Collective Investigation

INTO

**THE AFTER-HISTORY OF GASTRO-
ENTEROSTOMY.**

Report by

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THE British Medical Association, in connexion with its collective investigation scheme, decided in 1928 to conduct an inquiry into the after-history of gastro-enterostomy in respect of cases operated on during the period 1920-24 inclusive, and for that purpose two forms dealing with the questions to be answered were issued to those members of the Association who were willing to take part in the inquiry. One form dealt in Section A with sex, age, occupation, and the operative and immediate post-operative history, and in Section B with the after-history when hospital treatment had ceased. The other form requested an indication of the views of surgeons and medical practitioners as to the value of the operation. Considerable care has been taken by a large number of surgeons and medical practitioners in the filling up of these forms, and valuable information has been obtained as to the results of the operation. Acknowledgement must be especially made of the praiseworthy response of so large a number of medical practitioners to the request for particulars of the after-histories of cases, and to the conscientious manner in which they have discharged what must have been a very onerous task. Any utility that may result from this investigation will be mainly due to their generous efforts.

Reports of 2,609 cases have been received in response to this inquiry. The conditions dealt with and the number of reports on each were as follows:

	No. of Reports.
Cases of duodenal ulcer	985
" perforated duodenal ulcer	112
" pyloric ulcer	454
" perforated pyloric ulcer	20
" gastric ulcer	603
" perforated gastric ulcer	42
" growths	336

There were in addition 47 reports which were inadequately filled in, and had to be rejected as useless for the purposes of the inquiry.

These returns represent the operative work of eighty-six surgeons, and may therefore be taken as a fair indication of the value of the operation as performed by a number of surgeons, all of whom were attached to hospitals containing not less than a hundred beds.

Owing to the large number of cases returned and the mass of details that had to be dealt with, it is proposed in this part of the report to deal only with the cases of duodenal ulcers, and to issue subsequent reports on the cases of pyloric ulcers, gastric ulcers, perforated ulcers, and growths.

PART I.—DUODENAL ULCERS.

There were 995 reports of the results of operations for duodenal ulcer; they do not include the perforated cases, which will be dealt with in a subsequent report. The answers to the various questions have been carefully collated, and the results are embodied in the following tables.

TABLE I.—*Sex Incidence.*

Number of cases	995
Males (percentage)	33.6
Females (percentage)	16.4

This table shows that about five times as many cases occur among males as among females.

TABLE II.—*Age Incidence (at Time of Operation).*

Age.	Percentage.
14-20 years	15.9
30-40	29.1
40-50	31.4
50-60	18.1
60-70	5.5

This table shows that the majority of patients with duodenal ulcer were operated on between 30 and 50 years of age. Of the patients operated on between 14 and 30 years one only was 14 years of age; and two were 17 years of age.

TABLE III.—*Type of Operation.*

Type of Operation.	No. of Cases.	Percentage.
Posterior gastro-enterostomy	786	79.0
Posterior gastro-enterostomy and cm-bedding of ulcer	159	16.0
Anterior gastro-enterostomy	18	1.8
Gastro-duodenostomy	9	
Posterior gastro-enterostomy and excision of ulcers	8	
Anterior gastro-enterostomy and lateral anastomosis	6	
Posterior gastro-enterostomy and lateral anastomosis	5	3.2
Gastro-enterostomy and partial gastrectomy	2	
Posterior gastro-enterostomy and cauterization of ulcer	1	
Excision of ulcer only	1	

In addition, appendicectomy was performed in 29.6 per cent., and cholecystotomy in 2.1 per cent. of the cases.

The reasons for operating were given in 787 cases. They are recorded in the following table.

TABLE IV.—*Reasons for Operating.*

Symptoms.	No. of Cases.	Percentage.
Pain	787	100.0
Vomiting	326	41.4
Melaena	85	10.8
Haematemesis	64	8.1
Haematemesis and melaena	27	3.4
Loss of weight	36	4.5

With regard to haemorrhage as one of the reasons for operating, it will be seen from the above table that all the cases in which melaena and haematemesis occurred (separately or combined) only total 22.3 per cent., but amongst the 787 cases very few systematic investigations for occult blood are recorded.

The direct results of operation in the 995 cases were as follows.

TABLE V.—*Results of Operation.*

Result.	No. of Cases	Percentage.
Good recovery	910	91.5
Delayed recovery	35	3.5
Death	50	5.0

The results in 492 cases submitted to x-ray examination prior to operation are shown in the following table.

TABLE VI.—*Results of X-Ray Examinations.*

Result.	Percentage.
Positive	65.6
Negative	17.3
Pyloric obstruction only shown	17.1

In 123 cases test meals were employed prior to operation. The results are recorded in Table VII.

TABLE VII.—*Results of Test Meals.*

Result.	Percentage.
Hyperchlorhydria	16.2
Normal acidity	9.7
No free hydrochloric acid	4.1

AFTER-HISTORIES OF THE OPERATION CASES.

The 995 cases dealt with in Tables I, II, III, and V include 744 cases in which the after-histories were given, 19 cases in which the after-histories consisted only of statements that the patients were in good health at some specified time after operation, and 232 cases in which no after-history was given. For the preparation of the after-history statistics the 744 cases only are employed. In the majority of these cases the questions relating to the after-history were all answered, but as in a few cases some of the questions were left unanswered, the statistics in the following tables have been worked out as percentages of the numbers of the answers to the respective questions.

The after-history inquiries were directed to the elucidation of the following points. Pain or other discomfort after food; diarrhoea or constipation; ability to take food; time of return to work after operation; full work or not; gain or loss of weight; condition of health and well-being after operation; any medical treatment found necessary.

TABLE VIII.—*Pain or Other Discomfort After Food.*
(Information on these points was given in 671 cases.)

	No. of Cases.	Percentage.
No pain or discomfort	447	66.6
Occasional slight pain or discomfort ...	99	14.8
Temporary pain or discomfort (in most cases soon after operation)	84	12.5
Severe pain or discomfort	41	6.1

TABLE IX.—*Diarrhoea.*
(Diarrhoea occurred in 45 cases out of the 744.)

Diarrhoea.	No. of Cases.	Percentage.
Slight	41	5.5
Severe	4	0.5

TABLE X.—*Constipation.*
(Constipation occurred in 126 cases out of the 744.)

Constipation.	No. of Cases.	Percentage.
Slight	111	14.9
Severe	15	2.0

TABLE XI.—*Food Able to be Taken.*
(Information as to diet was given in all of the 744 cases.)

	No. of Cases.	Percentage.
Full diet	462	62.1
Certain articles of diet avoided ...	282	37.9

In the majority of the 282 cases in which some modification of the diet was necessary only one or two articles of diet had to be avoided on account of their producing flatulence or indigestion. Among these cases 161 avoided some form or forms of protein food (beef, mutton, veal, pork, bacon, cheese, eggs), and 121 avoided some form or forms of carbohydrate food (vegetables, pastry, fats, fruit). Therefore, of those on a modified diet about 60 per cent. were obliged to avoid some form of protein, and 40 per cent. some form of carbohydrate. These results are opposed to the view expressed by L. R. Broster,¹ who states that in

a general way pastry and carbohydrates upset the duodenal ulcers.

Information as to the time of return to work after operation was given in 580 cases. In a certain number of other cases it was stated that the individuals were either of the leisured classes doing no work, or were past the age for work. The particulars are given in the following table.

TABLE XII.—*Time of Return to Work After Operation.*

Time of Return to Work.	No. of Cases.	Percentage.
1 to 2 months	171	30.0
2 to 3	250	43.1
3 to 4	63	11.7
4 to 6	54	9.3
Over 6	31	5.9

This table shows that 73.1 per cent. returned to work within three months from the date of the operation. With regard to those that did not return to work till after three months, the reasons given in the majority of the cases were that there was no immediate necessity for return, or that work was not available at the time.

TABLE XIII.—*Work Capacity.*
(Information on this point was given in 602 cases.)

Work Capacity.	No. of Cases.	Percentage.
Full work	566	94.0
Light work	31	5.7
Unable to work	2	0.3

TABLE XIV.—*Weight After Operation.*
(Information on this point was given in 637 cases.)

Weight.	No. of Cases.	Percentage.
Gained	458	71.9
Constant	140	22.0
Lost	39	6.1

TABLE XV.—*Condition of Health and Well-being After Operation.*
(Information on this point was given in 620 cases.)

Health.	No. of Cases.	Percentage.
General improvement of health ...	572	92.2
Fair improvement of health	32	5.2
No improvement of health	16	2.6

Subsequent Medical Treatment Required.

Among the 744 cases subsequent medical treatment was necessary in 34—that is, 4.5 per cent. of the cases. Among these, laxatives were required in 13 cases, occasional alkaline treatment in 10 cases, occasional bismuth and sodium bicarbonate for flatulence in 7 cases, bismuth and pepsin in 3 cases, and astringents for persistent diarrhoea in 1 case.

TABLE XVI.—*Number of Years After Operation during which Patients were under Observation, or during which Reliable Information was Obtained.*
(Definite information on this point was given in 657 cases.)

Years under Observation.	No. of Cases.	Percentage.
2-3 years	10	1.5
3-4	100	15.2
4-5	131	27.5
5-6	148	22.6
6-7	108	16.4
7-8	76	11.6
8-9	34	5.2

This table shows that 83 per cent. of the patients were under reliable observation for periods ranging from four to nine years.

Classification of Results.

The classification adopted is somewhat similar to that of L. R. Broster.² The cases are grouped according to results in the following manner.

Very good. Able to eat anything; no pain; gained or constant weight; in full work; occasional slight flatulence in a few cases.

Good. Improved; no pain or only occasional pain from indiscretion in diet; gained or constant weight; work; able to eat all foods except one or two items.

Fair. Restricted diet; light work; pain requiring medical treatment.

Poor. Operation of little or no benefit; able to do little or no work.

TABLE XVII.—*Classification of Results.*
(The results returned enabled this classification to be made in 669 cases.)

Classification.	No. of Cases.	Percentage.
Very good	450	67.2
Good	149	22.3
Fair	34	5.1
Poor	36	5.4

From this table it will be seen that the late results of the operation were very satisfactory in 89.5 per cent. of the cases.

Occupation.

As the occupational incidence of duodenal and pyloric ulcers was practically the same it has been considered advisable to include both types of ulcer in this section. It will therefore not be necessary to refer to occupation when dealing with pyloric ulcers in a subsequent report. The occupations were given in 1,389 cases of duodenal and pyloric ulcers, including the cases of perforation, and have been classified as follows.

TABLE XVIII.—*Occupational Incidence.*

Occupation.	No. of Cases.	Percentage.
Mechanics and skilled artisans	306	22
Labourers	209	15
Domestic workers	213	15
Professional and leisured classes	129	9
Factory workers	118	9
Shop workers	123	9
Clerks	90	6
Farmers and land workers	56	4
Miners	50	4
Various occupations	95	7

It will be seen that duodenal and pyloric ulcers occur amongst individuals engaged in all kinds of occupations, but rather more than half of the cases occur amongst those whose occupations suggest the consumption of one or more meals a day under uncomfortable conditions, and possibly in a hurried manner, with consequent probable interference with normal digestion. This is even more marked in the cases of perforated ulcers, as 76 per cent. of these occur among those engaged in such occupations. The great majority of the returns received in this investigation are of hospital patients, so that the above figures give no indication as to the occurrence of the disease among the bulk of the middle and upper classes.

Secondary Gastro-jejunal Ulcers.

Number.—Twenty-one ulcers of this type—that is, 2.8 per cent.—occurred among the 744 cases in which after-histories were given.

Sex.—All males.

Age.—80 per cent. of the cases occurred between 30 and 50 years of age.

Symptoms.—Pain occurred in 13 cases, hæmorrhage in 7, and vomiting in 4.

The 2.8 per cent. incidence of these ulcers, and the fact that they all occurred among males, confirm the statement of A. J. Walton³ that the incidence of gastro-jejunal ulceration for duodenal ulcers is about 3 per cent., and that practically it is only found in the male sex. Moynihan⁴ states that the records of his cases over a period of twelve years gave 1.84 per cent. of cases that developed gastro-jejunal ulceration.

TABLE XIX.—*Periods After the Gastro-enterostomy Operation at which Symptoms occurred necessitating Operation for Gastro-jejunal Ulceration.*

Period.	No. of Cases.
15 days	1
6 weeks	1
6-12 months	4
1-2 years	2
2-3 "	4
3-4 "	5
4-5 "	4

It will be seen from this table that 38 per cent. of the gastro-jejunal ulcers occurred within two years of the operation, and 62 per cent. between two and six years after the operation. Moynihan⁵ states that as a rule this form of ulcer, if it comes at all, comes within two years of the operation.

Sites of the Gastro-jejunal Ulcers.—These were mentioned in four cases only: one at the pyloric antrum; one at the distal side of the gastro-enterostomy stoma; one adherent to the middle colic artery; one half an inch distal to the gastro-enterostomy.

Results of Operations for the Gastro-jejunal Ulcers.—Good recovery in 13 cases; death in 7 cases; one patient too weak for operation.

Synopsis of Operations Performed.

Partial gastrectomy. Four cases—all recovered.

Ulcer excised. Two cases—one recovery and one death.

Jejunostomy and invagination of ulcer. One case—death.

Partial gastrectomy and resection of anastomosis. One case—death.

Jejunal ulcer found perforated into colon. Colon and jejunum separated, holes closed, and gastro-enterostomy undone. One case—recovery.

Ulcer excised and gastro-enterostomy undone. Two years later large perforating ulcer on posterior wall of stomach. Partial gastrectomy done. One case—death.

Pylorectomy and partial gastrectomy. One case—recovery.

Gastro-colic fistula secondary to a jejunal ulcer developed two to three years after first operation. Ulcer excised. One case—recovery.

Eight months after first operation jejunal ulcer found and lateral anastomosis done. Four years later, on account of persistent pain, a partial gastrectomy was done. One case—recovery.

Suture of perforated jejunal ulcer. One case—death.

Anterior gastro-enterostomy and lateral anastomosis. One case—recovery.

Gastro-enterostomy undone. One case—recovery.

Cauterization of ulcer. One case—recovery.

Resection of ulcer and four inches of jejunum, and lateral anastomosis done. One case—death.

Medical treatment only. One case—recovery.

Nature of operation not stated. One case—death.

Jejunal ulcer found at operation, but left as patient was too weak for radical operation. Patient was fairly well one year later, but still had pain.

Remarks on the Seven Deaths.—One died at end of operation. One died soon after excision of ulcer. One died from coma and convulsions two days after operation. Three died three days after operation. One died two weeks after the third operation done for perforation of stomach.

Second Operations Required for Intercurrent Lesions after Gastro-enterostomy.

Twenty-one of these operations—that is, 2.8 per cent.—were required among the 744 cases in which after-histories were given; 86 per cent. of the cases were between 30 and

60 years of age. Particulars of the individual cases are given as they could not be tabulated.

1. Yielding of sutures three days after first operation from acute dilatation of stomach. Repair done; death one day after.

2. Pain and vomiting seven days after first operation from strangulation of small intestine in paraduodenal fossa. Relief of obstruction done; death.

3. Wound broke down ten days after first operation. Repair done; death on second day.

4. Obstructive vomiting ten days after first operation from obstruction of efferent loop by adhesions. Lateral anastomosis done; recovery.

5. Vomiting thirteen days after first operation. Lesion not stated. Lateral anastomosis done; recovery.

6. Pernicious vomiting twenty-one days after first operation from strangulation of ileum by slipping. Relief of obstruction done; death on second day.

7. Persistent vomiting one month after first operation from obstruction of afferent loop by slipping. Lateral anastomosis done; recovery.

8. Obstructive vomiting one year after first operation from obstruction of efferent loop by adhesions. Lateral anastomosis done; recovery.

9. Pain and dyspepsia one and a half years after first operation. Duodenal ulcer still active. Division of pylorus and closure of both ends done; recovery.

10. Pain and vomiting one and a half years after first operation from omental adhesions. Enterolysis and entero-enterostomy done; recovery.

11. Vomiting one and a half years after first operation from vicious circle. Gastro-enterostomy undone and pyloroplasty done; recovery.

12. Pain two years after first operation from lesser curve ulcer. Gastrectomy done; recovery.

13. Pain three years after first operation from indurated mass at site of previous operation. Excision of mass and separation of adhesions done; recovery.

14. Pain, vomiting, and loss of weight three years after first operation from lesser curve ulcer. Patient too weak for radical operation, and medical treatment only employed. Result not stated.

15. Intestinal obstruction three years after first operation from adhesions; division of adhesions done; recovery.

16. Pain three and a half years after first operation from small ulcer on lesser curvature; cauterization of ulcer done; recovery.

17. Pain and vomiting four years after first operation from kinking of two loops of jejunum. Anastomosis between the two loops done; recovery.

18. Recurrent vomiting five years after first operation. Gastro-enterostomy undone; recovery.

19. Pain five years after first operation from cholecystitis and gall-stone. Removal of gall-bladder done; recovery.

20. Pain five and a half years after first operation from adhesions. Adhesions separated; recovery.

21. Gastro-colic fistula seven years after first operation. Suture done; death one day later from shock.

Secondary Haemorrhage.

(Not stated as due to anastomotic ulcer.)

Number.—Eighteen cases of secondary haemorrhage—that is, 2.4 per cent.—occurred among the 744 cases in which after-histories were given.

Sex.—Males 16; females 2.

TABLE XX.—Age Incidence.

Age.	No. of Cases.
20-30 years	3
30-40 "	4
40-50 "	11.

TABLE XXI.—Nature of Haemorrhage.

Nature of haemorrhage.	No. of Cases.
Haematemesis...	10
Melaena	5
Haematemesis and melaena	3

TABLE XXII.—Periods at which Haemorrhage started after the Gastro-enterostomy Operation.

Period.	No. of Cases.
1-2 years	4
2-3 "	7
3-4 "	4
5-6 "	2
6-7 "	1

Treatment.—Sixteen had rest only, with or without medical treatment; 2 were operated on—1 resection of duodenal ulcer, and 1 entero-enterostomy for omental adhesions.

Results.—Good recovery in 13 cases; fair recovery in 5 cases. No deaths.

Analysis of the Post-operative Mortality.

Among the 995 cases of duodenal ulceration 11 deaths occurred from another lesion some years after the operation and quite unconnected with it. As these 11 cases up to the time of death were free from all symptoms connected with the ulceration the deaths are not included among the post-operative deaths.

The number of post-operative deaths out of the 995 cases was 50—that is, 5.0 per cent. These are the deaths that occurred as a direct result of the operation of gastro-enterostomy, and do not include the deaths from gastro-jejunal ulcers and from second operations performed for some intercurrent lesion, which have already been enumerated in the preceding part of this report.

Sex.—Of the 50 deaths, 86 per cent. occurred amongst males, and 14 per cent. amongst females—a ratio which is roughly that of the sex incidence of the disease.

TABLE XXIII.—Age Incidence of Deaths.

Age.	Percentage of Deaths.
20-30 years	12
30-40 "	10
40-50 "	44
50-60 "	22
60-70 "	12

TABLE XXIV.—Time of Occurrence of Death After Operation.

Time.	Percentage of Deaths.
1-6 days	64
7-14 "	26
3-4 weeks	4
4-5 "	4
6-7 "	2

Among the 50 cases haemorrhage (haematemesis, melaena, or both) occurred as a symptom prior to operation in 24 per cent. of the cases. It would appear from these figures that the risk of a fatal post-operative result is not increased by the occurrence of haemorrhage prior to the operation.

TABLE XXV.—Cause of Death.

Cause of Death.	No. of Cases.
Shock	11
Pneumonia	7
Haemorrhage	5
Cardiac failure (fatty heart)	5
Peritonitis	2
Pulmonary embolism	2
Cerebral embolism	1
Pneumonia and empyema	1
Bronchiectasis and empyema	1
Strangulation of intestine	1
Cause not stated	14

Carcinoma Developing at the Site of Ulcers.—No authenticated case was reported in the whole series. In one case carcinoma was diagnosed five to six years after the operation, but was considered inoperable; the patient died a few months later, but no post-mortem examination was allowed. In answer to a special letter, the medical practitioner who had been in charge wrote that from the clinical aspect of the case he considered that carcinoma developed at the site of the old ulcer, which at the operation had neither been invaginated nor excised.

GENERAL OBSERVATIONS BY SURGEONS AND MEDICAL PRACTITIONERS.

The second form requested an indication of the views of surgeons and medical practitioners as to the value of the operation of gastro-enterostomy.

Views of Surgeons.

Of the 86 surgeons who sent in returns, 37 filled in this second form. Their views as to the value of the operation for duodenal and pyloric ulcers are as follows:

Thirty-six consider the operation of great value in cases of duodenal and pyloric ulceration associated with stenosis of the pylorus.

Six consider that, in addition to the operation, invagination, excision, or cauterization of the ulcer should be done.

Four consider the operation of great value in the treatment of perforated duodenal or pyloric ulcers in addition to closure of the perforation.

Three consider the operation of greater value when combined with closure of the pylorus.

Views of Medical Practitioners.

The second form was filled in by 153 medical practitioners. Their views as to the value of the operation for duodenal and pyloric ulcers are as follows:

One hundred and twenty-three consider the results of the operation to be very satisfactory in the great majority of cases.

Seventeen state that recurrence of pain and gastric disturbance occurred in many cases.

Thirteen state that recurrence of pain and gastric disturbance occurred in a few cases.

One considers that the operation is unfavourable in cases of simple duodenal ulcers without pyloric stenosis.

BRIEF SUMMARY OF RESULTS.

Duodenal ulceration is about five times more common in males than in females.

The liability to duodenal ulceration rapidly diminishes after 50 years of age.

Posterior gastro-enterostomy, with or without embedding or removal of the ulcer, was the operation performed in 96.4 per cent. of the cases.

Hyperchlorhydria was present in 86.2 per cent. of the cases submitted to test meals.

Neither diarrhoea nor constipation is a marked result of the operation, but constipation of a mild character is more frequent than diarrhoea.

About one-third of the cases operated on made some slight modification in diet; of these, 60 per cent. avoided some form of protein, and 40 per cent. some form of carbohydrate.

About three-fourths of the patients returned to full work within three months of the date of the operation.

General improvement of health and well-being occurred in all but a few cases.

The results of the operation were satisfactory in about 90 per cent. of the cases.

Secondary gastro-jejunal ulcers occurred in 2.8 per cent. of the cases.

Secondary haemorrhage occurred in 2.4 per cent. of the cases, but with no fatal result.

The post-operative mortality was 5 per cent., the mortality being highest in patients from 40 to 50 years of age. The majority of deaths occurred within seven days of the date of operation.

No authenticated case of carcinoma developing at the site of an ulcer was reported in the whole series.

REFERENCES.

¹ *British Medical Journal*, November 3rd, 1928. ² *Ibid.* ³ *Ibid.*, April 21st, 1928. ⁴ *Ibid.*, December 8th, 1928. ⁵ *Ibid.*

THE ROYAL SOCIETY.

PRESIDENT'S ANNIVERSARY ADDRESS.

THE 267th annual meeting of the Royal Society was held, according to custom, on St. Andrew's Day, November 30th. The President, Sir ERNEST RUTHERFORD, O.M., was in the chair, and delivered the usual anniversary address, in the course of which he mentioned the fourteen Fellows who had died during the year, and stated the grounds for the award of the Society's medals.

Deceased Fellows.

By the death of Sir Bertram Windle, M.D., the President said, the Society had lost a Fellow whose main activities were devoted to administrative work as principal of University College, Cork, and in his later years as professor of anthropology at Toronto. In his earlier days as professor of anatomy in Birmingham Windle carried out important researches in comparative myology, and wrote interesting popular works on prehistoric Britain.

Referring to the death of Mr. Walter Heape, the President said that he was one of the group of students who drew their inspiration from the school created by Francis Balfour at Cambridge. He introduced precision into the study of the embryology of mammals, and was one of the first to investigate the oestrous cycle and to promote scientific study of breeding and sexual physiology. Heape belonged to the class of scientific amateurs to whom science in this country had been so much indebted in the past.

Of Sir E. Ray Lankester, a Fellow of the Society for fifty-four years, the President naturally spoke at some length.

"There is scarcely a group of animals he did not study, scarcely a problem he did not help to elucidate, more especially in the morphology of the invertebrata. . . . A man of exceptional intellectual power, of deep insight and sound judgement, he was a great teacher, and for long the recognized leader among British zoologists. A picture of Lankester would be incomplete without reference to his vivid and impulsive personality. He was restrained, prudent, and temperate in scientific treatment, but in other contacts with the world, and especially with the official world, he was apt to be not only *fortiter in re* but *violenter in modo*. But these exuberances welled up from a generous heart, and were displayed only in what Lankester believed to be a just cause. He will be remembered not only as a great zoologist, but as a lover of all natural knowledge, a respecter of all serious workers in science, and a very strong help to his friends and pupils."

After indicating the great contributions to synthetic organic chemistry made by Dr. William Henry Perkin, Waynflete Professor of Chemistry at Oxford, the President said:

"All these achievements, remarkable as they seemed at the time, were surpassed by his work on alkaloids. Perkin early conceived the ambitious project of determining the constitution and effecting the synthesis of certain of the more complex vegetable alkaloids; his memoirs on this subject, by their insight into intricacies of molecular constitution, their grasp of experimental methods, and their attention to minute detail, opened a new epoch in organic chemistry. His ingenuity and pertinacity were rewarded by the synthesis of many of the naturally occurring alkaloids."

The Society's Officers.

The President next spoke of the retirement of two distinguished officers, Lieut.-Colonel Sir David Prain, I.M.S. (ret.), treasurer for ten years, and Sir James Jeans, secretary for an equal period. During their tenure of office, he said, the Society had greatly increased its responsibilities, mainly owing to the large bequests which resulted in the foundation of the Foulerton and Yarrow professorships.

"Sir David Prain has devoted himself wholeheartedly to the welfare of the Society; his wide experience of administration and breadth of scientific knowledge have been of much service on innumerable occasions. He has been ever ready to subordinate his own convenience, if he could thereby more effectively help the Society."

Sir David Prain is succeeded in the post of treasurer by Sir Henry Lyons, and Dr. F. E. Smith becomes joint secretary with Dr. H. H. Dale; Lord Rayleigh is now foreign secretary in the place of Sir Henry Lyons.