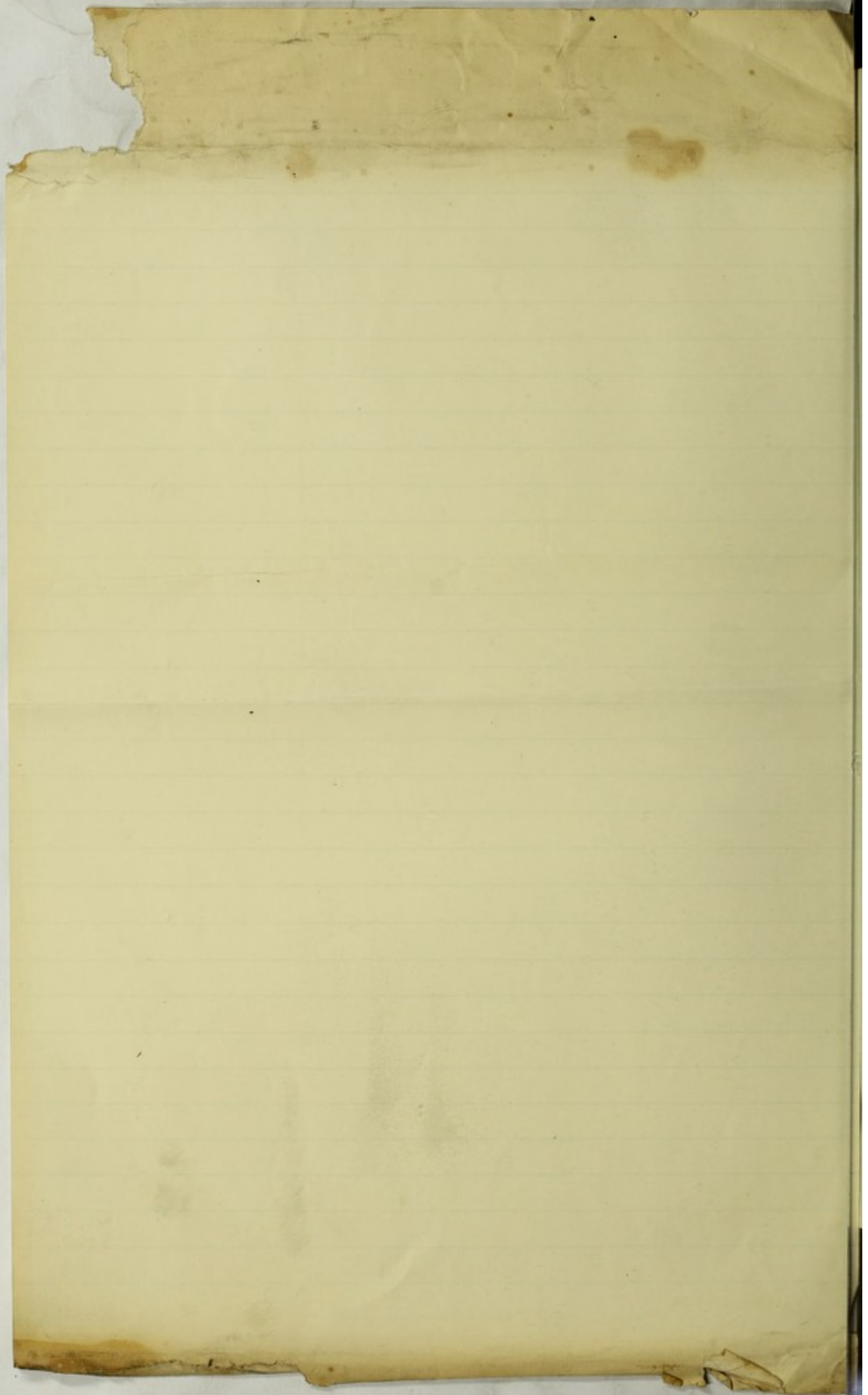
To the Editor of the British Medical Journal.

Sir,

In a letter (July 26 p. 118) addressed to you upon the subject of "Sudden death under an anaesthetic" Dr. Levy ^{reflects} ~~contrasts~~ the series of 18,000 ^{chloroform cases} in the practice of one Surgeon with the 13,000 — the actual number was 13,393 cases. — collected by the Anaesthetics Committee of the British Medical Association appointed in 1891. He writes: "Contrast this series [18,000 in the practice of one Surgeon] with the 13,000 odd ~~cases~~ ordinary chloroform administrations collected by the Anaesthetics Committee of the British Medical Association [1891], all conducted by experienced anaesthetists; the proportion of Chloroform deaths works out at 1 in 1,339." The statistics are mine. Dr. Levy has presumably consulted the Report issued in 1900 somewhat hurriedly as the results at wh. he arrives are not ~~to~~ ^{very} borne out by the Committee's findings. The ^{records} books wh. contain the accounts of the 25,920 cases analysed were returned by "experienced anaesthetists" or surgeons whose name appear on pp 6-8 of the Report but the anaesthetics were administered mostly by inexperienced men, house officers & newly qualified. As Vice-Chairman of the Executive Committee it was my duty to study every case, so I am sure upon point.







Anæsthetic.	Total records in A (uncomplicated).	Cases in B (complicated).	Cases in B γ and B δ (danger).	Ratio of B to total.	Ratio of B γ and B δ to total.
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TABLE XXXI.—AFFECTIONS OF THE HEART.
Including valvular disease, "weak action," degeneration, dilatation, etc.

All	181	25	8	12'13	3'88
1	72	14	6	16'28	6'98
2	22	3	0	12'0	0'0
3	16	0	0	0'0	0'0
4	8	1	0	11'1	0'0
5	8	1	0	11'1	0'0
14	33	1	0	2'94	0'0

TABLE XXXII.—VALVULAR DISEASE OF HEART ALONE.

All	133	14	3	9'52	2'04
1	58	7	3	10'77	4'61
2	20	3	0	13'04	0'0
3	14	0	0	0'0	0'0
4	4	1	0	20'0	0'0
5	7	1	0	12'5	0'0
14	16	0	0	0'0	0'0

TABLE XXXIII.—TUBERCULOSIS.
Including phthisis.

All	1,572	43	6	2'66	0'37
1	1,140	32	5	2'76	0'438
2	247	4	0	1'59	0'0
3	35	2	0	5'40	0'0
4	84	1	0	1'17	0'0
5	14	0	0	0'0	0'0
14	18	0	0	0'0	0'0

TABLE XXXIV.—PULMONARY PHTHISIS.

All	870	5	2	0'57	0'22
1	686	3	2	0'43	0'29
2	117	1	0	0'85	0'0
3	10	1	0	9'09	0'0
4	34	0	0	0'0	0'0
5	1	0	0	0'0	0'0
14	13	0	0	0'0	0'0

TABLE XXXV.—BRONCHITIS.

All	61	19	3	23'75	3'75
1	45	9	3	16'6	5'5
2	6	2	0	25'0	0'0
3	3	3	0	50'0	0'0
4	4	1	0	20	0'0
5	—	—	—	—	—
14	1	0	0	0'0	0'0

Anæsthetic.	Total records in A (uncomplicated).	Cases in B (complicated).	Cases in B γ and B δ (danger).	Ratio of B to total.	Ratio of B γ and B δ to total.
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TABLE XXXVI.—EMPHYEMA.

All	133	7	3	5'0	2'14
1	98	7	3	6'6	2'86
2	10	0	0	0'0	0'0
3	5	0	0	0'0	0'0
4	12	0	0	0'0	0'0
5	1	0	0	0'0	0'0
14	3	0	0	0'0	0'0

TABLE XXXVII.—EMPHYSEMA.

All	28	11	6	28'20	15'38
1	15	6	4	28'57	19'05
2	5	1	1	16'6	16'6
3	0	1	0	100'0	0'0
4	4	0	0	0'0	0'0
5	—	—	—	—	—
14	—	—	—	—	—

TABLE XXXVIII.—ALCOHOLISM.

All	163	26	9	13'76	4'76
1	69	13	7	15'85	8'54
2	50	6	0	10'71	0'0
3	12	3	0	20	0'0
4	2	1	1	33'3	33'3
5	4	1	0	20	0'0
14	11	0	0	0'0	0'0

TABLE XXXIX.—EPILEPSY.

All	19	2	0	9'52	0'0
1	10	1	0	9'09	0'0
2	5	1	0	16'6	0'0
3	1	0	0	0'0	0'0
4	—	—	—	—	—
5	—	—	—	—	—
14	1	0	0	0'0	0'0

From a consideration of the foregoing tables the following facts appear:—

1. *Emaciation.*—While the complication and danger rates retain their relation to each other, both show an increase of about four times the corresponding rates for all patients, irrespective of condition.

2. *Shock and Collapse.*—While the complication rate under all anæsthetics and under chloroform is increased more than three times, the danger rate under all anæsthetics is more than eleven times augmented, and under chloroform more than eight times. In other words, 7 out of 8 cases of complication were cases of danger. The tendency to employ ether in cases of shock and collapse is seen to some extent in the table, while of the 12 cases which do not appear in the table—all of which were uncomplicated—to 9 was given ether preceded by some other anæsthetic.

3. *Anæmia*.—A considerable number of cases of this condition were recorded, and the table shows that the incidence of complications is more than twice that obtained from all cases. In the cases under chloroform and "gas and ether," however, the increase was less than twice. Thirteen of the 45 cases which were under other anæsthetics than those given in the table were nitrous oxide cases (anæsthetic 28), and 3 of these (23·08 per cent.) were complicated cases. The danger rate for patients suffering from anæmia was increased more than twice, but the increase is less marked with chloroform than with ether and "gas and ether." Chloroform appears to have been employed with more than usual frequency in anæmic patients.

4. *Pyrexia*.—In these cases, of which 113 are recorded, the complication rate is considerably lessened. There was, however, one case of danger (out of a total of 9) under gas and ether.

5. *Pyæmia, etc.*—The complication rate is about the same as that for all patients, and no case of danger appears in the 78 cases of this condition which were recorded.

6. *Malignant Disease*.—Out of a large number of cases the complication rate is sensibly increased, the increase being due in the main to the higher complication rate under chloroform (nearly double), while the rates for ether and "gas and ether" are little altered. It is noteworthy that there is no recorded case of danger in the 526 cases in this table.

7. *Affections of the Heart*.—There seems to have been no marked tendency to select any particular anæsthetic in cases suffering from these conditions. The apparently large number of cases under anæsthetic 14 is due to the fact that they all occurred in the practice of one observer, who almost always employed this succession of anæsthetics, and who seems to have recorded these affections with especial care. The complication rate in these affections is increased more than four times, and under chloroform the danger rate is as high as 6·98, as against the danger rate 1·032 for the whole of the chloroform cases. Six of the 8 cases of danger occurred under this anæsthetic, out of a total of 86 cases of heart affections in which it was employed. The other 2 cases of danger, which do not appear in the table, occurred under anæsthetic 7 (chloroform followed by ether).

8. *Valvular Disease of the Heart*.—The remarks that have been made with reference to the selection of the anæsthetic in affections of the heart generally also apply to valvular disease alone. There was no tendency observable to employ one anæsthetic more than another. The complication and danger rates were augmented to about three times these rates for all patients. The only three cases of danger occurred under chloroform, giving a danger rate of 4·61 per cent. for this anæsthetic in valvular disease.

There were instances of all varieties of valvular disease in the record books excepting tricuspid disease, but there is nothing in the records to show that one kind more than another has any special influence in modifying the course of anæsthesia.

9. *Tuberculosis, including Phthisis*.—The 1,615 cases of some form of tuberculosis recorded in this table exhibit a complication rate rather below that for all cases. This does not, however, apply to gas and ether (anæsthetic 3), for which the rate was in 37 cases considerably increased. A noteworthy contrast to this is furnished by the 251 ether cases in the table, in which the complication rate is almost halved. The danger rate for these conditions is notably diminished, danger cases being only recorded under anæsthetics Nos. 1 and 7. Out of the 1,172 chloroform cases 5 were cases of danger, giving a rate of 0·438, or less than half the general chloroform danger rate.

10. *Pulmonary Phthisis*.—The remarks in the previous section apply with even greater force to this table. Anæsthesia in pulmonary phthisis is remarkably free from complications and dangers throughout the whole of the record books.

11. *Bronchitis*.—The liability to complications appears to be very largely increased in this condition, and the danger rate is more than five times increased under chloroform, all 3 danger cases occurring with this anæsthetic.

12.—*Empyema*.—Of 140 cases in which this condition was recorded there were 7 cases of complications, 3 of them being cases of danger. These complicated cases all occurred with chloroform, the total chloroform cases with empyema being 105, so that the chloroform complication rate when this disease is present is increased to more than twice the general chloroform complication rate, while the danger rate shows a still larger increase. With other anæsthetics the numbers were so small that although no complicated case arose no conclusion can be deduced from this fact.

13. *Emphysema*.—Although only 39 cases are recorded, the complication and danger rates are higher than in any of the other pathological states in the tables. It would seem that this condition exerts a considerable influence in determining the occurrence of complications, but the numbers are too small to permit of a comparison between the different anæsthetics.

14. *Alcoholism*.—This condition prejudicially affected the course of anæsthesia in a marked degree. Irrespective of the kind of anæsthetic employed, the liability to complications was increased fivefold, and to dangers more than six times. Under chloroform alone, while the complication rate is increased to nearly

five times, the danger rate is augmented to eight times the general chloroform danger rate. Out of 13 complicated cases under this anæsthetic, no less than 7 were cases of danger. It would appear from the table that ether was employed for patients in this condition in a larger proportion of cases than usual. In the 56 cases in which it was used, the complication rate is increased more than three times, but there was no case of danger.

15. *Epilepsy*.—The numbers are too few for comment.

Among the conditions not included in the above tables, owing to the small number of cases recorded, albuminuria, as a pre-existing state, is mentioned eighteen times—eight times under chloroform, with 3 complicated cases, but no case of danger; six times under ether, with 3 complicated cases, of which 2 were deaths, one from brain hæmorrhage and one from uræmia, both cases occurring several days after the administration, and both placed in Class II (cases incapable of exact classification.) (*Vide* cases 727, 728.)

Single instances of each of four conditions were recorded, and in every case dangerous complications marked the course of anæsthesia. These were one case each of myxœdema and adhesions of lung under chloroform, Raynaud's disease under gas and ether, and influenza under A.C.E. mixture.

To summarise the foregoing section, it will be observed that there is an increased liability to the occurrence of complications and dangers in patients suffering from the following conditions:—Emphysema, shock and collapse, alcoholism, affections of the heart generally, emaciation, empyema, bronchitis, valvular diseases of the heart, and anæmia.

Symptoms of danger were particularly prone to arise under chloroform in emphysema, shock and collapse, alcoholism, affections of the heart generally, valvular disease of the heart, and empyæma.

Further, when complications arose in such conditions as shock and collapse, emphysema, and alcoholism, they exhibited a markedly increased percentage of cases of danger; while in patients suffering from malignant disease and febrile conditions the complications were unusually free from danger.

Lastly, in patients suffering from pyrexia, tuberculosis, and pulmonary phthisis (especially the latter) anæsthesia was more than usually free from complications and dangers. The remarkable diminution of the chloroform danger rate in a large number of cases of tuberculosis, and especially in phthisis, deserves attention.

PREPARATION OF PATIENT, TEMPERATURE OF OPERATING ROOM, ETC.

Many observers afford more or less information on these points, and in the printed cases in this Report wherever such notes are available they have been added. But the notes are too few to enable the Committee to deduce conclusions therefrom.

DURATION OF ADMINISTRATION.

The duration of administration, which for the sake of uniformity is always stated in minutes, was recorded in 16,149 cases, of which 15,707 have been regarded as uncomplicated (Division A), and 442 as complicated (Division B). The cases are arranged below in nine tables. It must be noted that "duration" in the "danger" and "death" cases (B γ and B δ) is calculated from the commencement of the administration to the time at which dangerous or fatal symptoms arose, no cognisance being taken of subsequent administration in the "danger" cases.

TABLE XL, showing the duration of administration, irrespective of the anæsthetic employed, in 16,149 cases, arranged in seven duration periods, and the percentage incidence of complicated (B) and "danger" (B γ and B δ) cases for those periods.

Duration in minutes.	Uncomplicated cases (Div. A).	Complicated cases (Div. B).	A and B together.	Percentage of B in total.	Danger cases.		B γ and B δ together.	Percentage of danger cases in total.
					B γ .	B δ .		
Under 5	420*	6	426†	1'41	2	1	3	1'58
5 to 10	3,615	84	3,699	2'27	31	6	37	1'00
10 to 15	2,878	60	2,938	2'04	23	3	26	0'88
15 to 30	5,259	130	5,389	2'41	41	7	48	0'89
30 to 60	2,799	129	2,928	4'40	22	4	26	0'88
60 to 120	691	31	722	4'29	1	2	3	0'41
Over 120	45	2	47	4'25	0	1	1	2'12
	15,707	442	16,149	2'73	120	24	144	0'89

As there were no less than 31 different anæsthetics employed in the cases included in Table XL, any conclusions drawn from this table as to the influence of duration of administration are necessarily of much less value than in the succeeding tables, which deal with each anæsthetic separately.

TABLE XLI, showing the duration of administration in 8,097 chloroform cases, arranged in seven duration periods, and the percentage incidence of complicated (B) and danger (B γ and δ) cases for those periods.

Duration in minutes.	Uncomplicated cases (Div. A).	Complicated cases (Div. B).	A and B together.	Percentage of B in total.	Danger cases.		B γ and B δ together.	Percentage of danger cases in total.
					B γ .	B δ .		
Under 5	145	3	148	2'02	2	1	3	2'02
5 to 10	2,182	64	2,246	2'84	27	5	32	1'42
10 to 15	1,579	43	1,622	2'65	20	3	23	1'41
15 to 30	2,452	92	2,544	3'61	36	4	40	1'57
30 to 60	1,163	86	1,249	6'88	17	2	19	1'52
60 to 120	256	16	272	5'88	0	1	1	0'33
Over 120	16	0	16	0'0	0	0	0	0'0
	7,793	304	8,097	3'75	102	16	118	1'45

TABLE XLII, showing the duration of administration in 4,138 ether cases, arranged in seven duration periods, and the percentage incidence of complicated (B) and danger (B γ and B δ) cases for those periods.

Duration in minutes.	Uncomplicated cases (Div. A).	Complicated cases (Div. B).	A and B together.	Percentage of B in total.	Danger cases.		B γ and B δ together.	Percentage of danger cases in total.
					B γ .	B δ .		
Under 5	14	2	16	12'50	0	0	0	0'0
5 to 10	755	14	769	1'82	0	1	1	0'13
10 to 15	731	8	739	1'08	2	0	2	0'27
15 to 30	1,498	18	1,516	1'12	1	1	2	0'13
30 to 60	842	26	868	2'99	4	1	5	0'57
60 to 120	209	6	215	2'79	0	0	0	0'0
Over 120	15	0	15	0'0	0	0	0	0'0
	4,064	74	4,138	1'78	7	3	10	0'24

* Including 237 nitrous oxide cases.

† For percentage purposes the 237 nitrous oxide cases are excluded, and 189 is the number on which the ratio is reckoned.

TABLE XLIII, showing the duration of administration in 1,805 "gas and ether" cases, arranged in seven duration periods, and the percentage incidence of complicated (B) and "danger" (B γ and B δ) cases for those periods.

Duration in minutes.	Uncomplicated cases (Div. A).	Complicated cases (Div. B).	A and B together.	Percentage of B in total.	Danger cases.		B γ and B δ together.	Percentage of danger cases in total.
					B γ .	B δ .		
Under 5	20	0	20	0'0	0	0	0	0'0
5 to 10	420	4	424	0'94	2	0	2	0'47
10 to 15	313	2	315	0'63	0	0	0	0'0
15 to 30	591	7	598	1'17	2	1	3	0'50
30 to 60	339	4	343	1'16	0	0	0	0'0
60 to 120	97	1	98	1'02	0	0	0	0'0
Over 120	6	1	7	14'28	0	0	0	0'0
	1,786	19	1,805	1'05	4	1	5	0'27

TABLE XLIV, showing the duration of administration in 588 A.C.E. cases, arranged in seven duration periods, and the percentage incidence of complicated (B) and "danger" (B γ and B δ) cases for those periods.

Duration in minutes.	Uncomplicated cases (Div. A).	Complicated cases (Div. B).	A and B together.	Percentage of B in total.	Danger cases.		B γ and B δ together.	Percentage of danger cases in total.
					B γ .	B δ .		
Under 5	2	0	2	0'0	0	0	0	0'0
5 to 10	172	1	173	0'57	1	0	1	0'57
10 to 15	120	4	124	3'22	1	0	1	0'80
15 to 30	191	2	193	1'03	0	0	0	0'0
30 to 60	76	2	78	2'56	0	0	0	0'0
60 to 120	16	0	16	0'0	0	0	0	0'0
Over 120	2	0	2	0'0	0	0	0	0'0
	579	9	588	1'53	2	0	2	0'34

TABLE XLV, showing the average duration of administration in uncomplicated chloroform cases (Division A), and the average duration of administration in complicated chloroform cases (Division B) arranged according to their degrees of complication, the duration of the "danger" and "death" cases (B γ and B δ) being, in this and the three following tables, calculated, as before, up to the commencement of the dangerous or fatal symptoms only.

—				No. of administrations.	Total duration in minutes.	Average duration of each administration.
Uncomplicated cases.	Division A	...	...	7,793	177,277	22'748
Complicated cases.	Division B	Subdivision a	...	117	4,306'5	36'808
		" β	...	69	1,956'0	28'347
		" γ	...	102	2,104'5	20'632
		" δ	...	16	356'0	22'25
	B totals	...	...	304	8,723'0	28'686

TABLE XLVI, showing the average duration of administration in uncomplicated ether cases (Division A), and the average duration of administration in complicated ether cases (Division B), arranged according to their degrees of complication.

—				No. of adminis- trations.	Total duration in minutes.	Average duration of each administration.
Uncomplicated cases.	Division A	...	...	4,046	109,702	26'993
Complicated cases. Division B	Subdivision	α	...	37	983	26'56
		β	...	27	1,081	40'03
		γ	...	7	225	32'14
		δ	...	3	85	28'3
B totals			...	74	2,374	32'08

TABLE XLVII, showing the average duration of administration in uncomplicated "gas and ether" cases (Division A), and the average duration of administration in complicated "gas and ether" cases (Division B), arranged according to their degrees of complication.

—				No. of adminis- trations.	Total duration in minutes.	Average duration of each administration.
Uncomplicated cases.	Division A	...	...	1,786	46,794	26'200
Complicated cases. Division B	Subdivision	α	...	10	365	36'50
		β	...	4	182	45'5
		γ	...	4	65	16'25
		δ	...	1	20	20'0
B totals			...	19	632	39'5

TABLE XLVIII showing the average duration of administration in uncomplicated A.C.E. cases (Division A), and the average duration of administration in complicated A.C.E. cases (Division B), arranged according to their degrees of complication.

—				No. of adminis- trations.	Total duration in minutes.	Average duration of each administration.
Uncomplicated cases.	Division A	...	...	579	12,813	22'129
Complicated cases. Division B	Subdivision	α	...	4	69	17'25
		β	...	3	105	35'0
		γ	...	2	25	12'5
		δ	...	0	0	0'0
B totals			...	9	159	22'1

In Table XL the chloroform cases form a little more than half the total; the percentages in the table are therefore largely influenced by that fact.

Tables XLV to XLVIII show that the average duration of administration in uncomplicated cases was for chloroform 22'748 minutes, for ether 26'993, for "gas and ether" 26'200, and for A.C.E. 22'129 minutes. The averages of chloroform and A.C.E. are similar, as also are those of ether and "gas and ether."

Under chloroform (Table XLI) the "complications" rate (percentage incidence of Division B cases) increased with the longer duration of the administration. It was lowest (2'02, 2'84, 2'65, averaging 2'73) in

the three duration periods up to 15 minutes; in cases lasting from 15 to 30 minutes it sensibly increased (being 3·61) and in all cases lasting over 30 minutes the average was as high as 6·63. But the "danger" rate (percentage incidence of B γ and B δ cases) for the different duration periods shows variations very unlike those of the "complications" rate. The total cases in the "under 5 minutes" duration period and in the two duration periods over 60 minutes were very few. It is nevertheless somewhat striking to note the comparatively high incidence of "danger" in 148 cases lasting less than 5 minutes, and the remarkable freedom from "danger" in the 288 cases lasting over an hour. In the remaining four duration periods the "danger" rate was about 1·5.

The "danger" cases that ended fatally had an administration duration of 2, 5, 10 (4 cases), 15 (3 cases), 19, 20 (2 cases), 30, 40, 45, and 90 minutes respectively; so that 12 of the 16 patients (75 per cent.) had died before the average duration of chloroform administration was attained.

Further, it is important to note that the three longest "durations" (40, 45, and 90 minutes respectively) were recorded in cases in which the patients survived the operation, but died subsequently from "after-effects." Thus 12 out of the 13 cases in which death occurred "on the table" (the fatal symptoms being wholly or in part due to the anæsthetic) terminated in less than 22 minutes. In fact, the average duration of administration prior to the onset of the dangerous symptoms in the 118 cases classified under "danger" (102 and death (16) was only 20·85 minutes.

Reference to Table XLV also shows that the average duration of administration in the 117 cases in which minor complications occurred exceeded 36 minutes; whilst in the 186 cases of minor complications (B α) and of anxiety (B β) combined it was 33·67 minutes. Again, of the 117 cases of minor complications 79 (67·5 per cent.) had an administration duration which was more than the average duration of chloroform administrations (22·740 minutes), whilst the 38 cases which had a duration period below the average formed only 32·5 per cent. of the total.

The following facts, therefore, appear:—(1) That the highest minor complication rate was observed, as might be expected, in the longest administrations; in other words, the longer the cases lasted the greater was the chance of some minor complication occurring. (2) That cases of danger, not ending fatally, occurred with about equal frequency in the various duration periods up to 60 minutes; the percentage incidence for the first five periods being respectively 1·35, 1·20, 1·23, 1·41, and 1·36. (3) That in no instance was the onset of non-fatal "danger" (B γ) noted as occurring after 60 minutes from the commencement of chloroform administration.

Under ether (Table XLII) in 16 cases that had an administration duration of less than 5 minutes there were 2 with complications. In the next three duration periods (*i.e.*, up to 30 minutes) the complication percentage was 1·32; whereas in the three duration periods above 30 minutes the mean of the complication percentages was 2·91. The danger rate was highest (0·57) in the cases lasting from 30 to 60 minutes. The cases of death in these tables were 3, their duration being 10, 30, and 45 minutes respectively. The average duration of administration in cases of minor complications (Table XLVI) was less than the corresponding rate in cases of anxiety. As with chloroform, the highest "complication" rates occurred in cases lasting over 30 minutes; but the highest danger rate was also in the cases in which the administration lasted beyond 30 minutes. But, although the complication rate for all durations of administration under ether was 1·78, or nearly half the corresponding rate (3·75) under chloroform, the danger rate under ether sank to 0·24, just one-sixth of the danger rate under chloroform (1·45).

Under "gas and ether" (Tables XLIII and XLVII) the cases of minor complications and cases of anxiety occurred, as a rule, in cases of long duration. The 4 cases of non-fatal danger had a duration of 5, 10, 20, and 30 minutes respectively. The duration in the single case of death tabulated was 20 minutes.

Under A.C.E. there was no case of death noted in these tables, but 2 of non-fatal "danger," which lasted 10 and 15 minutes respectively.

Thus, under all the four principal anæsthetics the onset of dangerous or fatal symptoms occurred, as a rule, in the early stages of anæsthesia; whereas the complications of the later stages of prolonged anæsthesia were generally instances of "minor complications" (B α) or of "anxiety" (B β), and were very rarely cases of "danger," either non-fatal (B γ), or fatal (B δ).

THE OPERATION.

Operation.—Some note as to the operation was made in all but about 500 cases in Class I. The note was usually precise in stating the locality as well as the nature of the operation. Occasionally the latter particular alone was given, and less frequently the locality alone (*e.g.*, "operation upon neck").

At the time of analysing the record books the operations were classified as far as possible in the observer's words, so that there were upwards of 1,000 headings under which the various operations were entered. In order to arrange the operations for comparison these were reduced to 46 groups. At the time of analysing the cases in detail, besides entering each operation in the book provided for the purpose, a note was made in another book of all operations upon the upper air passages, rectum, urethra, abdomen, lower air passages, testicle, kidney, for strangulated hernia, cerebral operations, excision of the eyeball, suprapubic operations, and anæsthetics given during labour. The figures for these selected operations are placed first in the table (Nos. 1 to 12).

In Table XLIX the number of cases in the various group is stated. It must be pointed out that some groups of operations include others. For example, "amputation of extremities" not only includes all the succeeding seven groups, but also a few cases in which "amputation" was the only record. "Excisions generally" includes all excisions of joints and therefore the two following groups, which are given separately because the figures are of interest. "Operations for hernia" include also those for strangulated hernia, and "rectal operations" include excisions of the rectum and operations for hæmorrhoids.

The group "operations involving the upper air passages" includes more cases than would at first sight appear likely from the numbers in groups associated with this region. For example, an operation for nævus of the lip would appear under "small operations," but it would also appear under operations on the upper air passages.

It will be remembered (p. 9) that a case was only placed in the complicated class when the symptoms were due wholly or in part to the anæsthetic. When the operation alone was held to be obviously responsible for the untoward symptoms, the case was regarded as uncomplicated. In Table XLIX, therefore, the effect of the operation apart from the anæsthetic cannot be fully estimated. An attempt is made in the table, however, to gauge the effect which the operation may have had in producing complications when such complications were associated with the anæsthetic. Many of these complications (see abstracts) would not have occurred from the effects of the anæsthetic alone without the operation.

The table shows the numbers of different operations under the principal anæsthetics, with their complication and danger rates. It only deals in detail with the first four anæsthetics, the numbers under succeeding anæsthetics being too small for any useful purpose to be served by carrying it farther.

The most striking fact brought out in the table is that both the complication and danger rates are determined in larger measure by a surgical factor, such as shock from hæmorrhage, interference with important structures, etc., than by the anæsthetic. The difference in the complication and danger rates for amputations of different degrees of severity, and the high rates for excisions of the hip joint, operations upon the thyroid, and excisions of the rectum sufficiently exemplify this fact; while the low complication and danger rates for amputations of the foot or toe, for orthopædic operations, operations on abscesses or glands, operations on bone, and "minor operations" afford corroborative evidence.

Attention is claimed by the high danger rates for operations for strangulated hernia, those involving the pleura or lung, excisions of the eyeball, operations on the testicle and kidney, abdominal operations, and operations involving the upper air passages; and the high complication rate in suprapubic operations, operations on the testicle, and in abdominal operations also deserves mention.

Anæsthetic I. Chloroform.—The particular operations which appear to be attended by the most frequent complications under chloroform are abdominal operations, operations on the testicle, excisions of the larger joints, amputations close to the trunk, excisions of breast, excisions of rectum, suprapubic operations, those involving the pleura or lung, operations for ruptured perineum, operations on the kidney, excisions of the eyeball, and rectal operations generally. The anæsthesia was comparatively free from complications when chloroform was used in labour, for minor operations generally, and for minor amputations. The frequency of complications in operations on tonsils and adenoids was also less than half the average, but it is noteworthy that the three complicated cases were all cases of danger.

Cases of danger under chloroform occurred especially in connection with the following operations:—Major amputations and excisions, operations for ruptured perineum, excisions of the eyeball, operations involving the pleura or lung, abdominal operations, and operations upon the upper air passages. Amongst the 525 operations for circumcision, the large majority being children, there was a danger rate of 1.25. The following operations are associated with a danger rate below the average:—Minor operations generally, operations for dislocation or fractures, orthopædic operations, minor amputations, operations for strangulated hernia, and operations on the vulva or vagina. Ovariectomy and hysterectomy together, although showing one of the highest complication rates, were comparatively free from danger.

Anæsthetic II. Ether.—The complications with this anæsthetic were frequent in the following operations:—Operations for strangulated hernia, operations on the testicle, operations for ruptured perineum, abdominal operations, urethral and rectal operations, operations for hernia other than strangulated, and

ALL ANÆSTHETICS.					DESCRIPTION OF OPERATIONS.	ANÆSTHETIC I.				
Total cases in Divisions A and B together.	Complicated cases (B).	Ratio of B to total.	Danger cases (B y and B δ).	Ratio of danger cases to total.		Total cases in Divisions A and B together.	Complicated cases (B).	Ratio of B to total.	Danger cases (B y and B δ).	Ratio of danger cases to total.
		per cent.		per cent.			per cent.		per cent.	
*1,629	55	3·38	22	1·35	Operations involving upper air passages.	1,057	35	3·31	20	1·89
854	73	8·55	13	1·52	Abdominal operations involving opening of peritoneum (excluding vaginal hysterectomy and all herniotomies).	234	35	14·96	5	2·14
205	16	7·24	5	2·44	Operations involving pleura or lung.	184	15	8·15	5	2·71
115	11	9·56	2	1·74	Operations on testicle.	62	8	12·90	1	1·61
85	9	10·59	—	—	Suprapubic operations on bladder.	41	4	9·76	—	—
719	26	3·62	6	0·83	Operations involving male urethra.	359	10	2·78	6	1·67
121	5	4·13	2	1·65	Kidney operations.	50	3	6·00	1	2·00
1,128	48	4·25	11	0·97	Rectal operations.	455	20	4·39	7	1·53
186	12	6·46	6	3·22	Operations for relief of strangulated hernia.	124	4	3·22	1	0·80
105	5	4·54	—	—	Cerebral operations.	102	4	3·92	—	—
323	13	4·02	6	1·86	Excisions of eyeball.	158	7	4·43	5	3·16
111	1	0·90	—	—	Anæsthetics given for labour.	86	1	1·16	—	—
532	36	6·76	5	0·93	Removal of the breast.	215	25	11·62	4	1·86
45	8	17·7	3	6·6	Operations on the thyroid.	30	4	13·3	2	6·6
1,438	55	3·82	19	1·32	Amputations of extremities, generally.	865	34	3·93	10	1·15
21	2	9·52	2	9·52	" " shoulder and forequarter.	9	1	11·1	1	11·1
119	7	5·87	3	2·52	" " arm and forearm.	73	6	8·21	2	2·73
224	9	4·01	3	1·33	" " hand and finger.	184	4	2·17	2	1·08
28	5	17·85	2	7·14	" " hip.	19	3	15·78	—	—
219	11	5·02	6	2·73	" " thigh.	118	9	7·62	4	3·38
153	9	5·88	1	0·65	" " leg.	83	6	7·22	1	1·20
650	12	1·84	2	0·30	" " foot and toe.	357	5	1·40	—	—
562	40	7·11	10	1·78	Excisions of joints generally.	391	29	7·41	9	2·30
127	15	11·81	3	2·36	" " hip.	96	14	14·58	3	3·12
180	13	7·2	3	1·6	" " knee.	121	8	6·61	2	1·65
1,191	49	4·11	9	0·75	Operations for tumours, cysts, bursæ, etc. (excluding cases that appear under other headings, as tumours of breast, rectum, abdominal tumours).	656	32	4·87	7	1·06
3,524	58	1·64	16	0·45	Operations on abscesses, glands, or scraping soft parts.	2,378	35	1·47	14	0·58
1,268	23	1·81	5	0·39	Operations on bone, scraping, etc.	811	18	2·21	5	0·61
706	18	2·54	4	0·56	Anæsthetics given for dislocations or fractures.	514	12	2·33	3	0·58
679	13	1·91	4	0·58	Orthopædic operations.	461	12	2·60	4	0·86
15	1	6·6	1	6·6	Laminectomies.	11	1	9·09	1	9·09
556	33	5·93	10	1·79	Herniotomies generally.	310	14	4·5	3	0·96
677	16	2·36	7	1·03	Circumcisions.	525	15	2·85	7	1·25
1,293	51	3·94	8	0·61	All operations on male genito-urinary organs, except circumcisions.	717	24	3·34	7	0·97
461	41	8·89	7	1·51	Ovariectomies and hysterectomies.	154	20	12·9	1	0·64
522	20	3·83	3	0·57	Uterine operations (other than excisions).	158	7	4·43	2	1·26
608	33	5·42	8	1·31	All abdominal operations not included under two last headings.	244	15	6·14	4	1·63
332	9	2·71	1	0·30	Operations on vagina, vulva, or female bladder.	133	5	3·75	1	0·75
178	9	5·05	3	1·68	Operations for ruptured perinæum.	68	5	7·35	3	4·41
241	7	2·9	4	1·65	Operations for hare-lip or cleft palate.	214	7	3·27	4	1·86
360	6	1·6	3	0·83	Operations on adenoids or tonsils.	193	3	1·55	3	1·55
250	10	4·0	3	1·2	Excisions of tongue, jaw, etc. (mouth).	180	7	3·8	2	1·1
†3,858	34	0·88	2	0·05	Extractions of teeth.	158	1	0·63	—	—
408	22	5·39	3	0·73	Operations for hæmorrhoids.	131	8	6·1	1	0·76
31	2	6·45	2	6·45	Excisions of the rectum.	20	2	10·0	2	10·0
657	9	1·52	4	0·60	Eye operations other than excision.	391	8	2·04	4	1·02
246	12	4·87	2	0·81	Operations on blood-vessels.	120	8	6·6	2	1·6
1,067	13	1·21	1	0·09	Small operations, as for nævi, etc.	758	11	1·45	1	0·13
667	14	2·09	—	—	Anæsthetics given for examinations or adhesions.	405	11	2·71	—	—
910	20	2·19	5	0·54	Operations vaguely described.	613	14	2·28	5	0·81

* 3,508 cases of nitrous oxide gas and "gas and oxygen" are excluded from this heading.

ANÆSTHETIC 2.					ANÆSTHETIC 3.					ANÆSTHETIC 4.				
Total cases in Divisions A and B together.	Complicated cases (B).	Ratio of B to total.	Danger cases (B γ and B δ).	Ratio of danger cases to total.	Total cases in Divisions A and B together.	Complicated cases (B).	Ratio of B to total.	Danger cases (B γ and B δ).	Ratio of danger cases to total.	Total cases in Divisions A and B together.	Complicated cases (B).	Ratio of B to total.	Danger cases (B γ and B δ).	Ratio of danger cases to total.
		per cent.		per cent.			per cent.		per cent.			per cent.		per cent.
264	13	4'92	1	0'37	224	3	1'34	—	—	75	1	1'33	1	1'33
259	16	6'18	—	—	115	5	4'35	2	1'74	20	1	5'00	—	—
10	—	—	—	—	5	—	—	—	—	11	—	—	—	—
27	2	7'41	1	3'70	14	1	7'14	—	—	—	—	—	—	—
17	—	—	—	—	8	1	12'50	—	—	6	2	33'3	—	—
143	8	5'59	—	—	90	2	2'22	—	—	23	—	—	—	—
25	—	—	—	—	19	—	—	—	—	2	1	50'00	—	—
290	15	5'17	2	0'68	294	8	2'72	2	0'68	22	1	4'54	—	—
34	5	14'70	4	11'76	10	—	—	—	—	7	1	14'28	—	—
3	1	33'3	—	—	—	—	—	—	—	—	—	—	—	—
110	3	2'72	—	—	19	1	5'26	1	5'26	9	1	11'1	—	—
5	—	—	—	—	3	—	—	—	—	8	—	—	—	—
159	3	1'88	—	—	80	3	3'75	—	—	24	1	4'16	—	—
5	1	20'00	—	—	2	1	50'00	1	50'00	3	—	—	—	—
392	12	3'06	3	0'76	53	2	3'77	1	1'88	31	2	6'45	1	3'23
7	1	14'28	1	14'28	1	—	—	—	—	1	—	—	—	—
26	—	—	—	—	3	—	—	—	—	2	—	—	—	—
25	3	12'00	—	—	6	—	—	—	—	4	1	25'00	—	—
3	—	—	—	—	—	—	—	—	—	1	—	—	—	—
65	2	3'09	2	3'09	8	—	—	—	—	5	—	—	—	—
44	3	6'81	—	—	4	—	—	—	—	2	—	—	—	—
214	3	1'40	—	—	28	2	7'14	1	3'57	14	1	7'14	1	7'14
89	5	5'61	—	—	22	1	4'54	—	—	11	—	—	—	—
22	—	—	—	—	4	1	25'00	—	—	3	—	—	—	—
33	1	3'03	—	—	7	—	—	—	—	2	—	—	—	—
278	11	3'98	1	0'35	108	3	2'7	—	—	41	—	—	—	—
663	15	2'26	1	0'15	178	4	2'24	—	—	138	1	0'71	—	—
214	3	1'40	—	—	61	1	1'63	—	—	35	—	—	—	—
123	4	3'25	—	—	19	—	—	—	—	13	—	—	—	—
112	—	—	—	—	34	—	—	—	—	32	1	3'12	—	—
4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
120	10	8'3	4	3'3	54	2	3'7	—	—	19	3	15'78	—	—
80	—	—	—	—	29	—	—	—	—	28	1	3'57	—	—
291	12	4'12	1	0'34	184	4	2'17	—	—	38	2	5'26	—	—
129	9	6'99	—	—	48	2	4'16	—	—	9	1	11'1	—	—
154	8	5'19	—	—	133	—	—	—	—	5	1	20'00	1	20'00
170	7	4'11	—	—	83	4	4'81	2	2'4	18	—	—	—	—
80	1	1'25	—	—	82	3	3'65	—	—	2	—	—	—	—
37	3	8'1	—	—	55	—	—	—	—	1	—	—	—	—
5	—	—	—	—	—	—	—	—	—	10	—	—	—	—
67	3	4'47	—	—	24	—	—	—	—	33	—	—	—	—
19	1	5'26	—	—	7	—	—	—	—	12	—	—	—	—
114	6	5'26	1	0'87	185	2	1'08	—	—	11	1	9'09	1	9'09
103	9	8'73	2	1'94	130	3	2'3	—	—	6	—	—	—	—
6	—	—	—	—	1	—	—	—	—	—	—	—	—	—
154	—	—	—	—	61	1	1'63	—	—	14	—	—	—	—
68	1	1'47	—	—	31	1	3'22	—	—	9	—	—	—	—
152	—	—	—	—	54	—	—	—	—	39	1	2'56	—	—
147	1	0'68	—	—	54	2	3'7	—	—	13	—	—	—	—
163	4	2'45	—	—	46	1	2'17	—	—	30	—	—	—	—

† Including 3,508 cases of "gas" and "gas and oxygen."

operations involving the upper air passages. Few complicated cases occurred in operations for removing the breast and small operations (abscesses, scraping bone, circumcision, etc.).

As regards cases of danger, there were none for the majority of operations, but the number of cases is limited. The danger rate in operations for strangulated hernia was as high as 11·76, and operations for hæmorrhoids and major amputations showed noticeably high danger rates.

In attempting to draw any conclusions from the figures, the Sub-Committee would point out that as ether was often selected for use in conditions of exhaustion and collapse, the danger rate for this anæsthetic is undoubtedly influenced thereby. This helps to explain the high ether danger rate in strangulated hernia. It is nevertheless noteworthy that in the 124 cases of strangulated hernia in which chloroform was employed there was only one case of danger.

Anæsthetics 3 to 45.—The numbers of each operation are generally too small to warrant any conclusions being drawn. Attention may, however, be directed to the increased complication and danger rates for abdominal and rectal operations under "gas and ether" (anæsthetic 3) and to the fact that with most of the major operations under this anæsthetic there was no case of danger.

As regards the A.C.E. mixture (anæsthetic 4), although a high complication rate appears for hernia, this is due to the fact that in two of the three cases (see complicated cases Nos. 238 and 329) A.C.E. was given upon the assumption that it was ether by mistake from a Clover's inhaler. The other case was an operation for relief of strangulated hernia. In other instances of apparently high complication rates under the A.C.E. mixture the complications were usually of a minor character.

Other noteworthy facts which, however, do not appear in the table are the high complication and danger rates for anæsthetic 5 (mixtures of chloroform and ether) in operations for the removal of the breast (11 cases, 3 complicated cases, 1 danger case, complication rate 27·27, danger rate 9·09) and operations on the uterus and appendages (70 cases, 3 complicated cases, 1 danger case, complication rate 4·28, danger rate 1·47). With anæsthetic 7 (chloroform followed by ether) there were only two cases of amputation at the hip joint, both of which were cases of danger.

SOURCES OF ANÆSTHETICS.

Source.—The Sub-Committee have devoted considerable time to the consideration of the question as to whether the complication or danger rate bears any relationship to different varieties or "makes" of the anæsthetics employed. Owing principally to the facts that in many cases the manufacturer's name is given while the particular variety is unstated, and in others the variety is mentioned but no maker's name is appended, the Sub-Committee are unable to draw more definite conclusions than those given below.

An analysis was made of the records of the various kinds and "makes" of chloroform, ether, and other anæsthetics, and the results were tabulated.

The combinations which constitute anæsthetics Nos. 4 to 45 inclusive, with the exceptions of No. 28 and No. 29, were all composed of chloroform and ether, associated in some cases with alcohol.

Hence the main interest centres round chloroform and ether. Moreover, the comparatively small number of cases recorded of the various successions and combinations, coupled with the consideration that the imperfections in the ether and chloroform records became accentuated when dealing with successions and combinations, has led the Sub-Committee to confine their remarks to chloroform and ether.

The following facts appear from the tables:—In the bulk of the chloroform cases the anæsthetic was obtained from one firm, so that comparisons as to complications and dangers, possibly dependent upon different "makes" of this anæsthetic, might be fallacious. Comparing "pure," "methylated," and other chloroforms, no evidence is afforded of one kind being safer than another.

With regard to ether, it is impossible to base conclusions upon the 28 sources given from which the anæsthetic was obtained. The varieties are not properly discriminated, nor are many of the firms mentioned actually manufacturers. With the exception of one firm, whose preparation gives the figures of 22 complications out of 138 cases, the incidence of complication appears to be directly proportional to the number of times the "make" of anæsthetic was employed. With regard to the exception mentioned, it is necessary to bear in mind that as the record is from one observer the method employed may have been at fault.

With reference to the effect of the quality of the anæsthetic as a factor in the production of complicated and danger cases, the Sub-Committee find that no authoritative conclusions are justifiable from the figures placed before them.

METHODS OF ADMINISTRATION.

Method.—Some note was made as to methods employed in 20,696 cases, and these are dealt with below under each anæsthetic so far as the number of records make it advisable.

ANÆSTHETIC I.—CHLOROFORM.

As will be shown in the following section, which deals with the quantities of the different anæsthetics employed, there were often widely different ways of using a particular apparatus. This section cannot therefore be of more than general significance.

The chief methods of administering chloroform fall under the general heads of towel or cloth, lint, Skinner's mask or "mask," "open method" with no details as to plan adopted or material employed, Junker's apparatus, or combinations of these.

The following table shows the number of cases under each method in the uncomplicated (A) and complicated (B) divisions; the number of cases of danger (B γ and B δ), and the complication and danger rates in each instance.

As doubt sometimes exists with regard to the exact details of a method, no more definite classification of methods is possible than that given below. For instance, "towel" includes one or more layers of towel, and towel in the form of a cone, etc.

TABLE L.

Method.	No. of times method used in uncomplicated cases (A).	No. of times method used in complicated cases (B).	No. of times method used in danger cases (B γ and B δ).	Complication rate (ratio of B to total).	Danger rate (ratio of B γ and B δ to total).
				Per cent.	Per cent.
All methods together	13,393	438	138	3'270	1'032
Towel	4,441	181	65	3'92	1'41
Lint	3,793	83	23	2'14	0'59
Skinner or mask	2,375	86	26	3'49	1'06
Junker	411	11	0	2'61	—
"Open method"	326	14	0	4'12	—
Mask of towel with sponge... ..	153	7	1	4'37	0'62
Allis	24	2	2	7'69	7'69
Combined methods	26	7	3	21'21	9'09
Various or unstated	1,406	47	18	3'23	1'24

The above table shows that chloroform was administered in the large majority of cases upon a towel, lint, or Skinner's or other form of mask.

The most frequently used method (towel) shows the highest complication and danger rates, the former being increased by one-fifth, the latter by more than one-third. Of the 65 danger cases in which this method was employed, only 5 died—a percentage much below the average for all the chloroform cases. The Skinner's mask, including a few cases in which an Esmarch's mask was used, and some in which the kind of mask was unspecified* shows rates of complication and danger only slightly increased. The 3,876 cases in which the anæsthetic was administered on lint show a striking diminution in both the complication and danger rates. In the former the reduction is more than one-third, in the latter nearly one-half. From these figures it might be gathered that the liability to serious complications when lint is employed is even more lessened than the liability to minor complications. This is, however, not the case, for no less than 7 of the 23 cases of danger with this method ended fatally, or more than twice the percentage obtaining with all the methods together.

The fact that no danger cases occur with the open method is probably explained by the fuller details which are given of such cases, allowing their allocation under a more definite heading.

* It is understood that in all chloroform cases under the head of "Skinner's or other mask" no sponge was employed. A special heading is provided for all the cases in which a sponge was used.

Junker's apparatus shows a diminished complication rate, and an absence of danger cases, in the 422 cases in the table. But it is important to point out that the 3 danger cases which are tabulated under the head of "combined methods" all happened while a Junker's apparatus was in use, and one of them was a death.

The few cases under the headings "Allis's inhaler" and "combined methods" show strikingly high rates of complication and danger.

ANÆSTHETIC 2.—ETHER.

Method.—Ether was nearly always given from an inhaler, Clover's portable regulating ether inhaler being most frequently employed.

The following table shows the number of cases under each method in the different divisions, with the complication and danger rates:—

TABLE LI.

Method.	No. of times used in uncomplicated cases (A).	No. of times used in complicated cases (B).	No. of times used in danger cases (B γ and B δ).	Complication rate (ratio of B to total).	Danger rate (ratio of B γ and B δ to total).
All	4,455	140	14	3'047	0'304
Clover's small ether inhaler ...	4,084	136	13	3'22	0'31
Ormsby's inhaler	46	1	0	2'13	—
Clover, then Ormsby	29	1	0	3'3	—
Towel or other form of cone, with or without sponge.	52	0	0	—	—
Method doubtful or unstated ...	244	2	1	0'81	0'41

As the large majority of the cases in the above table were conducted by means of a Clover's inhaler, the data for comparisons are insufficient.

The 6 deaths recorded in connection with ether occurred among the 13 danger cases under Clover's inhaler, but it must be remembered that in 2 of them the death occurred some days after the administration.

ANÆSTHETIC 3.—GAS AND ETHER.

Method.—As may be seen by reference to the footnote on p. 10, under the heading of anæsthetic 3 are included both cases in which ether was given after nitrous oxide, an Ormsby's apparatus being used for its administration, and cases in which, during the course of the nitrous oxide inhalation, ether vapour was gradually added, the mixture of nitrous oxide and an increasing amount of ether vapour being inhaled for a short time before the ether vapour was given alone. In these latter cases Clover's portable regulating inhaler was mostly employed, although in some of the cases Clover's large inhaler was used. Doubt sometimes exists as to which form of Clover's apparatus is alluded to, so that all cases in which this method was used are grouped together under the head of Clover's apparatus.

In some cases of the last method, after anæsthesia was well established by means of a Clover's apparatus, the administration was continued with an Ormsby's inhaler.

Particulars as to the form of gas apparatus employed are generally wanting, so that the cases are grouped under the particular form of inhaler used for the ether.

The following table shows for each method the number of uncomplicated (A), complicated (B), and danger (B γ and B δ) cases, with the complication and danger rates in each instance:—

TABLE LII.

Method.	No. of times used in uncomplicated cases (A).	No. of times used in complicated cases (B).	No. of times used in danger cases (B γ and B δ).	Complication rate (ratio of B to total).	Danger rate (ratio of B γ and B δ to total).
All methods	2,026	45	7	2'173	0'338
Clover	1,249	20	5	1'58	0'39
Ormsby	625	20	1	3'10	0'16
Clover, then Ormsby	18	0	0	—	—
Unstated	134	5	1	3'6	0'72

In considering the above table, it is obvious that the complications may have been caused by one, other, or both of the anæsthetics employed, or by the method adopted in their administration. Upon examination of the individual cases, it appears that in 33 cases the ether was probably the cause of the complications, in 5 the nitrous oxide was probably a contributory or chief cause, while in 7 cases it is impossible to say which anæsthetic brought about the complication.

With regard to the 5 complicated cases in the production of which the nitrous oxide appeared to be a factor, and possibly some of the 7 doubtful cases referred to above, the complication seems to have often occurred when the change from nitrous oxide to ether was effected, and was apparently of an asphyxial character. It may be seen by reference to pp. 26, 27, 42, and 55, that in some of these cases a Clover's apparatus and in some an Ormsby's inhaler was employed. In 27 of the cases of "minor complication," 3 "cases of anxiety," and in 3 of the 7 "danger cases" there is no evidence to associate the symptoms with the nitrous oxide gas in the relation of effect and cause.

The table shows that the complication rate is increased for Ormsby's inhaler, and diminished for Clover's apparatus, so that the one method was twice as prolific in complications as the other. However, when the danger cases are considered it will be seen that this relation is reversed, and the one death that happened with anæsthetic 3 is one of the 5 danger cases in which Clover's method was employed. It will be seen, on reference to this death (p. 62, No. 729) that the fatality could not be imputed in any sense to the method employed.

In comparing the methods in which Clover's and Ormsby's inhalers were used respectively, the following facts deserve attention:—The records of the use of Clover's apparatus are derived from the practice of a large number of observers in different parts of the country, while the statistics referring to Ormsby's inhaler were supplied from the record books of an extremely limited number of observers, all of whom were experts. The notes of these latter cases were kept with great precision, so that a large number of trivial complications find a place in them which in the records of the use of Clover's apparatus were often omitted. The nature of the complications recorded exhibits this fact. Thus with the Ormsby's inhaler there were 17 cases of "minor complication" (see, definition p. 9) out of the 20 complicated cases. The others were 2 "cases of anxiety" and 1 of danger, with no fatality. With the Clover's apparatus, only 11 of the 20 complicated cases were "cases of minor complication," 4 were "cases of anxiety," 4 "cases of danger," and 1 the "case of death" previously alluded to as not being due to the method.

ANÆSTHETIC NO. 4.

Method.—The method employed for the administration of the A.C.E. mixture was stated with more or less exactness in 617 of the 678 cases in which that anæsthetic was used.

The following table shows for each method the number of uncomplicated (A), complicated (B), and danger (B γ and B δ) cases, with the complication and danger rates in each instance.

As with chloroform, it is necessary to point out that the descriptions of the methods in the table are not in every case definite. For example, "towel" includes cases in which a single layer of towel was apparently used, as well as cases in which the towel was fashioned into a cone, or was in more than one layer. Nearly all the "mask with sponge" cases were anæsthetised with Rendle's mask.

TABLE LIII.

Method.	No. of times used in A.	No. of times used in B.	No. of times used in B γ and B δ .	Complication rate.	Danger rate.
All	660	18	3	2'655	0'442
Towel	207	3	0	1'43	—
Lint	163	2	0	1'21	—
Skinner's mask	28	0	0	—	—
Mask with sponge	148	5	2	3'27	1'31
Clover's ether apparatus	51	5	0	8'93	—
Junker's " "	5	0	0	—	—
Unstated	58	3	1	4'92	1'64

A striking feature of the above figures is the freedom, not only from danger, but also from complications generally, in cases anæsthetised by the more open methods of towel, lint, and Skinner's mask, as contrasted with the percentages in "mask with sponge" cases, and the high complication rate when Clover's apparatus was used.

ANÆSTHETIC 5.

Method.—This mixture was principally given by means of Clover's apparatus, in the practice of two observers, one of whom used 1 part of chloroform mixed with 2 parts of ether, the other 1 part of chloroform mixed with 7 parts of ether. The "other methods" include Junker's apparatus, lint, and "mask with sponge."

In the following table the cases are classified as in the preceding tables of "methods":—

TABLE LIV.

Method.	No. of times used in A.	No. of times used in B.	No. of times used in B γ and B δ .	Complication rate.	Danger rate.
All	406	12	4	2·871	0·956
Clover... ..	286	10	3	3·38	1·01
Other methods	17	0	0	—	—
Unstated	103	2	1	1·90	0·95

The high percentages of complication and danger in this table under Clover's apparatus are further accentuated when the only other 2 cases of complication in the table (in which the method was unstated) are examined. One was a case of "minor complication," namely, after-sickness, lasting for 2 days (No. 339, p. 29); the other (the danger case) was a case of death, and in this the fatal result could not be in any sense imputed to the method employed (case 730).

ANÆSTHETICS 6 TO 45.

Method.—In each of these successions and combinations the number of cases recorded was small, and the methods employed were so various that the Sub-Committee found that no useful purpose could be served by attempting to associate any particular method or combination of methods with the complications and dangers which occurred.

QUANTITY OF ANÆSTHETIC USED.

Quantity.—Both the duration of the administration and the quantity of anæsthetic which was used were recorded in 15,683 of the total number of 25,896 cases.

As appears below, the rate at which the anæsthetic was used, particularly as regards chloroform, varied within wide limits. Many factors—often necessarily unknown—must obviously affect the amount of anæsthetic used. Such variable quantities as the temperature of the air, the personal equation of the patient and of the administrator, and the duration of the administration influence the rate of use, in many cases, far more than the particular method employed determines it. As a further question of the difficulties encountered in attempting to examine the influence of the amount of anæsthetic used in a given time upon the incidence of complications and dangers, it should be mentioned that while some observers stated the quantity with extreme exactness in minims, most were content to record it in drachms or half-drachms. It should also be noted that unless the rate of intake of vapour by the patient can be shown to bear some direct proportion to the rate of evaporation, the actual dose inhaled cannot be concluded to vary with the amount used. Owing to all these facts, it is impossible to arrive at conclusions of practical value.

The Sub-Committee dealt with the records of time and quantity as follows:—For every method employed the amount of anæsthetic used in each case was noted, and divided into the number of minutes occupied in its administration. To compare the relations thus arrived at the following standard was adopted:—The number of minutes occupied in the administration of one ounce of the anæsthetic was ascertained, assuming the rate of use to have been uniform—thus if three drachms of chloroform were employed in one quarter of an hour, reduced to the standard this would be expressed as one ounce in forty minutes. In this way the various methods were compared quantitatively.

Besides the distinctive methods referred to on p. 91, a large number of modifications were used. For example, a towel was sometimes employed with chloroform poured in unmeasured quantities on it; at other times a drop-bottle allowed a supply *guttatim*. Thus it will be seen that the headings adopted by different observers in the record books often included what were in effect widely different methods. It is important to bear this in mind in estimating the cases *en bloc*. Because doubt often exists as to the exact details of the method employed, it is impossible to provide statistics for each variation in method.

ANÆSTHETIC 1.—CHLOROFORM.

Quantity.—In 9,279 cases the time and quantity were both recorded. In most of these cases the method was also given with more or less exactness. Taking the cases together, the average periods in which one ounce of chloroform was used are as follows:—

TABLE LV.

	No. of cases in which both factors were stated.	Average rate of use.
Total cases (A and B)	9,279	1 oz. used in 54'743 minutes.
Uncomplicated cases (A)	9,060	1 " 54'779 "
Complicated cases (B)... ..	219	1 " 53'247 "
Danger cases (B γ and B δ)	79	1 " 49'685 "

The following table shows the average periods for the principal methods mentioned in the previous section (p. 91):—

TABLE LVI.

Method.	Total No. of cases in all divisions (A and B) in which both time and quantity were recorded, with average rate of use of one ounce.		Total No. of uncomplicated cases (A) in which both time and quantity were recorded, with the average rate of use of one ounce.		Total No. of complicated cases (B) in which both time and quantity were recorded, with the average rate of use of one ounce.		Total No. of danger cases (B γ and B δ) in which both time and quantity were recorded, with the average rate of use of one ounce.	
	No. of cases.	Minutes.	No. of cases.	Minutes.	No. of cases.	Minutes.	No. of cases.	Minutes.
Towel	3,195	45'25	3,119	45'05	76	53'08	35	53'13
Skinner	2,369	54'17	2,304	54'85	65	45'26	21	43'31
Lint... ..	2,573	58'19	2,520	58'12	53	61'32	15	54'87
Mask or towel with sponge.	175	66'44	168	65'53	7	88'38	1	102
Junker	334	86'11	332	86'12	2	85'0	—	—

By reference to Table L, p. 91, and Column I in the above table it will be seen that the chief methods (towel, Skinner, and lint) show complication and danger rates greatest when the rate of use of chloroform is most rapid (towel, one ounce in 45'25 minutes) and least when the rate is slowest (lint, one ounce in 58'19 minutes); but the figures in Table LVI also show that when the towel is employed the average rate of use in the complicated and danger cases was considerably slower than in the uncomplicated cases. With lint the average rate of use was slower in the complicated cases, but more rapid in the danger cases. The figures for Skinner's mask show the rate of use to be increased in both complicated and danger cases.

On arranging the complicated cases in their subdivisions, the average periods are as follows:—

TABLE LVII.

Cases in Division B.	Towel.		Skinner.		Lint.	
	No. of cases.	Average time for use of one ounce.	No. of cases.	Average time for use of one ounce.	No. of cases.	Average time for use of one ounce.
—	—	Minutes.	—	Minutes.	—	Minutes.
<i>a</i>	25	59'17	29	48'39	28	71'75
<i>β</i>	16	43'44	15	41'94	10	41'76
<i>γ</i>	32	54'72	16	44'09	11	59'18
<i>δ</i>	3	36'1	5	40'8	4	43

The rapidity of the use of chloroform in subdivision δ (cases of death) is perhaps partially explained by the fact that the "duration" of such cases was short, and the rate of use must obviously be more rapid in the earlier than in the later stages of the administration.

The foregoing facts, together with the great variations in the rate of use referred to below when the methods are considered *seriatim*, render the Sub-Committee unable to conclude whether the rate of use of chloroform by itself has any influence in the production of complications and dangers.

Dealing with the methods *seriatim*, the cases in which Skinner's mask was used will now be considered.

In consequence of the great differences already alluded to in the time occupied in using one ounce of chloroform, the average time has been ascertained for each record book separately as regards each method, in order that the relation, if any, between the complication and danger rates and the rate of administration might be demonstrated. With SKINNER'S MASK the shortest average obtained from the record books was 23.7 minutes, which was the average of one book containing 135 cases that exhibited 16 complications, viz., 6 of the α subdivision, 6 of the β subdivision, and 4 of the γ subdivision. The longest average was 103.9 minutes for an ounce, being the average of a book of 68 cases exhibiting 1 complication in the α subdivision. Most of these cases appear to have been chloroformed by dropping from a drop-bottle on to the flannel mask.

Under the head of LINT a great variety of methods appear to be included; in some cases a single layer was employed, in others several layers, while in some the lint was twisted into a cone. Sometimes chloroform was dropped from a drop-bottle, in others poured on in unmeasured quantity. Taking separate record books, the longest average time occupied for the use of one ounce was 86.1 minutes, being the average of a book containing 134 cases and exhibiting 12 complications, all in the α subdivision. The shortest average time was 24.7 minutes, from a book of 131 cases associated with one complication, which was in the γ subdivision. It is noticeable that in one record book 986 cases are recorded, with an average time of use of one ounce of 69.7 minutes, associated with 15 complications, giving a complication rate of 1.5 as compared with 2.14 for the total of the lint cases. These 15 cases are distributed in the following subdivisions:—7 in α , 2 in β , 5 in γ , and 1 in δ .

The danger rate for the above 986 cases closely approximates to the danger rate for the whole of the lint cases (0.60, as against 0.59).

A TOWEL was used in the following diverse ways:—One layer, two or more layers, the corner of a towel, mask made from a towel, and cone made from a towel. Many observers used a drop-bottle; others poured unmeasured quantities of chloroform on the towel. Many of those who used the latter method returned no record of the amount employed, so that probably this method is not sufficiently illustrated in the tables. The shortest average period from any record book of the rate of use of chloroform from a towel is 13.05 minutes, being the average of 80 cases, with 2 complications (in subdivisions α and γ), while the longest average period is 129.4 minutes, being the average of 160 cases, with only 1 complication, in the γ subdivision. On the other hand, with an average period of 104.5 minutes, from a book containing 192 cases in which the towel was employed, there were no less than 12 complications in the following subdivisions:—4 in α , 1 in β , 6 in γ , and 1 in δ . These statistics show that a slow induction of anæsthesia is not necessarily safe. Upon this point it is worthy of note that the two books containing the greatest number of towel cases are one with 433 cases, an average period of 20 minutes, and 7 complications (2 in the α , 2 in the β , 2 in the γ , and 1 in the δ subdivisions); and one with 349 cases, an average period of 47 minutes, and 9 complications (5 in the α , 1 in the β , and 3 in the γ subdivisions). The contradictory nature of the statistics of this method is probably accounted for by the great variety of ways in which the towel was employed, and the wide latitude which it necessarily leaves in the hands of the administrator, who thus becomes an undesirably potent factor in preserving or jeopardising the well-being of the patient.

With regard to JUNKER'S APPARATUS, including Krohne's modification, the time and quantity were stated in 235 cases in which it was employed throughout the administration. In these 235 cases one ounce was used on an average in 86.07 minutes. In 32 cases a Junker was used after some other method (see "combined methods" Table L); 6 of these cases were complicated, and 3 were cases of danger. In these complicated cases the rate of use could not be estimated; indeed, of the 11 complicated cases in which Junker's apparatus was used throughout the rate of use is only given twice. In a case in subdivision α it was one ounce in 70 minutes, and in a case in subdivision β one ounce in 100 minutes. The shortest average periods from separate books are, for 16 cases from one book 42.7 minutes, and for 27 cases from another book 58.1 minutes. The former book contained 1 complicated (α) case and the latter 5 complicated cases (3 in subdivision α and 2 in subdivision β) in which this apparatus was employed, but the rate of use was not given in these cases. The longest average period is 108.02 minutes from 71 cases, 1 of which is in subdivision α .

The rates of use for "mask or towel with sponge" are not given in enough instances to demand comment.

ANÆSTHETIC 2.—ETHER.

Quantity.—In 3,679 cases the time and quantity were both recorded. There are not sufficient data of other methods than Clover's inhaler to enable statistics to be presented. The following table shows the average rates of use of ether with all methods and with Clover's small portable regulating inhaler, in the different divisions, in those cases in which both time and quantity were noted :—

TABLE LVIII.

	Total No. of cases (A and B) in which time and quantity were recorded.	Average rate of use. One ounce in—	No. of uncomplicated cases (A) in which time and quantity were recorded.	Average rate of use. One ounce in—	No. of complicated cases (B) in which time and quantity were recorded.	Average rate of use. One ounce in—	No. of danger cases (Bγ and Bδ) in which time and quantity were recorded.	Average rate of use. One ounce in—
	—	Minutes.	—	Minutes.	—	Minutes.	—	Minutes.
All methods ...	3,679	12'85	3,620	12'84	59	13'2	7	12'04
Clover's inhaler ...	3,564	12'67	3,506	12'66	58	13'17	7	12'04

With Clover's inhaler the slowest rate of use (one ounce in 23'6 minutes), occurred in the report of an observer who recorded only 8 cases, the most rapid (one ounce in 7'3 minutes), in the report of another observer who again recorded only 8 cases. With these exceptions a fairly uniform rate of evaporation is reported.

The above table tends to show that the evaporation rate of ether appears to have little bearing upon the incidence of complications and dangers.

It would almost seem as if the ether were practically a constant, and as if some variable factor, such as the condition of the patient at the time of the administration (*vide p. 73 et seq.*), were the determining cause of complications and dangers.

ANÆSTHETIC 3.—GAS AND ETHER.

Quantity.—In the 1,368 cases in which the time and quantity were both mentioned, the quantity of ether used did not vary much from an average rate of one ounce in 11'82 minutes, whatever apparatus was employed.

In the 45 complicated cases the time and quantity were only recorded 14 times, with an average rate of use of ether of one ounce in 16'1 minutes. The rates of use in these 14 complicated cases were far less constant, the most rapid rate being one ounce in 5 minutes with an Ormsby, the slowest one ounce in 40 minutes with a Clover. The data, being so imperfect, are not tabulated.

ANÆSTHETIC 4.—THE A.C.E. MIXTURE.

Quantity.—The time and quantity were both stated in 471 uncomplicated cases and 6 complicated cases. The former show an average time for the administration of one ounce in 36'84 minutes, the latter in 42'83 minutes. The average rate of use of A.C.E. varied very widely in the hands of different administrators. The most rapid average rate of use from any one observer's book was one ounce in 12'25 minutes (on a Skinner's mask); the slowest one ounce in 90'6 minutes (on lint).

It is therefore useless to follow these figures farther.

ANÆSTHETIC 5.—MIXTURES OF CHLOROFORM AND ETHER.

Quantity.—The average rate of use in the 268 uncomplicated cases of which data were available was one ounce in 22'2 minutes. In 7 of the 12 complicated cases in which corresponding data were given the rate was one ounce in 12'6 minutes.

REPEATED ADMINISTRATIONS.

Information on this point was not asked of the observers in uncomplicated cases, but was requested in all cases attended by complications. It is impossible, therefore, to show in tabular form the influence of second, third, or subsequent administrations in the production of complications and dangers. The following are the figures in brief:—In 403 cases it was noted that an anæsthetic had been previously administered on one or more occasions, and as many as 34 of these 403 cases exhibited complications. The repeated administration cases under chloroform numbered 337, those under ether 31, gas and ether 16, and under all other anæsthetics 19.

Of the above 337 chloroform cases there were 26 which showed various degrees of complications; exactly half of these were cases of danger, and of these, 3 cases proved fatal.

Of the 31 cases under ether 4 exhibited complications; but there was no case of danger.

EXAMINATION OF THE PHENOMENA RECORDED AS HAVING OCCURRED DURING NARCOSIS.

Phenomena.—The record books contain a large number of notes respecting the phenomena evinced by patients under the influence of anæsthetics.

These phenomena were taken as a basis for the classification of the cases throughout the report (see p. 9).

In the complicated cases the records of phenomena are numerous, but in the large majority of uncomplicated cases such records are obviously wanting.

As the phenomena during administration are chiefly of interest in their relation to the supervention of difficulties or dangers, it will be advisable to first give a statement of the phenomena in uncomplicated cases.

UNCOMPLICATED CASES.

Phenomena.—Notes are to be found of various phenomena, many of which were dependent upon causes other than the anæsthetic. Struggling, rigidity, muscular spasm, opisthotonos, excitement, and tremor are recorded. Amongst respiratory abnormalities the following appear:—Cough, laryngeal irritation, rapid, laboured, shallow, obstructed, and spasmodic breathing, immobility of thorax, hiccough, stoppage of breathing from surgical causes, and unusual secretion of mucus or salivation. In one case a tooth entered a bronchus.

There are numerous instances of alterations in the patient's colour—pallor, lividity, cyanosis—in some cases associated with malposition of the patient, valvular or degenerative disease of the heart, distension of abdomen, obesity, empyæma, asthma, or phthisis.

Amongst circulatory changes the following were noted:—Slow, weak, irregular, or rapid pulse, failure or stoppage of pulse, faintness, various degrees of traumatic and surgical shock, sometimes culminating in death.

Vomiting, straining, or retching frequently occurred in connection with anæsthesia. In some cases the patients had not been suitably prepared for operation, or were suffering from intestinal obstruction. Amongst the rarer phenomena defæcation and micturition are mentioned.

The following table deals with the more frequently recorded phenomena in uncomplicated cases under the chief anæsthetics:—

TABLE LIX.

The Phenomena recorded in the Uncomplicated Cases.

Phenomena.	All Anæsthetics.	Anæsthetic 1.	Anæsthetic 2.	Anæsthetic 3.	Anæsthetic 4.
Struggling, rigidity, or muscular spasm	215	94	72	17	7
Excitement or "noise"	37	17	13	3	0
Secretion of mucus or salivation	40	8	11	15	0
Cough	29	7	15	3	0
Lividity or cyanosis	74	27	21	18	2
Vomiting during administration	164	110	26	12	4

Struggling, etc., would appear to have occurred with greater frequency in ether (anæsthetic 2) and A.C.E. (anæsthetic 4) cases than in "gas and ether" (anæsthetic 3) and chloroform (anæsthetic 1) cases. Excitement was recorded in ether cases with double the frequency with which it was noted under chloroform or "gas and ether."

Secretion of mucus or salivation was relatively most frequently recorded with "gas and ether," next with ether, and least frequently with chloroform.

Cough is relatively most frequently mentioned as occurring under ether, next under "gas and ether," and but rarely under chloroform.

The relative frequency of lividity or cyanosis was greatest with "gas and ether" and least with chloroform, the other two anæsthetics occupying intermediate positions.

It is interesting to observe that vomiting during administration was distinctly more common with chloroform than with the other three anæsthetics in the table, and that under ether, "gas and ether," and the A.C.E. mixture a similar proportion of patients vomited.

COMPLICATED CASES.

Various noteworthy phenomena were recorded 1,065 times in the 733 complicated cases (B).

The following table shows the number of times the various phenomena were recorded in Class B, under anæsthetics Nos. 1 to 14 inclusive.

The phenomena recorded under other anæsthetics are too few to admit of tabular arrangement.

TABLE LX.—Phenomena recorded in Complicated Cases.

No.	All Anesthetics	Anesthetic 1.	Anesthetic 2.	Anesthetic 3.	Anesthetic 4.	Anesthetic 5.	Anesthetic 6.	Anesthetic 7.	Anesthetic 8.	Anesthetic 9.	Anesthetic 10.	Anesthetic 12.	Anesthetic 14.
1	4	3	1	—	—	—	—	—	—	—	—	—	—
2	9	8	1	—	—	—	—	—	—	—	—	—	—
3	7	2	4	—	1	—	—	—	—	—	—	—	—
4	72	53	5	—	1	—	1	—	3	—	1	1	—
5	2	1	—	—	—	—	—	—	—	—	—	—	—
6	1	1	—	—	—	—	—	—	—	—	—	—	—
7	1	1	—	—	—	—	—	—	—	—	—	—	—
8	16	7	3	3	1	—	—	—	—	2	—	—	—
9	35	3	20	9	1	—	—	—	—	—	—	—	—
10	26	14	7	1	1	—	—	—	—	2	1	—	—
11	9	7	2	—	—	—	—	—	—	—	—	—	—
12	9	5	4	—	—	—	—	—	—	—	—	—	—
13	11	—	11	—	—	—	—	—	—	—	—	—	—
14	1	—	1	—	—	—	—	—	—	—	—	—	—
15	114	61	24	11	7	1	—	3	3	—	—	1	—
16	6	3	2	—	—	—	—	—	—	—	—	—	—
17	183	137	11	13	3	3	1	5	4	—	—	—	3
18	36	12	16	3	—	—	—	1	—	3	—	—	—
19	30	7	10	8	1	—	—	1	—	—	1	—	—
20	2	6	2	2	1	—	—	—	—	—	—	—	—
21	11	—	—	—	—	—	—	—	—	—	—	—	—
22	4	2	—	—	—	—	—	1	—	—	—	—	—
23	3	3	—	—	—	—	—	—	—	—	—	—	—
24	82	70	2	1	1	2	—	3	1	—	—	—	1
25	62	48	4	—	3	1	2	2	—	—	—	—	—
26	14	9	1	1	—	2	—	1	—	1	—	—	—
27	98	82	1	2	3	2	1	1	1	—	1	—	1
28	6	6	—	—	—	—	—	—	—	—	—	—	—
29	18	13	2	1	—	—	—	—	1	—	—	—	—
30	1	1	—	—	—	—	—	—	—	—	—	—	—
31	1	—	—	—	1	—	—	—	—	—	—	—	—
32	5	2	1	—	—	—	—	—	—	—	—	—	—
33	35	26	4	—	3	—	—	—	—	—	—	—	—
34	5	—	3	1	—	1	—	—	—	—	—	—	—
35	55	30	11	—	1	1	—	3	2	1	—	—	—
36	25	5	13	2	1	—	—	—	—	1	—	—	—
37	2	—	1	—	—	—	—	—	—	—	—	—	—
38	1	—	—	—	—	—	—	—	—	—	—	—	—
39	14	11	1	1	—	—	—	—	—	—	—	—	—
40	37	26	1	1	—	—	—	—	—	—	—	—	—
41	9	—	—	—	—	—	—	—	—	—	—	—	—
42	3	2	—	—	—	—	—	—	—	—	—	—	—
	1,065	667	169	62	30	16	6	24	17	9	7	3	7

The above 1,065 phenomena may be grouped together in the following manner:—

TABLE LXI.

	All Anæsthetics.	Anæsthetic 1.	Anæsthetic 2.	Anæsthetic 3.	Anæsthetic 4.
Respiratory phenomena	538	313	106	47	16
Circulatory phenomena	299	240	12	7	8
Phenomena connected with the alimentary tract ...	46	28	8	1	4
Phenomena connected with the nervous and muscular systems.	146	74	27	4	2
Imperfectly recorded phenomena (<i>e.g.</i> , "took it badly").	36	12	16	3	—
	1,065	667	169	62	30

In considering the figures in detail it is obvious that certain phenomena must have occurred much more frequently than the records show. A reference to the abstracts of complicated cases (Division B), p. 14 *et seq.*, will show that in many instances only one phenomenon is recorded. There clearly must have been omissions, for example, in the case of "widely dilated pupil," since only 26 instances are noted in the 438 complicated cases under chloroform, 138 of which were cases of extreme peril, 18 ending fatally.

Table LXI shows that respiratory phenomena are the most numerous recorded in complicated cases, although, as may be seen from Table LX, they include very different grades of danger.

The circulatory phenomena are recorded with widely differing frequency under different anæsthetics. The relative frequency with which phenomena of these two groups appear in the record books in complicated cases is here appended:—

TABLE LXII.

Anæsthetic.	No. of respiratory phenomena recorded.	No. of circulatory phenomena recorded.	Ratio of Col. I to Col. II.
All	538	299	100 : 55.5
1	313	240	100 : 76.7
2	106	12	100 : 11.3
3	47	7	100 : 14.9
4	16	8	100 : 50
Anæsthetics 1, 4, 5, 8, and 14 together (<i>i.e.</i> , chloroform group, see p.).	349	260	100 : 74.5
Anæsthetics 2, 3, 7, and 9 together (<i>i.e.</i> , ether group, see p.).	170	27	100 : 15.9

Respiratory Phenomena.—Under this heading phenomena from Table LX, Nos. 1 to 20 inclusive, are included.

Among the minor phenomena of respiration the following are recorded so seldom as to require no further comment:—*Holding the breath, respiration slow, respiration sighing, respiration gasping, breathed badly, straining, phonation, noise, or laughter.*

Examples of jerky, irregular, and intermittent breathing are relatively more frequent under chloroform than under ether.

Embarrassed or difficult breathing (including "dyspnœa") was relatively more frequent with ether than with chloroform, and with "gas and ether" than with ether.

Obstructed breathing was recorded relatively more often with ether than with chloroform, but this is not true of obstruction due to foreign bodies.

"Spasm of glottis" and "respiratory spasm," especially the latter, were more frequent under ether than under chloroform.

Cough occurred most frequently under "gas and ether," next under ether, and, as in the uncomplicated division, very rarely under chloroform.

As only 6 records appear in which the word "asphyxia" is used to designate phenomena, whilst a large number of cases exhibited symptoms demanding artificial respiration, no comment upon these records can be usefully made.

The striking preponderance of feeble or shallow breathing in the complicated chloroform cases is seen in the table, this being four times as frequent with chloroform as with ether.

Respiration is recorded as having failed, ceased, or stopped in 183 cases. This number includes all cases of suspended breathing, whether transient or permanent, which were noted, but it does not include danger or fatal cases unless a note was made of cessation of breathing.

It should further be remembered that no note of such conditions finds a place among the phenomena of uncomplicated cases. From the figures it may be calculated that actual cessation of breathing occurred in just over 1 per cent. of the total chloroform administrations.

Under ether the incidence was less than one quarter (0.24) per cent., but "gas and ether" gives a rate of 0.62 per cent. With the A.C.E. mixture the proportion was 0.44 per cent.

The figures of the chloroform group (*i.e.*, anaesthetics Nos. 1, 4, 5, 6, 8, and 14), when compared with those of the ether group (Nos. 2, 3, 7, and 9), support the conclusion that cessation of respiration is much more frequent under chloroform than under ether.

The following table illustrates these points:—

TABLE LXIII.

Anaesthetic.	Total No. of cases.	No. of cases in which breathing ceased.	Ratio to total.
			per cent.
1	13,393	137	1.02
2	4,595	11	0.24
3	2,071	13	0.62
4	678	3	0.44
Chloroform group	15,048	151	1.00
Ether group	7,029	29	0.41

Circulatory Phenomena.—The phenomena grouped under the headings, "Pulse rapid, irregular, intermittent, and slow," are too few for useful comment.

There are 82 cases in which the pulse is stated to have "become weak, feeble, or bad." Seventy of these cases occurred under chloroform, as against 2 only under ether; and further, of 62 cases in which the pulse "failed, ceased, or became imperceptible," 48 were under chloroform, and but 4 under ether. The last-mentioned figures are important, for they show that the incidence of pulse failure under chloroform (0.36 per cent.) was over four times more frequent than with ether (0.08 per cent.). No cases of cessation of pulse were noted under "gas and ether," while 3 were recorded as having occurred under A.C.E.

Under the heading, "Pallor, faintness, or depression," of the 98 cases recorded, 82 fail under chloroform, 3 under A.C.E. mixture, while but 1 occurred with ether, and 2 with gas and ether.

Under ether, circulatory phenomena were recorded almost as often as "cessation of respiration"; but under chloroform, although the number of records of "cessation of respiration" was very large, the records of circulatory depression were far more numerous.

The records of "syncope" or "sudden heart failure" give so small a total as 14, 9 occurring under chloroform, 1 under ether, 1 under gas and ether.

With regard to the kindred conditions of shock and collapse, it should be noted that unless there was evidence of a direct causal relation between the anaesthetic and the shock or collapse the cases were classed as uncomplicated, and therefore do not appear in this table (see p. 121). The 6 complicated cases grouped under "shock" were all chloroform cases, and of the 18 under "collapse," 13 were connected with chloroform, 2 with ether, and 1 with gas and ether.

The more grave circulatory phenomena (Nos. 24 to 29 inclusive) are grouped together in the following table:—

TABLE LXIV.

Anæsthetic.	Total No. of cases.	No. of records of grave circulatory phenomena.	Ratio to total No. of cases.
			per cent.
1	13,393	228	1·70
2	4,595	10	0·22
3	2,071	5	0·24
4	678	7	1·03
Chloroform group (Nos. 1, 4, 5, 6, 8, 14) ...	15,048	249	1·65
Ether group (Nos. 2, 3, 7, 9)	7,029	22	0·31

These figures again show the tendency for phenomena of circulatory depression to arise in connection with the use of chloroform.

There are 45 cases in which *Retching or Vomiting* was recorded, and in 5 of these the vomit consisted of stercoraceous material. Simple vomiting occurred in complicated cases under chloroform with more than twice the relative frequency with which it occurred under ether, whilst with A.C.E. the relative frequency was even greater. Of the 5 cases in which stercoraceous vomiting was noted, 3 occurred under ether, 1 under "gas and ether," and 1 under a mixture of chloroform and ether, but none under chloroform. Ether was probably chosen in these cases because of the patient's grave condition.

The following table gives the number of cases in which retching or vomiting was recorded, with the percentage incidences in the total number of cases, the uncomplicated cases, the complicated cases, and the danger cases for the first 4 anæsthetics:—

TABLE LXV.

Anæsthetic.	Total cases.	No. of cases of vomiting or retching in total.	Ratio to total cases.	Total uncomplicated cases (A).	No. of cases of retching or vomiting in A.	Ratio to total A cases.	Total complicated cases (B).	No. of records of retching or vomiting in B.	Ratio to total B cases.	Total danger cases (B γ and B δ).	No. of cases of retching or vomiting in B γ and B δ.	Ratio to total danger cases.
			per cent.			per cent.			per cent.			per cent.
1	13,393	138	1·03	12,955	110	0·84	438	28	6·4	138	8	5·8
2	4,595	34	0·71	4,455	26	0·56	140	8	5·0	14	3	21·42
3	2,071	13	0·62	2,026	12	0·59	45	1	2·2	7	1	14·28
4	678	7	1·03	660	4	0·6	18	3	16·6	3	0	—

Comparing the incidence of retching and vomiting in uncomplicated cases with that in complicated cases, the ratios are as follows:—For chloroform 0·84 and 6·4; for ether 0·56 and 5·0; for gas and ether 0·59 and 2·2; for A.C.E. 0·6 and 16·6. That is to say, that of the patients who vomited under chloroform 20·3 per cent., and of those who vomited under ether 23·5 per cent., belong to the complicated class.

The above figures show that the phenomenon "retching and vomiting" (which of itself has not been regarded as a "complication") was yet frequently associated with complications. The figures, indeed, are so striking as to suggest that the phenomenon bears a causal relation to the onset of complications.

In danger cases the number of records of retching and vomiting are few. With chloroform the percentage incidence is rather less than in the complicated cases as a whole. With ether and "gas and ether" the extremely high ratio seen in the table does not represent the true incidence, since 2 of the 3 ether cases and the 1 "gas and ether" case were those of patients suffering from intestinal obstruction with stercoraceous vomiting. When these are excluded the ratio under ether becomes 7·14, and under gas and ether nil.

Muscular Phenomena.—The appearance of "violence, struggling, movement, or excitement" in the complicated class is almost as frequent relatively under chloroform as under ether, thus contrasting with the figures in the uncomplicated class (Table LIX). Of the 30 chloroform cases in the table no less than 12 are cases of danger, 5 of them terminating fatally, whereas of the 11 ether cases not a single one is to be found among danger cases.

There was no record of these phenomena in the complicated "gas and ether" cases.

The one case under A.C.E. was a case of danger.

These facts would seem to indicate that under chloroform there is a connection between the above group of phenomena and the occurrence of dangerous symptoms.

"Rigidity" was reported in all the ether cases with about five times the frequency with which it was noted in all the chloroform cases (A and B).

Taking the uncomplicated cases alone, the relative incidence with ether was only double that with chloroform.

In the complicated cases, of the 20 instances of rigidity in the table, 5 occurred under chloroform (1·14 per cent.) and 13 under ether (9·29 per cent.). This high relative rate in ether cases is explained by the following consideration:—The cases were all placed in the complicated class on account of the fact that the anæsthetic was changed because of inconvenient rigidity. All such cases were placed in Division B, subdivision *a* (see p. 13).

There were 14 cases in which a "fit," "epileptiform seizure," or "convulsive seizure" were recorded during the administration. There was no evidence showing that any of these patients were epileptics. It is noteworthy that no less than 11 of these 14 cases occurred under chloroform, whilst only 1 is recorded under ether, 1 under "gas and ether," and 1 under a mixture of chloroform and ether.

With the object of ascertaining in danger cases (including deaths) the relative frequency of primary circulatory and primary respiratory failure, the following table has been drawn up. In this, it should be noted, only cases are included in which the symptoms of danger were held to be due *entirely* to the anæsthetic. Thus cases in which the patient's state of health or the effects of the operation were contributory causes are excluded.

TABLE LXVI.—SHOWING THE ORDER IN WHICH CIRCULATORY AND RESPIRATORY FAILURE ARE REPORTED TO HAVE OCCURRED.

(ANÆSTHETIC ALONE BEING RESPONSIBLE.)

Anæsthetics	1	2	3	4	5	6	7	8	14	41
Total administrations	13,393	4,595	2,971	678	418	59	208	225	275	23
Total cases of danger	138	14	7	3	4	1	6	5	1	1
No. of danger cases with primary circulatory failure	31	1	—	1	2	1	1	—	—	—
Percentage of primary circulatory failure in danger cases	22.46	7.14	—	33.3	50.0	100.0	16.6	—	—	—
Percentage of primary circulatory failure in total cases	0.23	0.02	—	0.15	0.48	1.69	0.48	—	—	—
No. of danger cases with primary respiratory failure	26	—	4	—	—	—	—	3	1	—
Percentage of primary respiratory failure in danger cases	18.84	—	57.14	—	—	—	—	60.0	100.0	—
Percentage of primary respiratory failure in total cases	0.19	—	0.19	—	—	—	—	1.3	0.36	—
No. of danger cases with simultaneous failure of circulation and respiration	6	1	—	—	—	—	—	2	—	1
Percentage frequency of simultaneous failure in danger cases	4.35	7.14	—	—	—	—	—	40.0	—	100.0
Percentage frequency of simultaneous failure in total cases	0.04	0.02	—	—	—	—	—	0.8	—	4.35
No. of danger cases in which respiration failed, but no mention is made of circulation	26	1	—	—	—	—	—	—	—	—
No. of danger cases in which it was uncertain whether circulation or respiration failed first	2	—	—	—	—	—	—	—	—	—

Many difficulties occurred in framing the above table, the chief one being that in exactly half the cases of respiratory failure under chloroform no clear statement was made as to the state of the circulation. Obviously this omission may have been due in many cases to the fact that this factor was not observed. Some recorders, however, appear to have ignored circulatory phenomena.

With regard to the 34 danger cases in which primary respiratory failure was recorded (under all anæsthetics), there was not sufficient evidence in many to wholly exclude the possibility of concomitant circulatory impairment, which probably contributed to the result. On the other hand, impairments of breathing may have predisposed to some of the cases of nominally primary circulatory failure.

Speaking generally, the table shows that the largest proportion of instances of primary circulatory failure occurred when chloroform alone or in mixture was employed.

In the single case in which primary circulatory failure occurred under ether the note states that sudden depression occurred ten minutes after the withdrawal of the ether.

Amongst rare complications is case No. 698, in which interference with the vagus in the neck appears to have inhibited the action of the heart, causing first stoppage and then bradycardia.

NOTES ON MOVING PATIENTS, AND THE INFLUENCE OF POSTURE

Posture, etc.—In two cases of death under chloroform (Nos. 705 and 707), in one case of death under ether (No. 726), and in one case of danger under chloroform followed by the A.C.E. mixture (No. 703), the symptoms of danger were noticed immediately after the patient had been moved.

In a case of danger under the A.C.E. mixture (No. 688), the symptoms of danger were noticed "after he was sat up in a chair" and "a few stumps had been removed."

A change from the lateral to the supine position in the case of a very stout man aged 64, under ether, gave rise to obstructed breathing, which was relieved by tongue traction (case No. 528).

The lithotomy position was a contributory factor to cessation of breathing in a patient (case No. 548) under the A.C.E. mixture, which had been preceded by "gas and ether."

In one case of laminectomy under chloroform (No. 660) the dangerous symptoms were attributed by the operator to the prone position.

In a patient aged 16, who took chloroform whilst his head and shoulders were well raised (case No. 53), the pulse failed, but at once improved on the head and shoulders being lowered.

AFTER-EFFECTS.

After-effects.—A column was provided in the record book for information under this head, and it was hoped that valuable material might be collected. The Committee have grouped as after-effects all phenomena recorded as having occurred after the cessation of the administration, whether in (i) "uncomplicated cases," (ii) "complicated cases" in which the complication was not an after-effect, or (iii) cases placed in the "complicated" division on account of the after-effects themselves.

Owing doubtless to the fact that the recording of after-effects requires an entry at a later time than that on which the other data are recorded, the material at the Committee's disposal is not such as to permit of any accurate statements as to the relative frequency with which the various after-effects occur. In the records of many observers—notably those of some hospital residents—the after-effects are entered in every case with praiseworthy care, but in many other books either no note as to the after-effects appears in the large majority of cases, or most of the cases are returned as exhibiting "good" after-effects, although in one such case the further note appears that "retching was pretty constant for 2 days." In four books all the cases are returned as showing no after-effects, a total of 430 cases. Obviously these facts prevent any precise conclusions in this section.

The following table shows the number of records of after-effects in all the cases (A and B):—

TABLE LXVII.

Table showing number of records of after-effects in the cases of Divisions A and B together.

	All anaesthetics.	Anaesthetic 1.	Anaesthetic 2.	Anaesthetic 3.	Anaesthetic 4.	Anaesthetic 5.	Anaesthetic 6.	Anaesthetic 7.	Anaesthetic 8.	Anaesthetic 9.	Anaesthetic 10.	Anaesthetic 14.
1 "Nil" or "good"	7,241	4,502	1,552	289	294	92	27	60	71	10	7	19
2 "Nausea," "retching," or "slight vomit- ing."	736	346	122	149	29	21	4	16	28	4	3	—
3 "Vomiting"	2,400	1,045	975	127	91	19	13	29	27	5	3	38
4 Considerable vomiting	170	95	34	25	3	7	—	2	1	1	—	—
5 Prolonged vomiting	94	69	4	10	2	2	—	3	—	—	—	—
6 Conditions of "faintness," "shock," or "collapse."	140	85	21	5	5	2	—	3	3	—	—	8
7 Cyanosis	11	6	3	1	1	—	—	—	—	—	—	—
8 Obstructed breathing, "stertor"	2	2	—	—	—	—	—	—	—	—	—	—
9 Irritative effects—spasm or cough	4	2	1	1	—	—	—	—	—	—	—	—
10 Excessive bronchial secretion	5	1	2	—	—	—	—	—	—	1	1	—
11 Bronchitis... ..	22	4	12	1	2	2	—	—	—	—	1	—
12 Broncho-pneumonia	1	—	—	—	—	—	—	—	—	—	—	—
13 Pneumonia	2	1	—	—	1	—	—	—	—	—	—	—
14 Excitement or noise	66	27	27	11	—	1	—	2	1	—	—	1
15 Rigors or convulsions	10	7	2	—	—	—	—	—	—	—	—	—
16 Glycosuria	1	—	1	—	—	—	—	—	—	—	—	—
17 Hæmatemesis	3	2	1	—	—	—	—	—	—	—	—	—
18 Hiccough	1	1	—	—	—	—	—	—	—	—	—	—
19 Retention of urine	1	1	—	—	—	—	—	—	—	—	—	—
20 Bloodstained expectorations	1	—	1	—	—	—	—	—	—	—	—	—
21 Angina	1	—	1	—	—	—	—	—	—	—	—	—
22 Cerebral hæmorrhage	1	—	1	—	—	—	—	—	—	—	—	—
23 Uræmia	2	—	1	—	—	—	—	—	—	—	—	—
24 Asphyxia from entrance of stercoraceous vomit into air passages.	1	—	1	—	—	—	—	—	—	—	—	—
25 Prolonged narcosis after cessation of administration.	4	3	1	—	—	—	—	—	—	—	—	—
26 Cessation of respiration	2	1	1	—	—	—	—	—	—	—	—	—
27 Miscellaneous minor effects	10	4	3	2	—	—	—	—	1	—	—	—
Totals	10,932	6,204	2,767	621	428	146	44	115	132	21	15	66

As some patients exhibited more than one after-effect, the total number of records in the above table (10,932) is larger than the number of cases of which after-effects were noted.

With regard to the large number of cases under the first heading, it has been pointed out above that too much weight must not be attached to these figures. It would seem probable that many observers ignored slight vomiting, and returned the after-effects as good, only noting vomiting when it gave rise to distress or demanded treatment.

The term "vomiting" was most frequently used without qualification as to its severity or duration. Vomiting when excessive caused cases to be classified as "complicated" (*q.v.*) and in two cases appeared to contribute to the fatal result (Nos. 714, 722).

Although the percentage frequency of vomiting cannot be estimated, it is yet possible to institute some comparison between certain anaesthetics in respect of this after-effect.

The following table gives such comparison:—

TABLE LXVIII.

1. Anæsthetic.	2. Total cases.	3. No. of records of after-vomiting.	4. Ratio of Col. 3 to Col. 2.
			per cent.
1	13,393	1,555	11'6
2	4,595	1,135	24'7
3	2,071	311	15'01
4	678	125	18'4
5	418	49	11'7
6	59	17	28'8
7	208	50	24'03
8	225	56	24'9
9	155	10	6'4
10	77	6	7'7
14	275	38	13'8
All	25,896	3,400	13'1

In the foregoing table all the records of vomiting, whether slight or severe, are included. But it is found that the relation between the incidence of prolonged vomiting and that of the ordinary post-anæsthetic sickness is not equal for the various anæsthetics.

The table given below shows this fact:—

TABLE LXIX.

1. Anæsthetic.	2. No. of records of vomiting.	3. No. of records of prolonged vomiting.	4. Ratio of Col. 3 to Col. 2.
			per cent.
1	1,555	69	4'4
2	1,135	4	0'3
3	311	10	3'2
4	125	2	1'6
5	49	2	4'0
6	17	0	0'0
7	50	3	6'0
8	56	0	0'0
9	10	0	0'0
10	6	0	0'0
14	38	0	0'0

When these two tables are compared it will be seen that minor degrees of vomiting are most common under anæsthetics Nos. 6, 8, 2, and 7, least under 9, 10, 1, and 5. Regarding the most commonly used anæsthetics, vomiting was most common after ether, next after the A.C.E. mixture, next after "gas and ether," and least after chloroform. But prolonged vomiting (including the graver forms of this after-effect) occurred most frequently after chloroform, next after gas and ether, next after A.C.E., and but rarely after ether. The A.C.E. mixture holds an intermediate position between ether and chloroform, both as regards the frequency of vomiting and the frequency of the severer forms of this after-effect. With regard to successions of anæsthetics, the irregular results are probably due to the small number of records.

The following table shows the percentage frequency of circulatory depression after the anæsthetics most frequently used:—

TABLE LXX.

1. No. of anæsthetic.	2. Total cases.	3. Total records of faintness, shock, collapse.	4. Ratio of Col. 3 to Col. 2.
			per cent.
1	13,393	85	0'63
2	4,595	21	0'46
3	2,071	5	0'24
4	678	5	0'74
5	418	2	0'48
7	208	3	1'44
8	225	3	1'3
14	275	8	2'91

Adding together the figures for those anæsthetics (Nos. 1, 4, 5, 6, 8, and 14) in which chloroform was the predominant factor, the following result appears:—Total cases in chloroform group, 15,048; total records of "faintness, etc.," 105; percentage incidence, 0'69. With the ether group (anæsthetics 2, 3, 7, and 9), 7,029 cases, 29 records—incidence 0'41 per cent. Cases in which the above after-effects were recorded without evidence of a cause other than the anæsthetic were classified as "complicated." This occurred most frequently under anæsthetic 1, much less so under anæsthetics 2 and 3. In comparing the chloroform with the ether group, it must be remembered in reference to these after-effects that in many instances ether was selected on account of the feeble condition of the patient. This enhances the contrast between the rates of incidences after chloroform and after ether respectively, as well as for the chloroform and ether groups respectively.

Although cyanosis is reported to have occurred with rather more relative frequency after ether than after chloroform, only 11 instances of this after-effect were noted, in all of which it is worthy of remark that only one case occurred after "gas and ether."

Obstructed breathing is stated to have occurred twice after chloroform. Irritative effects and excessive bronchial secretion were rare.

The following table shows the incidence of bronchitis following anæsthetics:—

TABLE LXXI.

1. Anæsthetic.	2. Total administrations.	3. Cases of bronchitis.	4. Ratio of Col. 3 to Col. 2.
			per cent.
All	25,896	23	0'08
1	13,393	4	0'03
2	4,595	13	0'28
3	2,071	1	0'05
4	678	2	0'29
5	418	2	0'48
10	77	1	1'3

The above table shows that although after-bronchitis is not common, it undoubtedly occurs far less rarely with ether than with chloroform. It was noted in about 1 case in 400 of ether administrations, but only in 1 in 3,300 cases where chloroform was used.

Three of the four cases of bronchitis after chloroform, and one of the two after A.C.E., had been suffering from this affection before the administration. In only one ether case was bronchitis present previously, and in one a previous "tendency" to bronchitis was recorded. The fact that in bronchitic patients ether is usually avoided further emphasises the enormous difference in the rates of occurrence of bronchitis after ether and chloroform respectively. It is noteworthy that one case of broncho-pneumonia occurred, although there were 23 cases of bronchitis. This occurred after ether followed by the A.C.E. mixture (case 732, p. 63). The death was said to be distinctly referable to the anæsthetic.

Of the 2 cases of pneumonia in the table, that after chloroform was septic, and unassociated with the anæsthetic, and the other, following the A.C.E. mixture, is described as pleuro-pneumonia, beginning on the fifth day after the inhalation, in a child of 6. The length of time after the operation admitted so many other possible causes that the case was classified as uncomplicated so far as the anæsthetic was concerned.

The figures under other anæsthetics are too few for comment.

As would be expected, symptoms of *excitement* during recovery from ether, whether given alone or in succession to gas, are more frequent than after chloroform.

Transient glycosuria occurred once (case 270) after half an hour's inhalation of ether. *Retention of urine* (? suppression) for 48 hours, occurred in one case after 35 minutes' administration. Chloroform was used first from a towel in large quantities, and dangerous circulatory failure occurred. Subsequently a little ether was added to the chloroform for the remainder of the operation (case 425). *Uræmia* occurred in two patients, once (case 728) after herniotomy lasting 30 minutes under ether, the patient having chronic Bright's disease, and death ensuing after ten days. In the second instance (case 733) ether in succession to gas was given for 2 hours 50 minutes, having been preceded by a hypodermic injection of morphine (gr. $\frac{1}{4}$) and atropine. The operation was ovariectomy, and death from uræmia followed in 30 hours. No note was made as to the condition of the urine before operation.

The other after-effects in the table demand no special comment.

With a view to determining what relationship, if any, existed between the duration of the administration and the character and severity of the after-effects recorded, the average duration of the administration was obtained and tabulated for each recorded after-effect, in connection with the various anæsthetics employed in uncomplicated cases. Complicated cases were excluded from the tables for several reasons, chiefly on account of the difficulty of separating the "phenomena" from the "after-effects" in these cases. Where the figures are sufficiently large to be of interest these are included in the following tables. Cases in which the duration was not mentioned are excluded from the tables.

TABLE LXXII.

Showing the average duration of the administration in minutes in cases of which the more common after-effects were noted.

	All Anæsthetics.		Anæsthetic 1.		Anæsthetic 2.		Anæsthetic 3.		Anæsthetic 4.	
	No. of cases.	Average duration.	No. of cases.	Average duration.	No. of cases.	Average duration.	No. of cases.	Average duration.	No. of cases.	Average duration.
<i>After-effect.</i>		Minutes.		Minutes.		Minutes.		Minutes.		Minutes.
Retching ...	34	25'18	11	23'72	11	22'0	6	24'6	—	—
Slight vomiting ...	523	28'41	262	27'08	101	35'37	87	24'57	22	23'59
Vomiting ...	2,078	26'37	926	25'97	922	26'21	79	27'10	60	20'48
"Very sick" ...	113	34'168	57	32'67	28	34'50	16	27'25	1	10'0
Prolonged vomiting ...	42	31'214	30	31'87	1	30'0	6	20'5	2	38'5
Collapse and shock ...	22	69'54	5	50'0	6	82'5	2	80'0	2	60'0
Headache ...	43	25'53	7	22'86	20	28'05	6	21'67	5	27'0
Excitement ...	47	21'98	21	20'95	18	21'39	4	44'5	—	—

Records of the occurrence of after-retching were not often made, so that the figures call for no comment. As regards vomiting of all degrees of severity, in the large majority of the cases "vomiting" was the only note; and doubtless very many of the 2,078 cases under this heading displayed this after-effect in very slight degree. It is indeed noteworthy that with the exception of anæsthetic 3 ("gas and ether") the average duration in the cases of which "vomiting" was noted is less than in the cases of which "slight vomiting" was recorded. But, speaking generally, the average durations of administration in cases which displayed all forms of after-vomiting were distinctly greater than those of cases in which the after-effects were "nil" or "good." The cases in which severe and prolonged after-sickness was recorded show considerably prolonged average durations of administration.

The figures under the heading "shock and collapse" are striking, showing that the cases in which these after-effects were noted had average durations of considerably more than twice those of cases in which the

after-effects were either "nil" or "good." It must, however, be stated that in all these cases the feeble condition of the patient or the gravity of the operation, or both factors combined, are held to account for the after-effects.

Headache.—The figures referring to this symptom call for no comment.

Excitement.—The average durations of administration were rather less than those both of cases exhibiting other after-effects and of cases from which after-effects were absent.

TREATMENT OF COMPLICATIONS.

Method of Restoration.—In the records of complicated cases notes were usually made of the methods of treatment employed to meet the exigencies of the various complications. The details of these cases and of the procedures adopted appear at pp. 14 to 63 of this Report. For convenience of reference, however, the following tables have been prepared, summarising the resuscitative measures:—

were employed in complicated cases which recovered, and in cases of death.

Anæsthetic 6.	Anæsthetic 7.	Anæsthetic 8.	Anæsthetic 9.	Anæsthetic 10.	Anæsthetic 12.	Anæsthetic 14.	Anæsthetic 17.	Anæsthetic 18.	Anæsthetic 25.	Anæsthetic 28.	Anæsthetic 38.	Anæsthetic 41.
Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.	Followed by recovery.
—	—	—	—	—	—	—	—	—	—	—	—	—
—	2	1	—	—	—	1	—	1	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	1	1	—	—	—	—	—	—	—	—	—	—
3	3	5	—	—	—	2	1	1	—	2	—	1
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
1	1	—	—	—	—	1	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	2	—	—	—	—	2	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	1
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	2	1	6	1	1	—	—	1	1	—	1	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	1	—	—	—	—	—	—
—	4	1	—	—	—	—	—	1	—	—	—	—
—	—	—	—	—	—	1	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	3	1	—	—	—	—	—	—	—	—	—	—
—	—	1	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	1	—	—	—	—	—	—	—	—

TABLE LXXIV.

Table showing number of times methods of treatment were employed in cases of minor complications (B a).

Methods of Treatment.	Anæsthetic 1.	Anæsthetic 2.	Anæsthetic 3.	Anæsthetic 4.	Anæsthetic 5.	All others.
Jaw pushed forward	1	2	1	—	—	—
Tongue drawn forward	14	3	1	1	—	—
Throat cleared out	2	—	—	—	—	—
Tracheotomy or laryngotomy	—	—	—	—	—	—
Flicking with cold or wet towel	1	—	—	—	—	—
Artificial respiration	—	1	—	—	—	—
Mouth-to-mouth inflation... ..	—	—	—	—	—	—
Inhalation of oxygen	—	—	—	—	—	—
Lowering head	3	—	2	—	—	—
Inversion, partial or complete	1	—	—	—	—	—
Warmth and stimulants	6	—	—	—	—	—
Hot applications to heart or chest	—	—	—	—	—	—
Hot cloths to head	—	—	—	—	—	—
Intermittent compression of heart	—	—	—	—	—	—
Ice in rectum	—	—	—	—	—	—
Faradism	—	—	—	—	—	—
Faradism to phrenic nerves	—	—	—	—	—	—
Change of anæsthetic (as a remedial measure)	28	73	18	6	1	9
Rubbing gums with brandy	—	—	—	—	—	—
Ammonia to nostrils	—	—	—	—	—	—
Amyl nitrite	1	—	—	—	—	—
Hypodermic injection of ether	9	—	—	—	—	—
Hypodermic injection of brandy or whisky	—	—	—	—	—	—
Enema of brandy	3	—	—	—	—	—
Hypodermic injection of strychnine	—	—	—	—	—	—
Hypodermic injection of digitalis	—	—	—	—	—	1
Hypodermic injection of strophanthus	—	—	—	—	—	—
Venesection	—	—	—	—	—	—
Transfusion of normal saline	—	—	—	—	—	—
Friction of lips	—	—	—	—	—	—

TABLE LXXV.

Table showing number of times methods of treatment were employed in cases of anxiety (B β).

Methods of treatment.	Anæsthetic 1.	Anæsthetic 2.	Anæsthetic 3.	Anæsthetic 4.	Anæsthetic 5.	All others.
Jaw pushed forward	1	—	—	—	—	—
Tongue drawn forward	10	5	2	—	—	2
Throat cleared out	1	1	—	—	—	—
Tracheotomy or laryngotomy	1	—	—	—	—	—
Flicking with cold or wet towel... ..	2	—	—	—	—	—
Artificial respiration	16	4	3	1	—	9
Mouth-to-mouth inflation	—	—	—	—	—	—
Inhalation of oxygen	1	—	—	—	—	—
Lowering head	10	1	1	—	—	1
Inversion, partial or complete	11	—	1	—	—	—
Warmth and stimulants	3	1	—	—	—	—
Hot applications to heart or chest	5	—	—	—	—	—
Hot cloths to head	—	1	—	—	—	—
Intermittent compression of heart	—	—	—	—	—	—
Ice in rectum	—	—	—	—	—	—
Faradism	—	—	—	—	—	—
Faradism to phrenic nerves	—	—	—	—	—	—
Change of anæsthetic (as a remedial measure)	22	3	1	—	—	4
Rubbing gums with brandy	—	—	—	—	—	—
Ammonia to nostrils	6	—	—	—	—	—
Amyl nitrite	5	—	—	—	—	—
Hypodermic injection of ether	13	1	—	—	—	1
Hypodermic injection of brandy or whisky	3	1	—	—	—	1
Enema of brandy	2	1	—	—	—	—
Hypodermic injection of strychnine	2	2	—	—	—	1
Hypodermic injection of digitalis	—	—	—	—	—	—
Hypodermic injection of strophanthus... ..	1	—	—	—	—	—
Venesection	—	—	—	—	—	—
Transfusion of normal saline	1	—	—	—	—	—
Friction of lips	1	—	—	—	—	1

TABLE LXXVI.

Table showing number of times methods of treatment were employed in non-fatal cases of danger (B γ).

Methods of treatment.	Anæsthetic 1.	Anæsthetic 2.	Anæsthetic 3.	Anæsthetic 4.	Anæsthetic 5.	All others.
Jaw pushed forward	3	—	—	—	—	—
Tongue drawn forward	28	1	2	1	1	3
Throat cleared out	1	1	—	—	—	—
Tracheotomy or laryngotomy	3	1	—	—	—	—
Flicking with cold or wet towel... ..	5	—	—	—	—	2
Artificial respiration	92	2	6	2	3	9
Mouth-to-mouth inflation	3	—	—	—	—	—
Inhalation of oxygen	2	—	—	—	—	—
Lowering head	12	1	2	—	—	2
Inversion, partial or complete	26	—	—	—	—	—
Warmth and stimulants	4	—	—	—	—	4
Hot applications to heart or chest	8	—	—	1	—	—
Hot cloths to head	3	—	—	—	—	—
Intermittent compression of heart	6	—	—	—	—	1
Ice in rectum	—	—	—	—	—	—
Faradism	6	1	—	—	2	—
Faradism to phrenic nerves	—	—	—	—	—	—
Change of anæsthetic (as a remedial measure)	18	—	1	1	—	1
Rubbing gums with brandy	2	1	—	—	—	—
Ammonia to nostrils	6	—	1	—	1	—
Amyl nitrite	9	—	—	1	1	1
Hypodermic injection of ether	21	—	—	—	—	5
Hypodermic injection of brandy or whisky	7	—	—	—	—	—
Enema of brandy	13	1	—	—	—	—
Hypodermic injection of strychnine	2	—	—	—	—	3
Hypodermic injection of digitalis	—	—	—	—	—	—
Hypodermic injection of strophanthus... ..	1	—	—	—	—	—
Venesection	—	—	—	—	—	—
Transfusion of normal saline	—	1	—	—	—	—
Friction of lips	—	—	—	—	—	—

In the above tables no mention is made of temporary or permanent discontinuance of the anæsthetic, as the records in regard to the point are imperfect. This remark applies with equal force to many other of the simpler procedures, such as "opening the mouth," "pushing forward the jaw." On the other hand, the more elaborate measures adopted in grave emergencies appear to have been generally recorded.

Under chloroform the following measures were most frequently adopted, with more or less success :— Artificial respiration, 120 times, with 12 deaths ; change of anæsthetic, 68 times, principally in the less serious complications, without a death ; tongue drawn forwards, 58 times, with 6 deaths ; hypodermic injection of ether, 57 times, with 9 deaths ; inversion, 45 times, with 7 deaths ; lowering head, 30 times, with 5 deaths. It is noteworthy that the 6 cases in which intermittent compression of the præcordium was practised were severe cases (625, 658, 670), and all recovered. One observer thus describes the method as used by him :— Firstly the tongue is drawn forward with forceps and the head lowered. The anæsthetist then stands on the left side of the patient, facing patient's face, and having bared the chest, places his left hand over the right auricle, a little to the right of the sternum, whilst the right hand is placed below the left nipple over the apex of the heart. The heart is then compressed between the two hands. He is convinced that the heart can be influenced by this method even in the adult. Cases Nos. 625, 658, and 670 were looked upon as dead by those present at the time.

No special remarks seem to be called for respecting the other measures mentioned in the tables.

With regard to ether (anæsthetic 2), "change of anæsthetic" was successfully adopted as a remedial measure in 76 cases ; the tongue was drawn forward 10 times, once in a fatal case ; while of the 9 cases in which artificial respiration was employed, 2 terminated fatally.

Under "gas and ether" change of anæsthetic as a remedial measure was adopted 21 times, artificial respiration practised 9 times, tongue drawn forward 5 times, and head lowered 5 times, in every case successfully.

With the A.C.E. mixture change of anæsthetic as a remedial measure was practised 7 times, and artificial respiration was 3 times successfully employed.

The evidence before the Committee is unfortunately insufficient to warrant any definite pronouncements as to the relative value of the remedial measures employed by the observers.

DEATHS IN CONNECTION WITH THE USE OF ANÆSTHETICS.

Of the 25,896 cases in the record books, the 29 deaths in subdivision δ (cases 705 to 733 inclusive) are too few to throw fresh light upon the subject, but they afford an opportunity of drawing attention to certain points of importance and interest.

Of the 18 "chloroform deaths" (cases 705 to 722) 3 are considered to have been due entirely to the anæsthetic, and 4 to the anæsthetic principally and the patient's condition secondarily. In the others there is either doubt as to the relative shares taken by the three factors, anæsthetic, patient's condition, and operation, or the death was distinctly due more to one or both of the two latter causes than to the anæsthetic.

Of the "ether deaths" not one is held to be due entirely to the anæsthetic. In case 725 the cause is doubtful, but there is a strong probability that the fatal result was reflexly produced by the operation, as the symptoms of ether narcosis pursued a normal course and there was no evidence of ether toxæmia. Further, the syncope occurred directly upon interference with the kidney (*cf.* cases 767 and 789). Cases 723 and 724, in which the death was associated with the entrance of vomitus into the larynx, were placed in the complicated division because it was felt that without the anæsthetic this accident might not have occurred. On the other hand, it must be remembered that foreign matters may be drawn into the air passages in quantity while the patient is *in articulo mortis* by the spasmodic gasps incident to that condition.

In the case of death under gas and ether (case 729) and in the case under the mixture of chloroform and ether (case 730) the patient's condition was the principal contributory cause of the fatality.

In the case under anæsthetic No. 8, chloroform given after a course of ether, the death is held to have been entirely due to the chloroform.

In case 732, after ether followed by the A.C.E. mixture, the A.C.E. having been given for the greater part of the operation, the death from broncho-pneumonia was referred by the recorder entirely to the anæsthetic.

The foregoing facts emphasise the conclusion that danger to life under the use of chloroform is greater than when other anæsthetics are employed.

Records are contained in the books of 52 deaths which are regarded by the Committee as in no degree due to the anæsthetic. The details of these cases are here appended for the sake of completeness. For details of the deaths recorded in the Press during 1892 see Appendix I.

DEATHS IN NO MEASURE DUE TO THE ANÆSTHETIC.

Twenty-seven Cases in connection with Chloroform.

- 734.—M. 28. Good.
"For adenoma in throat."
C. $\bar{\text{v}}\text{xii}$. 90 mins.
Death from hæmorrhage.
- 735.—F. 5. Very much collapsed. Was operated upon from 10 a.m. till 12.30 for glands in neck.
Jan., 1 p.m. For hæmorrhage after previous O.
C., given on fold of towel. $\bar{\text{v}}\text{iii}$. 10 mins.
Did not seem to suffer much from C., but very much from loss of blood. Recovered for a time, but died at 3 a.m., 10 hours after administration of C., from exhaustion after bleeding.
- 736.—M. Feeble. Railway accident.
Amputation below knee.
C., on lint. $\bar{\text{v}}\text{viii}$. 30 mins.
After-effects—nausea. Pt. died from shock and loss of blood within 24 hours.
- 737.—F. 10. Good. Intermediate hæmorrhage.
Ligature of two vessels.
C., on flannel inhaler. $\bar{\text{v}}\text{ii}$. 15 mins.
Faintness, with, for a time, almost complete absence of radial pulse. Breathing good. No special treatment. This Pt. died next day, from shock due to O. and great loss of blood.
- 738.—F. 64. Rather collapsed. Laparotomy.
C., on Skinner. $\bar{\text{v}}\text{xii}$. 60 mins.
Pt. never recovered consciousness. Died 3 hours after. Death due to shock of O. and excision of gangrenous gut.
- 739.—M. 14. Good, not prepared. Accident. Crush of body, and fractured ribs.
Amputation of arm at shoulder.
C., pure, drop method. $\bar{\text{v}}\text{v}$. 40 mins. $4\frac{1}{2}$ mins. going under.
Extreme shock. Died 6 hours after.
- 740.—M. 45. Collapsed. Railway accident.
Amputation of arm and leg.
C. $\bar{\text{v}}\text{xx}$. 45 mins.
Pt. died from effects of injury 12 hours after O.
- 741.—M. 14. Weak.
Excision of hip, with removal of sequestra from pelvis.
C., on Skinner. $\bar{\text{v}}\text{xvi}$. 90 mins.
Breathing laboured all through O. Child much collapsed. After-effects—vomiting. Died from collapse two days after. Transfused.
- 742.—M. 22 months. Weak. Intussusception four days, pulse weak.
For intussusception.
C. Meth., on lint. $\bar{\text{v}}\text{iv}$. 50 mins.
Brandy enema $\bar{\text{v}}\text{i}$ before and after O. E. $\bar{\text{M}}\text{x}$ injected during O. Pulse feeble. Died 5 hours after O.
- 743.—F. 7 months. Collapsed.
For intussusception.
C. $\bar{\text{v}}\text{ii}$. 30 mins.
Rallied for a time, but died from collapse 12 hours after O.
- 744.—M. 62. Emaciated, but otherwise healthy.
Gastrostomy.
C. $\bar{\text{v}}\text{xvi}$. 50 mins.
Pt. suffered from shock during O. Death resulted, from same, $1\frac{1}{2}$ hours after.
- 745.—F. 43. Very bad.
Abdominal section for malignant disease.
C., on double lint. $\bar{\text{v}}\text{xiii}$. 35 mins.
Pt. came round all right, having taken C. well. Began to vomit after a few mins. Death 3 hours after, due to condition of Pt., not to anæsthetic.
- 746.—F. Very bad collapse. Strangulated femoral hernia, of ten days' duration, on admission.
For strangulated hernia.
C., on lint.
The bowel was found to be gangrenous, and gave way during O. Pt. died 3 hours after O., of shock. Hypodermic injections of E. were three times administered during O., as the pulse appeared to be failing.
- 747.—? Sex. 48. Collapsed. Railway accident.
Amputation of arm and leg.
C., on towel. $\bar{\text{v}}\text{xx}$. 40 mins.
Patient died of shock 10 hours after O.
748. M. 55. Weak and inclined to collapse.
Dec., 10 a.m. For strangulated inguinal hernia.
C., on one fold of towel. $\bar{\text{v}}\text{vi}$. One hour.
Never rallied thoroughly. Died 10 hours later.
- 749.—F. 42. Collapsed, and faecal vomiting, also syphilitic.
Radical cure for old standing, large, umbilical hernia (strangulated).
C. $\bar{\text{v}}\text{iii}$. 45 mins.
No effects of C. Pt. died from shock and exhaustion 10 hours after O.
750. M. 2 years and 2 months. Fair.
Strangulated hernia, reduced, and radical cure.
C. 45 mins.
Pt. suffered greatly from shock during O. Died in 12 hours.
- 751.—F. 4. Good.
Excision of elbow.
C. $\bar{\text{v}}\text{iii}$. 45 mins.
Died of collapse 14 hours after O.
- 752.—M. $1\frac{1}{2}$. Jaundice. Pyæmia (? morb. cordis).
Removal of sequestrum.
C. $\bar{\text{v}}\text{iss}$. 25 mins.
Took C. well. Died 15 hours after O.
- 753.—M. 71. Strong man.
For strangulated hernia.
C., on towel. $\bar{\text{v}}\text{xxv}$. 55 mins.
Died from the disease.
754. M. $1\frac{1}{2}$ years. Healthy child.
For strangulated hernia.
C., on towel. $\bar{\text{v}}\text{xii}$. 35 mins.
Died from the disease.
755. F. 46. Somewhat collapsed.
For strangulated umbilical hernia.
C., on folded lint. $\bar{\text{v}}\text{viii}$. 30 mins.
E. injection hypodermically after 20 mins.' administration.
Pt. died next day.

756.—M. 55. Healthy.
Nov., 1 a.m. Trephining skull.
C., on towel. $\bar{\text{Xviii}}$. 50 mins.
Pt. died 11 hours after O.

757.—M. 20 months. Much exhausted, suffering from severe dyspnœa.

Tracheotomy.

C., on corner of towel. Less than $\bar{\text{v}}$. A few seconds.

O. failed to give relief, as bronchi were affected. Died in about three-quarters of an hour. Death was caused by the plugging of the larynx, trachea, and bronchi by diphtheritic membrane, and was probably accelerated by the O. Anæsthesia had nothing to do with the fatal result. The child recovered consciousness for a few mins. after the tube was inserted.

(NOTE.—*Cf.* case 713.)

758.—M. 8. Child had been delicate from birth. Family history of consumption. P.M.: Both lungs firmly adherent in places. Marked emphysema of both apices. Bronchi were injected, and contained some mucus. Heart, liver, spleen, and kidneys normal. Brain normal, pia mater in some places finely granular, no evidence of inflammation. Wound. The two edges of the palate had separated behind and were sloughing and ragged.

For cleft palate.

E., with Clover, first. Then C., with Junker. $\bar{\text{vi}}$. 35 mins.

Pt. died 55 hours after O. Conscious to the last, very restless. Temperature, 102° the day before death. Two hours before death it was 105° . Pulse 240.

759.—M. 10. Tubercular. (3rd administration.)

Excision of tubercular knee.

C. $\bar{\text{Xvii}}$. 55 mins.

During O. mucus gathered in Pt.'s throat. This was cleared out by scraps of gauze in forceps. In doing this some force was used, and this loosened three under teeth, whose roots were eaten away. Two of the teeth were swept out by the finger, and this seemed to be all. He afterwards developed septic pneumonia, and died. A tooth was found in his bronchus.

(NOTE.—Although a solid foreign body may enter the air passages when the patient is in a conscious state, there is no doubt that the liability to do so is increased when the Pt. is under an anæsthetic, and in the latter case the anæsthetic might be a contributory cause of the accident. *Cf.* cases 723, 724, 729.)

760.—M. 63. Has had one stroke.

Catheterisation for stricture.

C. 80 mins.

Pt. recovered, and walked to a warm bath, where he stayed for one hour, there becoming unconscious, and dying of apoplexy in five days, never having recovered consciousness. No P.M. allowed. The hæmorrhage probably came on while in the bath, and was not connected with the anæsthetic.

Eleven Cases in connection with Ether.

761.—F. 63. Very poor.

Ovariectomy.

E., with Clover. $\bar{\text{iii}}$. 35 mins.

Died on the table. In this case the death was undoubtedly due to hæmorrhage, from a vessel deep in the pelvis, which it was impossible to stop. Pt. took E. remarkably well.

762.—M. 15. Very collapsed.

Abdominal section for acute intestinal obstruction.

E., with Clover. $\bar{\text{iv}}$. 45 mins.

Sick. Death on table from shock.

763.—M. 30. Very anæmic. Pt. was run over by railway trucks, and both legs were nearly severed from the trunk, the right just below the trochanters, the left just above. When first brought in, he was quite conscious, and pulse good, but had evidently lost a large amount of blood.

2.30 a.m. Double amputation of thigh.

E., with Clover. $\bar{\text{v}}$. 7 mins.

On the table, when all hæmorrhage had been stopped, $\bar{\text{iv}}$ of brandy were given by mouth before anæsthetic, and gr. $\frac{1}{4}$ morph. subcutaneously. Pulse failed gradually, but O. was proceeded with. $\bar{\text{ii}}$ of brandy were injected into the rectum, E. into the skin of the chest ($\bar{\text{v}}$ in all), but with no avail, and he gradually died, on the table, though not before both limbs had been amputated. Death from shock.

764.—M. Somewhat collapsed.

Amputation above knee.

E., with Clover. $\bar{\text{iii}}$. 55 mins.

Death from shock 5 mins. after O. Shock due to injury and amputation.

765.—F. 9. Depressed.

Removal of scapula and arm, for sarcoma of scapula.

E. About one hour.

Pt. died from shock and hæmorrhage about 30 mins. after

limb was removed from trunk. Owing to the displaced position of the subclavian artery, great difficulty was experienced in finding it.

766.—M. 50. Extreme collapse.

Amputation through knee, and removing fragment from compound fracture of femur, at upper third.

E. $\bar{\text{ii}}$. 45 mins. (*sic*).

Died $2\frac{1}{2}$ hours later, from effects of shock, and hæmorrhage occurring previous to his being discovered on the railway line.

767.—M. 35. Anæmic. Scrofulous kidney. Much suppuration for many months.

Nephrectomy.

E. $\bar{\text{vii}}$. 150 mins.

Took anæsthetic well at first, and easily. Gradually got livid, and pulse weaker. Much shock. Death in 3 hours.

768.—M. 38. Weak from hæmorrhage. Pt. prepared by aperient the night before, enema in the morning, and a very light breakfast about 5 hours before O.

Examining wound of knee.

E. 20 mins. (Pure E.)

Marked shock. Died same evening.

769.—M. 46. Weak.

Amputation at shoulder joint.

E., with Clover. $\bar{\text{iv}}$. 40 mins.

Died from shock in the evening. No anæsthetic after-effects.

770.—M. 27. Weak from loss of blood. Railway crush.

Amputation of right foot and left leg, below the knee.

E., with Clover. $\bar{\text{iii}}$. 55 mins.

Pt. never rallied from O. Died 10 hours after.

771.—F. 35. Rather feeble.

Oöphorectomy.

E., with Clover. $\bar{\text{iv}}$. 70 mins.

Very sick. Died within 24 hours from collapse.

Five Cases in connection with Gas and Ether.

772.—F. 26. Not anæmic. Well nourished.
Abdominal section. Removal of two cystic ovaries.
G. and E. $\bar{\zeta}$ iii. 70 mins.
Was a good while going under. Pulse at end of O. not so good as at first. Much vomiting after O. Died at 10.30 p.m. same evening, from hæmorrhage. No vomiting till 8.15, and then only for a little while. Much collapsed on returning to special ward.

773.—F. 38. Anæmic.
Abdominal section.
G. and E. 115 mins.
Death in 14 hours.

774.—F. 22. Not anæmic. Fat.
Abdominal section.
G. and E. 45 mins.
Vomited four times. Retched a good deal. Death in 44 hours.

775.—F. 37. Bad. Pt. had been in constant pain, with pyrexia, for some weeks.

Laparotomy.

G. and E. $\bar{\zeta}$ viii. 90 mins.

She took anæsthetic well, but towards end of O. became rather pale, and her pulse was found to be 180, regular but small. She was then given an enema of brandy, which picked up the pulse a little, and E. was almost discontinued for the last 20 mins. of O. On getting back to bed she appeared to rally, but felt sick, and vomited a little grumous matter. She was given another enema of brandy. In about 2 hours' time she became very restless and blanched, and when examined was found to be pulseless, gasping for breath, and in a few minutes became quite unconscious, and died at 6 p.m. She was given E. $\bar{\text{M}}_5$ and $\bar{\text{M}}_{10}$ of brandy, with $\bar{\text{M}}_8$ liq. strych., under the skin, besides another enema of brandy.

776.—M. 61. Almost pulseless, abdomen much distended, very weak.

Lumbar colotomy for intestinal obstruction.

G. and E., with Clover. Gas two gallons. E. $\bar{\zeta}$ i½. 40 mins.

Stood O. well, kept lightly under. Died an hour and a half later, symptoms unrelieved.

Two Cases in connection with the A.C.E. Mixture.

777.—F. 40. Healthy. Railway accident. Both legs torn off at the knees. Right hand smashed. Suicide.
Amputation of hand and both thighs.
ACE., on folded towel. $\bar{\zeta}$ xiv. 120 mins.
Died. Shock was cause of death.

778.—M. Compression.

Trepining.

ACE., by open method. $\bar{\zeta}$ iii. 25 mins.

Died 8 hours after.

One Case in connection with Mixtures of Chloroform and Ether.

779.—F. 3. Collapsed.
Abdominal section.

C. 1 part and E. 2 parts, method unstated. $\bar{\zeta}$ ii. 15 mins.
Died 6 hours after O., but was rapidly sinking before.

One Case in connection with A.C.E. followed by Chloroform.

780.—F. 12. In extremis.
Abdominal section.

ACE. 15 mins., then 40 mins.
Child died 3 hours after completion of O.

Three Cases in connection with Chloroform followed by Ether.

781.—M. 14. Abdomen distended. Pain and vomiting.
For intestinal obstruction.
C., on towel. $\bar{\zeta}$ iv. Then E., with Clover. $\bar{\zeta}$ ii. 90 mins. in all.
Very little vomiting. Pt. died during the night, apparently of shock.

783.—M. Nervous, and bloated from hard drinking. Railway accident.

July. Amputation of both legs, one above the knee, the other above the ankle.

C., on lint and sponge. $\bar{\zeta}$ ii. Then E. $\bar{\zeta}$ v. Meth. 90 mins. in all.

After-effects—great thirst and constant vomiting, very little sleep. Death from shock, and failure of heart, 48 hours after O. "This man did not, in my opinion, die from the after-effects of C. and E., but from shock, etc."

782.—F. 8. In collapse.
Administration of enemata.
C., on towel. 20 mins. Then E. $\bar{\zeta}$ i.
Child died next morning, from intestinal obstruction.

One Case in connection with Ether followed by Chloroform followed by Ether.

784.—F. Collapsed. Pt. was admitted to hospital, in a collapsed condition, with a strangulated femoral hernia, with history of fœcal vomiting, of two days' standing. Radial pulse felt with great difficulty. E. was administered hypodermically, and later morphine gr. $\frac{1}{8}$ was administered in the same manner. It was decided to operate.

Sept. For strangulated hernia.

First E., with Clover, then C. \bar{v} iss, 10 mins. then E., with Clover, for 25 mins.

E. by Clover's inhaler was tried, but such violent struggling occurred that C. was resorted to for about 10 mins. She took C. well, the pulse improving. After this E. was used, the breathing keeping regular, pulse perceptible, pupils con-

tracted. A brownish fluid regurgitated. After 20 mins. E. \bar{u} x was again injected hypodermically, but the breathing became irregular, so the anæsthetic was discontinued, and the O. rapidly completed. In 10 mins., although E. hypodermically was again resorted to, heart and lungs ceased to act. Hot flannels, amyl nitrite, etc., were of no avail, causing only three or four gasps. "Death in this case cannot be attributed to the anæsthetic, about 15 mins. having elapsed since E. was discontinued."

(NOTE.—There was no evidence in the above case that aspiration of fœcal material into the air passages took place. Cf. case 724.)

One Case in connection with Ether after Morphine and Atropine.

785.—M. Suffering from severe shock, Amputation of both thighs. E. after morphine and atropine.

Died from shock $4\frac{1}{2}$ hours later. During O. breathing shallow and pulse feeble, but much better than before anæsthetic commenced.

SHOCK AND COLLAPSE.

There were numerous cases in the record book exhibiting many varieties of shock and collapse.

Cases of antecedent traumatic shock (*e.g.*, from railway accidents) are excluded from this section.

Cases of shock and collapse may be the result of (1) disease (*e.g.*, intestinal obstruction, prolonged suppuration), (2) antecedent hæmorrhage, (3) hæmorrhage referable to the operation, (4) (reflex) some operative manipulation (*e.g.*, traction on viscera), (5) prolonged operations under anæsthetics, (6) severe and extensive operative procedures (*e.g.*, Kraske's operation), and (7) severe after-effects (*e.g.*, vomiting), or of more than one of these causes.

In the complicated (B) cases (cases 1 to 733) many instances may be found of the above conditions in which the anæsthetic could not be excluded as a contributory cause of the complication.

Amongst the uncomplicated (A) deaths (cases 734 to 785) other instances occur.

Besides these there were certain cases in the uncomplicated (A) class which did not terminate fatally. These are appended below (cases 786 to 794).

Particular interest attaches to the cases which illustrate reflex shock. In the complicated division the following instances may be found:—Cases 93, 386, 405, 454, 655, 670, 692, 698, and 725.

In the uncomplicated division death No. 767 may have resulted in this way; and the four cases below, 786 to 789, appear to be of the same nature. The study of these cases appears to prove that reflex shock of a more or less fatal character does occur even when a patient is under the influence of an anæsthetic. When it is considered how very many operations are recorded of a similar nature to those in which the above symptoms occurred (see table) the small number of cases of reflex phenomena appears to warrant the assumption that the anæsthetic is in itself protective.

CASES OF NON-FATAL SHOCK IN THE UNCOMPLICATED (A) DIVISION.

786.—F. 50. Very anæmic. June. Dilatation of cervix. G. and E., method unstated. 20 mins. Ready in 1 min. Collapsed at end, "when large Hagar was going in." No after-vomiting.

787.—F. 60. Aortic murmur. March, 4 p.m. Cauterisation of vulva. C. Meth., on towel. \bar{v} iv. 20 mins. Became very blue in moderately deep anæsthesia, before

conjunctival reflex was abolished. At times there was great pallor from shock during O.

788.—F. 46. Healthy. Alcoholic habit. Jan., 12.40 p.m. Removal of unilateral ovarian cyst. ACE., on Skinner. \bar{v} v. 60 mins. Struggling in 5 mins. Pupils widely dilated. Muscular relaxation in 8 mins., and pupils now commenced to contract. Pt. commenced to vomit in 12 mins., and conjunctiva became sensible, after having been insensible for 4 mins. previously.

More ACE. administered, and in 18 mins. the pupils became unequal, first the right and then the left being the larger, the Pt. during these changes being completely insensible. On evacuation of the cyst the pulse became small and feeble, and then twenty drops of brandy were subcutaneously administered, which produced a favourable effect upon the pulse. After-effects—retching for an hour.

789.—F. 36. Very anæmic from loss of blood. Slight cough. Thin, spare, short. Pulse 84. Regular. Carcinoma of kidney. Beef-tea 6 a.m.

Jan., 10 a.m. Nephrectomy.

ACE., on Skinner and Rendle. Then E., with Ormsby. E., 5v. 40 mins.

Went under quietly; stertor, etc. Pulse and colour good for 20 mins. During ligature of pedicle, pulse gradually more rapid, R. remaining regular and softly snoring. The pulse became nearly imperceptible, and R. lost its snoring sound. Lips paler. Pulse remained barely, or not at all, perceptible for 10 mins. R. once ceased as if Pt. were holding breath, then went on again. Brandy injected, legs raised. Pt. moved off to bed. Pulse gradually came back, no vomiting. Some pain afterwards. "Case of shock from O."

790.—M. 32. Average.

Excision of rectum.

E., then C. Methods unstated. 30 mins.

Considerable shock from O. Pt. indicated this by quick pulse, but colour and R. were good. Colour, in fact, florid, and

pupil average size. 15 mins. after beginning pulse very quick, but colour still very fair. The colour then became very slightly paler, and pupil larger. No corneal reflex. Pulse could not now be counted. Face quickly became paler, and eyelids separated. O. was just over, and Pt. moved to ward.

791.—F. Good.

For piles.

E. (Meth.), with Clover. 5ii. 15 mins. (*sic*).

Pt. very emaciated. A good deal of shock from O. towards the end.

792.—M. 14. Poor.

Nov., 11 a.m. Excision of hip.

C., on flannel. 5vi. 90 mins.

Very collapsed. E. injected. Brandy enemata. Hot bricks, etc. "Collapse due to length of O. and hæmorrhage, not Chloroform."

793.—M. 11. Good.

Aug., 4 p.m. Excision of hip.

C., on Skinner. 5iii. 75 mins. (*sic*).

Anæsthetic had to be stopped several times, on account of Pt. losing blood and becoming very pale, and almost pulseless. Probably shock.

794.—F. 26. Pulse weak, 104. Tubal pregnancy. Rupture into peritoneum. Free hæmorrhage.

Oct., 7 p.m. Abdominal section.

C., on mask. 5x. 77 mins.

Pulse feeble at times during O. E. injected five times.

NOTES ON INCOMPLETE ANÆSTHESIA.

There are numerous instances in the complicated division (cases Nos. 1 to 733), of the occurrence of complications of different degrees of severity during a state of incomplete anæsthesia. Cases Nos. 76, 92, 224, 255, and 334, exhibiting minor complications, cases of anxiety Nos. 416, 417, and 481, cases of danger Nos. 562, 563, 566, 580, 581, 687, and 692, and cases of death Nos. 708, 709, 717, 718, and 719, may be cited as examples. In many other cases in Division B there is a more or less strong probability that anæsthesia was incomplete when the complication arose. Owing partly to the absence of accurate notes on this point, and partly to the personal equations of the observers, it is impossible to express in figures the relative numbers of cases which developed complications in profound and shallow degrees of narcosis respectively. A study of the complicated cases, however, shows that, when anæsthesia was undoubtedly incomplete, complications were more frequent than when it was unquestionably complete.

Under chloroform and its mixtures incomplete anæsthesia would appear to be associated with complications of all degrees of severity; while under ether there was no case of danger recorded which arose during shallow narcosis, unless the occurrence of vomiting in case 725 (which followed upon manipulation of the kidney and preceded the fatal syncope) be taken as evidence of an insufficient degree of anæsthesia.

Many of the cases of "reflex shock" in the complicated division were so classified because an imperfect degree of anæsthesia apparently permitted the condition to arise. In the cases of "reflex shock" in the uncomplicated division (cases 786 to 789, p. 121), there was no evidence that the anæsthesia was other than complete.

The occurrence of vomiting, which may be accepted as evidence of incomplete anæsthesia, appears to have been the origin of many complications associated with chloroform. Cases 32, 34, 35, 38, 40, 41, 42, 51, 52, and 144 amongst cases with minor complications, case of anxiety No. 444, cases of danger Nos. 563 and 581, and case of death 708, as well as case 363, which occurred under nitrous oxide gas, may be mentioned as instances.

Amongst the uncomplicated cases there is evidence of incomplete anæsthesia from such notes as "not properly under," "cried," "pain felt," "moved at incision," etc., in many instances.

In the record books of three observers especially evidence of incomplete anæsthesia is frequently found. The figures from these three books are instructive. In one book of 412 cases, 19 exhibited

complications, giving a rate of 4.6 per cent. (*cf.* Table III, p. 12). In the second book of 171 cases 20 complications occurred, *i.e.*, 11.7 per cent., and in the last book, containing 178 cases, the complications were 10, *i.e.*, 12.8 per cent.

The frequent occurrence of complications when the anæsthesia is incomplete emphasises the importance of the establishment of complete anæsthesia before surgical procedures are commenced, and of maintaining the requisite degree of anæsthesia during the remaining stages of the operation; also the importance of avoiding attempts to arouse the patient, such as by flipping with a towel, at the conclusion of the operation.

The evidence also shows that, in many instances, the importance of regulating the depth of the narcosis to the requirements of the operation and the general state of the patient was not appreciated.

CONCLUSIONS.

The foregoing Report, and the three Appendices which follow, present an account of such of the work of the Sub-Committee as they consider is likely to be of interest or value. Many other points have been investigated, on which the available evidence was found to be too meagre or contradictory to warrant their inclusion.

The Sub-Committee particularly desires to draw attention to the extreme value of the cases which appear in the Report and Appendices, as presenting examples of most of the complications and dangers occurring during anæsthesia.

To appreciate the basis of classification of individual cases, upon which the conclusions depend, the following must be remembered:—Much evidence, which it is impossible to publish, was afforded from (1) the papers returned by the observers, (2) the internal evidence of each record book, and (3) in numerous instances, when cases were difficult to classify, from correspondence with their recorders. Each case was discussed and submitted to the individual judgment of the members of the Sub-Committee; and, where the printed details may seem insufficient to justify the classification of particular cases, it must be understood that all the considerations which determined the classification could not be appended.

From a careful study of the whole of the facts at their disposal, the Sub-Committee feel that, owing to (1) the large number of factors in the problem, and (2) the personal equations of the numerous recorders, it is impossible to arrive at uniformly satisfactory statistics on the several points submitted for their consideration.

The following conclusions, however, appear to be justified:—

RELATIVE SAFETY OF THE VARIOUS ANÆSTHETICS.

I. The relative safety of the various anæsthetics may be gathered from the statistical tables in the report. When only those cases of danger which were held to be due entirely to the anæsthetic are considered, the following instructive figures are obtained, further emphasising the danger of chloroform as contrasted with ether.

Cases of danger (including deaths) considered to be due entirely to the anæsthetic:—

Under chloroform, 78, giving a danger rate of 0.582 per cent.

Under the A.C.E. mixture, 1, giving a danger rate of 0.147 per cent.

Under mixtures of chloroform and ether, 2, giving a danger rate of 0.478 per cent.

Under the A.C.E. mixture followed by chloroform, 1, giving a danger rate of 1.694 per cent.

Under chloroform preceded by ether, 5, giving a danger rate of 2.2 per cent.

Under chloroform followed by mixtures of alcohol, chloroform, and ether, 1, giving a danger rate of 0.36 per cent.

Under ether, 3, giving a danger rate of 0.065 per cent.

Under "gas and ether," 2, giving a danger rate of 0.096 per cent.

Under ether preceded by chloroform, 1, giving a danger rate of 0.480 per cent.

Under ether preceded by the A.C.E. mixture, 0.

Under the chloroform group of anæsthetics (addition of the first six headings above), 88, giving a danger rate of 0.584 per cent.

Under the ether group of anæsthetics (addition of the last four headings above), 6, giving a danger rate of 0.085 per cent.

II. Although (excluding nitrous oxide) ether may be accepted as the safest routine agent, certain circumstances determined by the state of the patient, the nature of the operation, etc., may render the use of some other anæsthetic or combination of anæsthetics both safer and easier.

THE BEST METHODS OF ADMINISTRATION.

III. No method of administration of chloroform is free from danger, but an examination of the complicated cases appears to show that the occurrence of danger depends largely upon the administrator who employs any particular method.

IV. No conclusion from the evidence before the Committee as to the best method of administration of ether and "gas and ether" is possible.

V. The data warrant the conclusion that the A.C.E. mixture should not be given from a closed inhaler (*e.g.*, Clover's). This conclusion applies to all mixtures containing chloroform (*vide* anæsthetic No. 5, p. 94).

VI. As regards the rate of use of the various anæsthetics, no conclusions other than those in the section on "Quantity of Anæsthetic Used," p. 94, can be offered.

BEST METHODS OF RESTORATION.

VII. The Sub-Committee are unable from the material at their disposal to draw any conclusion upon this point.

CLINICAL EVIDENCE REGARDING ANÆSTHETICS GENERALLY.

VIII. Anæsthetics are more commonly associated with complications and dangers in males than in females.

IX. Excluding infancy, and taking anæsthetics collectively, the complications and dangers of anæsthesia increase *pari passu* with advancing age.

X. Anæsthetics are notably more dangerous in proportion as the gravity of the patient's state increases. (The conclusions arrived at in the section on "Pathological States," p. 76, are extremely instructive, and should be referred to in this connection.)

XI. Danger to life is especially likely to be incurred at early periods of the administration of anæsthetics, while the tendency to less grave complications increases directly with the duration of anæsthesia.

XII. The tendency for complications, dangerous and otherwise, to occur, increases *pari passu* with the gravity of the operation.

CLINICAL EVIDENCE REGARDING CHLOROFORM.

XIII. Chloroform is about twice as dangerous in males as in females.

XIV. Chloroform is most dangerous during early infancy, and after thirty years of age; least so from ten to thirty years of age.

XV. In conditions of good health chloroform is very much more dangerous than other anæsthetics. In grave conditions chloroform still remains the least safe anæsthetic, but the disparity between it and other anæsthetics is far less marked than in health.

XVI. When danger occurs under chloroform, whatever its exact nature may be, there is abundant evidence that in a large proportion of cases the symptoms that are observed are those of primary circulatory failure.

XVII. Imperfect anæsthesia is the cause of a large number of cases of danger under chloroform.

XVIII. Vomiting during anæsthesia, which may lead to danger, seems to be more frequent under chloroform than under other anæsthetics.

XIX. Struggling is very much more frequent in the complicated cases under chloroform than in the uncomplicated, and this phenomenon must therefore be regarded as a source of grave danger under chloroform.

XX. The tendency for circulatory complications to appear increases directly with the relative amount of chloroform in the anæsthetic employed.

XXI. While vomiting is more common after administrations of ether, severe and prolonged vomiting is more common when chloroform has been used.

XXII. Circulatory depression following anæsthetics is more common after chloroform than after ether.

XXIII. While the respiratory complications of anæsthesia as a whole are of equal frequency under the ether and chloroform groups respectively, yet those that occur under ether are mostly of a trifling and transitory nature, while those that occur under chloroform are more grave and persistent.

CLINICAL EVIDENCE REGARDING ETHER.

XXIV. Under ether the complications of anæsthesia are more frequent with males than with females, but with the former they are generally slight, ether being rather more dangerous with females than with males.

XXV. Ether, when employed throughout or preceded by nitrous oxide gas or by the A.C.E. mixture, is singularly free from danger in healthy patients.

XXVI. Minor troubles in administration due to laryngeal irritation and increased secretion are more common under ether and "gas and ether" than under chloroform and its mixtures.

XXVII. Struggling occurs more frequently with ether when given alone than with other anæsthetics, but it rarely leads to danger.

XXVIII. After-vomiting is more common with ether than with other anæsthetics, but it is usually transient.

XXIX. Bronchitis is much more common as an after-effect of ether than of chloroform.

XXX. With "gas and ether" as with ether, dangers are more common in females, although complications are more frequent in males.

CLINICAL EVIDENCE REGARDING MIXTURES AND SUCCESSIONS OF ANÆSTHETICS.

XXXI. The A.C.E. mixture in most of the statistical tables holds an intermediate position between chloroform and ether.

XXXII. The A.C.E. mixture is more dangerous in males than in females, but not to such a marked degree as is chloroform.

XXXIII. The administration of ether antecedent to chloroform does not abolish the possibility of chloroform dangers.

XXXIV. The various mixtures and successions of anæsthetics were recorded too infrequently to justify definite conclusions.

GENERAL CONCLUSION.

XXXV. From the evidence before the Sub-Committee, they are convinced that by far the most important factor in the safe administration of anæsthetics is the experience which has been acquired by the administrator.

In many cases the anæsthetisation completely transcends the operation in gravity and importance, and to ensure success, particularly in these cases, it is absolutely essential that an anæsthetist of large experience should conduct the administration.

APPENDIX I.

CASES OF DEATH RECORDED IN THE PRESS DURING 1892, AND
CONSTITUTING APPENDIX I OF THIS REPORT.

Records of 34 deaths were obtained from the Press during 1892.

Of these, 8 cases were reported in the record books, and appear in the Report. These are:—

- Case 705, reported in *Lancet* and *B.M.J.*, 12.11.92.
Case 707, reported in *Lancet*, 26.3.92, and *B.M.J.*, 19.3.92.
Case 711, reported in *Lancet*, 21.5.92.
Case 713, reported in *Morning Leader*, 22.9.92.
Case 718, reported in *B.M.J.*, 22.10.92.
Case 719, reported in *Lancet*, 23.1.92.
Case 725, reported in *Lancet*, 4.6.92.
Case 784, reported in *B.M.J.*, 17.9.92.

Abstracts of the remaining 26 cases are given below.

- 1.—Jan. 7th—*Times*, 22.1.92.
M. 50. Suffering from a simple fracture of both bones of right leg. Leg had been in splints. P.M.: All the organs perfectly healthy.
To re-set, as splints were not satisfactory. Time 5 p.m. O. not begun.
C. A few minutes. About $\bar{5}\frac{1}{2}$.
Pt. turned a very bad colour, and began to breathe heavily. C. stopped. R. ceased immediately. A.R. kept up for $2\frac{1}{2}$ hours. Heart kept beating for $2\frac{1}{2}$ hours, but he never breathed again. Injection used.
- 2.—Jan. 16th—*Times*, 22.1.92.
M. 56. Cancer of jaw.
C. At first? Afterwards from Junker, with tube placed up nostrils. Inhaler fixed to coat.
After O. had begun, it was noticed that R. suddenly ceased. On looking round, operator saw that by some means the bottle of the inhaler had fallen on the pillow, and the contents had been upturned. Remedial measures?
- 3.—Jan. 29th—*B.M.J.*, 27.2.92.
M. 37. Small strangulated right inguinal hernia. Pt., though very weak, walked to hospital. Taxis employed without effect. General condition becoming worse, enema of brandy was given. No sign of organic lesion was discovered in chest before O. P.M.: Nothing abnormal in any organs, except few atheromatous patches on aorta, above sigmoid valves, and slight marginal emphysema. In hernial sac small knuckle of ileum deeply congested. Congestion not extending to mesenteric border, and involving only about two-thirds of circumference of bowel. Bowel adherent to sac round neck. A few flakes of recent lymph on abdominal side of ring.
For hernia.
E. ? Method. Some struggling at beginning. 8 to 10 mins.
Pt. under in 6 to 8 mins., and O. then begun. 2 mins. after beginning of O., three or four shallow Rs., and then R. ceased. Temporal pulse persisted. No stertor or mydriasis. Tongue drawn forward at once. Head extended. A.R. Enemata of brandy. Injections of strychnine. Faradic current to phrenics. A few ounces of dirty bilious fluid escaped from mouth. Tracheotomy performed. A.R. continued for an hour and a half. No signs of vitality.
- 4.—Feb. 6th.—*Dudley Herald*, 13.2.92.
M. 11. Acute disease of bone in left hip and right elbow. In Sept., 1891, diseased bone removed from hip. In Oct., 1891, ditto elbow. No ill effects. P.M.: Heart fatty.
For diseased bone.
C., on towel held to face.
When the O. was over the face became dusky. Usual remedies. Pulse stopped. Pt. did not even partially recover.
- 5.—March 14th—*Lancet*, 26.3.92; *B.M.J.*, 23.4.92.
M. 38. Sinus in right loin; 12 months. Bronchitis. He had successfully passed through an O. some time before. P.M.: Marked fatty degeneration of walls of heart. Liver enlarged, fatty, and amyloid.
O. ? On sinus; not begun.
C. given in preference to E. because of bronchitis. Usual way, on lint. 4 mins. About $\bar{5}$ iii.
The man struggled rather violently, and suddenly R. ceased, had previously given no indication of anything amiss. No note as to pulse, colour, pupil, etc. A.R. at once performed. E. subcutaneously, and battery applied. He made no attempt to breathe again.
- 6.—March 21st—*Reynolds*, 27.3.92.
M. 6 years and 10 months. A deformed child who suffered from cleft palate. He had had six previous Os. under C.
O. ? For cleft palate.
C.
The O. was in course of performance, when, for the second time, some more C. was given. The child's R. became shallow, and his pupils dilated. A.R. resorted to. Child ultimately expired.
- 7.—April 29th—*B.M.J.*, 7.5.92, and private letter.
M. 12. Came to hospital. Polypus of ear. P.M.: Heart somewhat enlarged; a good deal of fat upon its surface.
Two slight Os. (one to remove polypus.) The other?
C. Usual way. 10 to 15 mins. $\bar{5}$ iv $\frac{1}{2}$, about.
After completion of the O., the operator noticed that the Pt. had ceased to breathe. A.R. No avail.
- 8.—May 11th—*Canterbury Journal*, 21.5.92, *Lancet*, 4.6.92, and private letter.
M. 32. Brewer's labourer. Bad. Broken down by drink

and had chronic bronchitis. Strangulated inguinal hernia. Eight hours. In great pain and very ill. No P.M.

Herniotomy, not begun.

C. given rather than E. because of condition of lungs. On Skinner. 8 mins. \bar{v} iv.

O. not commenced. Conjunctival reflex never abolished. Struggling occurred very violently. Had to be held during struggling. During struggling he collapsed. Tongue pulled forward. Inversion. A.R. for three-quarters of an hour. Nitrite of amyl. Electricity. Injection of brandy.

9.—May 31st—*Lancet*, 11.6.92. *Evesham Standard*, 4.6.92. *B.M.J.*, 18.6.92, and private letter.

F. 35. Apparently well developed and healthy. Chronic sinuses in right axilla, following abscess. O. once before under ACE., to scrape sinus. Pt. had been drinking two days before. She asked that an anæsthetic might be given her. Breakfast 8 a.m., pulse 72, regular. Pt. afterwards found to have been a chronic alcoholic. P.M.: Pericardium markedly adherent, especially in front. Heart average size, slightly dilated; valves normal; muscles of left ventricle flabby. Liver and kidneys healthy.

To scrape sinuses. Time: 12 noon. O. not begun.

ACE. Ten days old. Kept in dark cupboard. Freshly opened the day before. On flannel inhaler. (Sample sent to Prof. Ramsay.)

Slightly excited at first. Soon showed signs of faintness. Hypodermic injection of brandy, \bar{v} i. Within 1 min. or so she became slightly cyanosed, and R. became irregular. Anæsthetic stopped, and injection of E. \bar{v} ½ given. Improved. Shortly after, within another minute, she was worse again. A.R., with tongue kept well out of mouth with forceps. Two more hypodermic injections of E. and hot fomentations to præcordium. No improvement. In 10 mins. more she was practically pulseless and heart sounds were scarcely audible. A.R. kept up for half an hour.

10.—May 27th—*Lancet*, 11.6.92.

M. 12. Pt. had large psoas abscess (right) opened under C. three months before. Took C. well. After this he had pneumothorax, and later hydrothorax (left). Health improved a little, but abscess formed over right sacro-iliac joint. Before O., heart normal, pulse 85. Lungs: dulness behind on left side from eighth rib downwards, with impaired voice and breath sounds, and loss of tactile fremitus. Bread and milk 4½ hours before administration. Not at all nervous. P.M.: Lungs—right, healthy; left, upper lobe healthy, lower lobe carnified. Empyema on left side. \bar{v} xvi pus. Heart rather more to right side than normal; muscle and valves healthy.

To open abscess. Not begun.

C., lint doubled. 2 or 3 min. \bar{v} i.

R. was at first regular, but shallow; when about three deep breaths were taken, and R. suddenly ceased altogether. Pulse found to be imperceptible. Corneal reflex gone, pupils widely dilated. A.R. (Sylvester) commenced at once. Two inspiratory gasps were taken. E. hypodermically. Hot sponges to præcordium. Raising of extremities. Galvanic current to heart. No rally. A.R. kept up for half an hour.

11.—June 6th—*Morning Leader*, 7.7.92, and private letter.

F. About 40. Pt. suffered from a deformity, by which her mouth was unable to be closed, because of a cicatrix due to a burn in childhood. Kept in bed 24 hours prior to O. Liquid nourishment 3 hours before O. Covered with blankets.

To amputate left forearm. Not begun.

C., on single layer of lint. By drop-bottle. 8 min. \bar{v} iii. Evaporation very rapid, owing to heat of weather.

Took C. well for 8 mins. Brief struggle just before losing consciousness. Pulse infrequent, small, soft, regular. R. deep, regular. Pupils moderately dilated, remaining so throughout. R. failed first suddenly. Head extended, tongue drawn forward. A.R. (Sylvester) at once. Nitrite of amyl one capsule. E. hypodermically \bar{v} ½, and repeated. Faradism; no

response. Death appeared to be instantaneous. A.R. maintained for half an hour.

12.—June 11th—*Birmingham Gazette*, 16.6.92. *Lancet*, 25.6.92. *B.M.J.*, 23.7.92.

M. 52. Muscular, thick-set, and inclined to be stout. Had suffered from severe pain of lumbar region, which had incapacitated him from work. Pus in urine; no blood. Moist sounds at bases. Heart: no bruit, but sounds feeble, and apex beat displaced outward. P.M.: Heart fatty, flabby, and dilated; valves healthy. Left lung: pleuritic adhesions. Bladder inflamed, and thickened behind a urethral stricture. Pain in back was attributed to rheumatoid arthritis of spine.

Exploratory. Not begun.

C. Pure. Three patients had been safely anæsthetised from the same bottle on the preceding day. Double fold of lint. Usual way. \bar{v} ii distributed over three occasions. 7 mins. \bar{v} iii or \bar{v} iv.

For 3 mins. he took the C. well. Then struggling, lasting 2 or 3 mins. and then ceasing. Three dressers held him down during struggling. Then he breathed well for 1 min., and was nearly under. He suddenly ceased to breathe, and the face became livid 7 mins. from start, and after \bar{v} ii had been inhaled (? whether this was \bar{v} ii additional or not). Pupils were less than a line in diameter, and pulse could be felt. Tongue drawn forwards. Inversion. A.R. (Sylvester and Howard). Under A.R., one or two feeble Rs. were taken. Pupils afterwards dilated. Diaphragm and phrenics were Faradised. Jugular vein opened. Trachea opened. Direct inflation tried. Pulse, when felt for next after cessation of R. (which was after some minutes), could not be detected. Heart puncture. Needle quite motionless. Further efforts abandoned.

13.—June 18th—*B.M.J.*, 18.6.92.

M. 33. Engine fitter. History of epilepsy in family. Pt. had attacks of petit mal. Had accident six months ago, breaking some ribs, from which he recovered. He had the appearance of being intemperate. P.M.: Lungs—extensive tuberculous disease. Heart: much fat externally; fatty degeneration of muscle of heart; ventricular walls thin; right ventricle dilated; valves all competent. Atheroma in all arteries examined (including aorta). Kidneys and spleen normal. Liver: \bar{v} 83, fatty, ? commencing cirrhosis.

Some minor O. Not begun.

C. Mask.

Took C. well till stage of excitement, when he began to struggle; he quieted down. More C. poured on mask, and then violent struggling. Administration then suspended and not resumed. Sudden cessation of movements. Tonic spasm, opisthotonos, R. ceased. Head lowered over table. Tongue drawn out. A.R. commenced. Veins of face and neck enormously distended, first congestion, then cyanosis. External jugular vein opened, and \bar{v} x of blood withdrawn. Blood flow soon stopped. No effort was made to breathe. Electricity. Injection of E. Hot applications to epigastrium, etc. A.R. continued for an hour and a quarter.

14.—July 1st—*Annandale Herald*, 7.7.92.

F. Young. Careful examination of heart before administration did not reveal any abnormal condition.

Extraction of teeth.

C.

In the course of the O. action of heart suddenly failed. Prompt steps were taken to restore animation, but the combined efforts of the medical men in attendance, persevered in for 35 mins., were of no avail.

15.—July 17th—*Daily Chronicle*, 3.8.92. Letter from anæsthetist.

M. 33. Had liver disease, for which invalided from India.

For deep-seated abscess of liver.

C. Given ten times successfully before. Cone-shaped piece of lint. 30 min. \bar{v} ½, about.

C. taken extremely well. No unpleasant symptom occurred until within a few seconds of death. O. nearly completed, when, recovering from effects of C., he suddenly gave a gasp and expired. A.R. and other means kept up for over half an hour with no effect. Anæsthetist considers the death to have been due quite as much to the O. (during which the Pt., who was in a very weak state, lost a large quantity of blood) as to the anæsthetic.

16.—Aug.—*Lancet*, 6.8.92.

F. 34. Suffering from toothache. Husband considered she was very delicate, and tried to dissuade her from taking C. Examined, and considered to be sound. P.M. Flabby heart and diseased, enlarged kidneys.

Removal of teeth.

C., given slowly. 30 drops.

After 30 drops had been taken, pulse became weak, and she had an epileptic fit, during which the heart failed.

17.—Aug.—*Echo*, 16.8.92.

F. 13 months.

O., severe. Not begun.

C. Not under.

Death ensued whilst C. was being administered.

18.—Aug. 9th—*Willesden Herald*, 12.8.92.

M. 36. Strong, healthy man. Suffered extremely from piles.

For piles. Just completed.

C., flannel on wire frame.

The O. was just completed when R. suddenly ceased. Pupils dilated widely. The anæsthetist considered that the heart and R. stopped at the same time, and that death was due to syncope. Artificial means resorted to, to no purpose.

19.—Sept. 15th—*Pall Mall Gazette*, 17.9.92. Letter from the operator and the anæsthetist.

F. 40. Well developed, but anæmic and underfed. No history of alcohol or morphia. In hospital four days before O., Bowels acted. Clothed as usual for ovariectomy. Room warm. Ovariectomy. Very large unilocular cyst. Small spray used.

C., first. Then E. sp. gr. 0.720. No other symptoms with same. C., on corner of towel. E., on lint. 30 mins. C. \bar{v} ½. E. \bar{v} ½.

Ten minutes to go off; no struggling. Vomited in first 5 mins. Not deeply anæsthetised at any time. Pupil and reflexes normal. Pulse got weaker as fluid removed from abdomen. E. then substituted, and O. finished. Pulse improved till end of O., and then R. became shallow. E. was then stopped. Pt. removed to bed, with warm bottles, etc. R. again became shallow. A.R. (Silvester) for an hour and a half. During which time heart was repeatedly examined and found to be beating, for at least an hour after the first symptoms of respiratory failure. Tongue pulled forward. Pt. inverted. N H₂ to nostrils. Sinapisms to heart and feet. Heat applied. R. failed first.

20.—Sept. 21st—*Manchester Examiner*, 24.10.92. *Lancet*, 29.10.92.

M. 63. Carcinoma of rectum. Much emaciated. Heart rather weak, but no valvular disease.

Lumbar colotomy. Not begun.

C. 10 mins. \bar{v} ½.

After 10 mins. suddenly R. became very shallow, and pulse imperceptible. C. was at once stopped. A.R. commenced. Injections of E., head lowered, legs raised. Nitrite of amyl. A.R. kept up for half an hour.

21.—Sept. 29th—*Weekly Dispatch*, 2.10.92, *Reynolds*, 2.10.92, and private letter.

M. 45. Alveolar abscess and deep-seated cellulitis of neck. Could scarcely breathe or speak. Whole neck greatly swollen. Temp. 102.8°. Gasping for breath. P.M.: Lungs and air passages much congested. Larynx and trachea swollen and œdematous. Deep-seated abscess round trachea.

Incision.

E., with Ormsby. \bar{v} ½.

On first incision being made, he began to be blue. R. stopped. Marked cyanosis. A.R. Hypodermic injections of brandy and E. Heart continued to beat for some little time after R. ceased.

22.—Oct. 19th—*Irish News*, 22.10.92.

M. 24. Compound comminuted fracture of elbow-joint, and tearing of artery, etc., on Sept. 18th. Amputation performed. Oct. 19th, second amputation found necessary because stump did not heal. Examined and found to be a fit subject.

Amputation of arm; not begun.

C. A few minutes.

Fainted and died from failure of action of heart.

23.—Nov. 12th—*Birmingham Gazette*, 31.10.92. *B.M.J.*, 12.11.92.

M. 25. Distiller. Strong, healthy-looking man. Chest first examined. Rather nervous, but became composed when reasoned with. Pt. seems to have possessed very little self-control. At time of original injury it required five persons to hold him while a few sutures were inserted. P.M.: Rigor mortis well marked. Cerebral congestion (venous). Heart quite healthy; left ventricle contracted and healthy and empty; right ventricle full of fluid blood. Lungs healthy but engorged with blood and nearly airless. Liver and kidneys healthy.

To free some tendons of wrist from scar of old wound. Not begun.

First C., then ACE. C. used frequently before without mishap. C. by folded lint and drop-bottle. ACE. 20 drops from drop-bottle. \bar{v} ½ C., in addition to the ACE.

Dry lint applied first to accustom Pt. to its presence. He snatched it away and said he could not breathe. When he became quieter, C. was given by drops. Held breath at intervals, shook his head and made several remarks. Presently R. deep and regular. Just as he seemed to be going under, he struggled again. ACE.—20 drops—begun. Pt. took several deep, regular breaths. Suddenly R. ceased, and face became cyanosed. Heart had shown no sign of failure, and sounds could be detected some time after R. ceased. A.R. continued vigorously for one hour. At first A.R. seemed likely to be successful, for face became a more natural colour, lips became red, and he occasionally uttered a feeble inarticulate sound. E. hypodermically. Brandy per rectum. Friction to raised lower limbs. Hot water to præcordium.

24.—Nov. 12th—*Lancet*, Dec., 92. *B.M.J.*, 26.11.92. *Birmingham Gazette*, 17.11.92.

F. 57. Ascites. Tumour (? cystic) in right pelvic region. Heart found to be apparently healthy before O. C. given in preference to E. because of asserted liability to pulmonary trouble. P.M.: Heart—no valvular lesion. Condition of muscle was not such as could have affected duration and tone of first sound. Fluid in abdomen.

O. for tumour. Only first incision made.

C. given before and after with no bad effects. Sample sent to Prof. Ramsay. Folded lint. Took C. perfectly well, and in no way excited. R. even and deep, normal rate up to the time when skin incision was made, 5 or 6 mins. Not accurately measured, could not have exceeded \bar{v} ½.

Took well. Pupils one line in diameter. Tongue well forward between teeth. Pt. was completely, but by no means deeply, under when the alarming symptoms arose. Quite suddenly, without warning, she became livid, made two or three shallow gasps, and R. ceased. Heart instantly examined, no sounds. O. at once stopped. Head lowered over end of table. A.R. (Silvester and Howard). No air could be made to enter or leave the chest. Insufflation by mouth was tried without effect. Tracheotomy. Insufflation through the tube was tried without effect. Heart puncture within a few minutes of onset of alarming symptoms. Cardiac muscle seen to be absolutely inactive when heart was punctured.

25.—Dec. 8th—*West Sussex Gazette*, 15.12.92. *B.M.J.*, 24.12.92. *Lancet*, 31.12.92.

F., 58. First time taking anaesthetic. Fairly good condition. Tumour left temple and fibroid of uterus. Heart examined and nothing abnormal detected. Cup of beef-tea at 7.30 a.m., O. at 12. Warmly clad. Room warm. Said she was afraid, but took it well. P.M.: Heart muscle healthy; slight patches of commencing atheroma. Lungs: emphysematous (slightly); some scarring at apices. Uterine fibroids. Other organs healthy.

To remove tumour.

C. Not more than three months old. Not exposed to light. No bad symptoms in other cases. Given by cone, formed by towel, as suggested by Lord Lister, by drop-bottle. 15 to 20 mins. Less than $\frac{3}{4}$.

Pt. nervous. For 10 mins. she took it satisfactorily; no struggling; no spasm; quickly under, not deeply under. O. commenced. She vomited slightly, and the conjunctival reflex returned. When vomiting ceased she was again completely anaesthetised, and pulse and R. were good and regular. Pupils were small and lid reflex absent. 4 or 5 mins. later she became suddenly pale; pupils dilated widely. Pulse could not be felt (almost immediately before this pulse felt to be good and the cut vessels spurted freely). She respired once or twice spontaneously before A.R. was begun. Tongue pulled forwards. A.R. kept up for 20 to 30 mins., with head drawn back, and allowed to hang over end of table (Sylvester). After beginning A.R. pupils slightly contracted, but almost immediately dilated again. Nitrite of amyl. Strong ammonia. Hot

sponges to præcordium. Subcutaneous E. over heart. No response.

26.—Dec. 18th—*Birmingham Post*, 22.12.92. *B.M.J.*, 7.1.93. M., 63. Labourer. Suffering from cancer of tongue, rapidly advancing, 6 months' duration. Man somewhat wasted, but organs apparently healthy. Lungs and heart carefully examined. No physical signs. P.M.: Venæ cavæ and right heart distended, and left ventricle empty and contracted. No valvular lesion. Brain congested. Other organs healthy.

Removal of tongue and glands under jaw. O. was proceeding. Almost bloodless. Incision made for lingual artery, to ligature.

C., by Skinner and drop-bottle.

At first some struggling and rigidity. After 6 to 7 mins., fully anaesthetised, R. regular and snoring. Inhaler removed for 2 or 3 mins. while lingual artery exposed. Conjunctival reflex returned, and inhaler again applied, and C. sprinkled on it. Pt. now suddenly became intensely rigid. Muscles in state of tonic contraction. Face blue. R. ceased. Carotid pulse, which had been observed throughout, continued to be perceptible for a few beats. O. stopped. Pt's. head and shoulders brought over end of table. A.R. (Sylvester) kept up for three-quarters of an hour. Tracheotomy. Inflation through tube. E., $\frac{3}{4}$ hypodermically. Enema of brandy and beef-tea. Acupuncture. No effect with treatment. The opinion of the majority of the medical men present was that tonic spasm of the respiratory muscles prevented R.

APPENDIX II.

REPORT FROM PROFESSOR RAMSAY.

The following samples of chloroform have been received :—

1. From A. W. Russell, Western Infirmary, Glasgow, December 21st, 1891.
2. From University College Hospital, London, January 6th, 1892.
3. From W. N. Clemmey, Borough Hospital, Bootle, January 9th, 1892.
4. From Chas. Dagleish, Radcliffe Infirmary, Oxford, January 24th, 1892.
5. From A. H. Butcher, Birkenhead, February 6th, 1892.
6. From Douglas Macdonald, Aberdeen Hospital, February 16th, 1892.
7. From E. J. Maclean, Bristol Hospital for Sick Children, March 5th, 1892.
8. From University College Hospital, London, March 9th, 1892.
9. From F. W. Hewitt (a specimen of ether), March 10th, 1892.
10. From R. C. M. Colvin Smith, Victoria Hospital, Chelsea, May 15th, 1892.
11. From Norman Hamper, North-West London Hospital, May 31st, 1892.
12. From David Wallace, Edinburgh, September 30th, 1892.
13. From David Baldwin Jacob, Queen's County Infirmary, Maryborough, October 8th, 1892.

The earlier of these samples were tested as follows :—

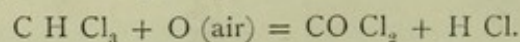
1. The specific gravity was taken.
2. They were distilled; the first and last portions of the distillate were collected separately.
3. These portions were tested for reducing power.
4. The boiling-point of the sample was observed.
5. The sample was shaken with water and tested for free acid.
6. The sample was mixed with sulphuric acid and any discoloration was noted.

These tests were not continued; for it was soon discovered that they were of no use. The specific gravity was that of pure chloroform, or so close that nothing was to be gained by noting it. The boiling-point was that of chloroform, with a difference that the ebullition commenced perhaps a degree too low. The amount of free acid found was small, but unmistakable. No coloration was produced with sulphuric acid; or if a faint yellow colour was observed, it is to be attributed to the trace of alcohol which is added to chloroform as a rule, under the impression that it will keep pure for a longer time.

The residue, on distillation, had a sharp smell, and possessed some reducing power; e.g., it precipitated silver from an ammoniacal solution of the nitrate.

It was therefore resolved to attack the problem from the other side, and to endeavour to render pure chloroform impure by exposing it to light in presence of air, and then to test for the impurity. It is perfectly certain that chloroform, delivered from the makers, is, so far as my experience goes, a pure article, and that it develops impurity on keeping.

About 3 lbs. of pure chloroform were therefore exposed to daylight and sunlight when there was any, in a large clear-glass bottle, for about 2 months (April and May). On removing the stopper of the bottle, thick fumes were to be noticed, implying the formation of hydrochloric acid. The smell was exceedingly acid and pungent, and it was very easy to detect the presence of carbon oxychloride, CO Cl_2 , formed from the chloroform evidently according to the simple equation—



It is impossible to respire such chloroform; it causes choking instantly. Carbonyl chloride is known to be poisonous; at least, foreign manufacturers tell me that their workmen regard it as such. It is difficult to see why, because it immediately reacts with water, forming carbon dioxide and hydrochloric acid, neither of

which are acute poisons. It is more probable that their fear is caused by the escape of carbonic oxide, CO, which is, as is well known, an intense poison.

An experiment was made in Professor Schäfer's laboratory by Mr. Parsons, his assistant, on the effect of such impure chloroform on a dog. It was necessary to introduce it into the lungs through a canula inserted into the windpipe. But, as was expected, no particular effects were observed; the anæsthesia continued, and respiration did not stop, unless an excessive dose of chloroform was given.

It is this substance, however, which gives chloroform the acrid smell which it sometimes possesses, and it is the only impurity which I believe to be present. It is this substance which, moreover, makes some samples of chloroform difficult to respire.

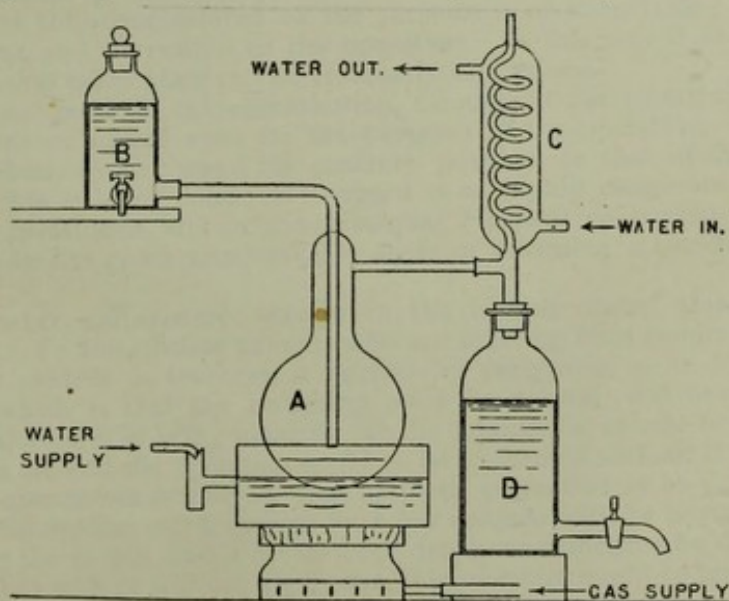
In testing the later samples, therefore, I confined myself to trying to breathe them, and judging as to whether this acrid substance was present. It is true there is a test, but one which does not give very decided results. It consists in placing over a sample of the chloroform in a test tube a layer of pure baryta-water, which should not be the least turbid; it must be filtered into the test tube, taking special precautions to exclude carbon-dioxide. If carbonyl chloride be present a film of carbonate of barium slowly forms at the junction of the two layers of liquid. But the test by breathing is much easier, and much more quickly performed. A single breath suffices to enable a judgment to be formed. All the samples were thus tested, and in no case was the chloroform received free from the pungent character described and produced by the presence of carbonyl chloride. I am sure that this impurity was present in small amount in every sample received.

Whether it was the cause of death or of accident is quite another affair. Is it not possible that after an inhalation of such impure chloroform the glottis closes, and that chloroform poisoning occurs? But on this it is necessary for medical experts to pronounce an opinion.

A sample of Pictet's chloroform was also received and tested. It appears to be no less pure than any good commercial sample of chloroform, nor is it any more pure. It too, when allowed to stand in a clear bottle exposed to light for some days, gave the same test for carbonyl chloride, and had the same pungent effect when breathed. As fractional distillation is generally to be preferred to fractional crystallisation as a method of removing impurities from a mixture, so here too I believe that it is preferable. The results are reached more quickly and more perfectly by distillation than by crystallisation.

As carbonyl chloride is the only impurity which I believe to exist in chloroform, it was necessary to devise some way of removing it. This is, fortunately, easily done. If the chloroform be distilled from quicklime, the carbonyl chloride is retained; the carbon dioxide and hydrochloric acid, produced by the action of the carbonyl chloride on the small amount of water in the chloroform, react with the lime, forming carbonate and chloride of calcium. The chloroform can be distilled away pure. It would even be sufficient to place slaked lime in the chloroform, and leave it to settle and draw off the clear liquid when required. For the utmost that could happen would be the formation of formate of calcium, a non-volatile salt. The chloroform vapour would be pure.

But it is preferable to distil the chloroform from lime. I have devised a special form of still which has been fitted up in University College Hospital. It is so arranged that very little attention is required.



R 2

A is the still, supplied from B, and rests on a water-bath, kept full by a constant supply of water. The vapour passes up C and is condensed, running into D, whence the chloroform is drawn as required. The experience of this still has been too short to enable me to say whether it will succeed ; if it is found suitable, it would be better to have it constructed of copper, as it would then be less liable to break.

I cannot omit this opportunity of urging the Committee to consider the question of inhalers. It is obviously very questionable to give chloroform by rule of thumb, in doses which are usually not excessive, but which sometimes result fatally, when it might be given with perfect control. Here, again, the opinion of a practical expert is to be preferred to mine ; but I ask for careful consideration of the question.

WILLIAM RAMSAY.

University College, Gower Street, London
February 4th, 1893.

APPENDIX III.

REPORT FROM SURGEON LIEUTENANT-COLONEL EDWARD LAWRIE.

THE RESIDENCY,
HYDERABAD, DECCAN,
JANUARY 5TH, 1893.

I have the honour to forward an abstract of the cases of chloroform anæsthesia of which I have kept notes in the Afzulgunj Hospital during the year ending December the 31st, 1892.

2. There were 1,521 administrations of chloroform during the year. In eleven instances, in which there was respiratory obstruction, partial anæsthesia, and in all the remaining cases full anæsthesia, was produced.

3. One accident occurred. The patient was a powerful Afghan who began to resist and struggle frantically to get away, when the inhalation commenced. We were obliged to hold him down. If we had allowed him to break loose in his almost frenzied state of mind, he might have created a very dangerous disturbance in or outside the Hospital. He took the chloroform quietly when he found we had the mastery; but in the meantime the chloroformist had held the chloroform cap tightly over the patient's face, while my attention was diverted, and an overdose was inhaled. The breathing gradually ceased, and then stopped altogether for 55 seconds; but it was restored by artificial respiration. The patient took chloroform again the day but one afterwards in the usual way, and it is clear that the method of administration was to blame for the accident and not the anæsthetic. The case was reported in *The Lancet* of October the 1st, 1892.

4. Chloroform was administered in the manner described on pages 258 and 259 of the Hyderabad Commission's Report, a copy of which is forwarded herewith. Slight improvements have been introduced in the system in the course of the year. Evidence of the improvement which has taken place in the method of administration is afforded by the sign of anæsthesia. In cases 1 to 700 stertorous breathing was the first sign of full anæsthesia in 4·5 per cent., and abolition of the corneal reflex in 96·5 per cent. In cases 701 to 1500 abolition of the corneal reflex was the first sign of anæsthesia in 99·63 per cent., and stertor only occurred in 0·37 per cent. Formerly the chloroform was poured on to the cap in unmeasured doses. Now, for the sake of economy, half a drachm or a drachm is poured on every 45 seconds, and the saving of chloroform is very great. All the students present are now made to take notes of the administration, and the attention of the whole clinical class is thus concentrated on the promotion of anæsthesia; with special reference to the patient's breathing at first, and afterwards to the operation. In this way if an accident happens the precise manner in which overdosing takes place can be accurately ascertained.

5. From the commencement of chloroformisation, throughout the anæsthesia, and until consciousness is restored, the patient is never moved even for the purposes of the operation, while the chloroform is being administered. If it is necessary to change the patient's position, or that of the table, the chloroform cap is entirely removed while this is being done. We regard it as highly dangerous to move a patient from one room to another during anæsthesia, and in the Afzulgunj Hospital no patient is ever taken away from the operating theatre until he has given unmistakable signs of returning consciousness and the anæsthesia has passed off.

6. Chloroform is never administered except in the manner stated above in para. 2, when there is respiratory obstruction. To anæsthetise patients who are suffering from respiratory obstruction, by means of tubes passed into their nostrils or tracheas, is necessarily dangerous, as it does not maintain the essential condition for safety—which is that the breathing must be natural, and never interfered with under any circumstances, while chloroform is being inhaled. If the anæsthetic cannot be given by natural inhalation it is not right to give it at all, and the operation ought to be performed without it.

7. The method of anæsthesia employed here in tooth extraction is to put the patient fully and deeply under the influence of chloroform and then wait for a few seconds until he begins to come out. There is then no difficulty in opening the mouth, and if he has been deeply anæsthetised he does not resist. As the dentist opens the mouth, whether with or without a gag, the chloroformist ought to push the lower jaw forward from

behind the angles. If this is done skilfully, it assists the operator and prevents any chance of the breathing being obstructed—which it is apt otherwise to be while the extraction is proceeding.

8. In case of accidental over-narcosis of the respiratory centre, either alone or with (a) asphyxia, or (b) signs of vagus irritation such as chloroform syncope, the only remedy which can restore the patient, and not interfere with or prevent the operation of the natural safeguards by which the administration of chloroform in both medicinal and lethal doses is surrounded, is artificial respiration. The experiments of the Hyderabad Commissions, and the later experiments of Dr. C. H. Leaf and of the President of the Second Commission, prove that chloroform has no direct action on the heart, and that the heart can only be affected under chloroform by interference with the breathing.

9. Finally we hold to the view that chloroform should never be administered for surgical purposes in public or in private practice, except in the event of unavoidable emergency or urgency, unless four or five trained assistants are present.

(Signed) EDWARD LAWRIE, M.B.,
Lieutenant-Colonel.

TABLE I.—ABSTRACT OF NOTES OF 1,521 CASES OF ANÆSTHESIA, FROM JANUARY 1ST TO DECEMBER 31ST, 1892.

	First sign of anæsthesia in cases														
	1 to 100	100 to 200	200 to 300	300 to 400	400 to 500	500 to 600	600 to 700	700 to 800	800 to 900	900 to 1000	1000 to 1100	1100 to 1200	1200 to 1300	1300 to 1400	1400 to 1500
(a) Stertorous breathing ...	9	6	4	2	7	2	2	0	0	1	1	0	0	1	0
(b) Cornea insensitive ...	91	94	96	98	93	98	98	100	100	99	99	100	100	99	100

Percentage of cases of stertorous breathing in cases 1 to 700 :—4·5 per cent.
" " " " " 701 to 1500 :—0·37 per cent.

TABLE II.—AVERAGE TIME TO PRODUCE FULL ANÆSTHESIA.

Males.			Females.		
Under 4 years.	From 4 to 15 years.	Over 15 years.	Under 4 years.	From 4 to 15 years.	Over 15 years.
71 1 mins. 30 secs.	135 2 mins. 36·6 secs.	1026 4 mins. 18·9 sec.	28 1 mins. 19·5 secs.	59 2 mins. 41·9 secs.	202 4 mins. 11·3 secs.

Total average time to produce full anæsthesia, in 1,521 cases, 3 mins. 53 secs.

Average duration of operations 11 mins. 9 secs.

After effects { Vomiting—occurred in 17 cases.
Retching—occurred in 5 cases.

Other after-effects—*nil*.

Cases in which full anæsthesia was not produced, 11.

Average amount of chloroform employed per case in 1,521 cases—2·3 ounces.



