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MAKERS OF JOHN HUNTER*

BY

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It has been the custom at this festival to recollect with gratitude the names and works of our Fellows recently deceased. Since the last Oration three years ago more than a hundred Fellows have died. The roll of those who have passed on is indeed one of which the College may be proud. It includes the names of two Past-Presidents—my old chief and kind friend Sir John Bland-Sutton, the John Hunter of his time, and Lord Moynihan, who, following Lister, brilliantly represented surgery in the House of Peers. Scotland has lost Sir David Wilkie, a great and arresting teacher and a delightful man. Sir Charles Ballance, remaining to the last a working student of neurology within these walls, has passed away at a ripe age. Albert Carless and Charles C. Choyce were known as authors of successful textbooks of surgery, and Choyce also as representing the reflux of the Empire's sons to the homeland, for he came from New Zealand. Professor G. A. Buckmaster and Professor William Wright had done strenuous service to this College as examiners for the Oversea Primary Fellowship examinations. Sir Squire Sprigge's name recalls his long, influential, and impartial editorship of the *Lancet*. Ophthalmic surgery deplores the loss of William Lang and of Robert Henry Elliot, and of my friend Claud Worth, a pioneer in the treatment of squint and a leading authority on the design and management of small yachts. Professor Henry Tonks, artist and director of the Slade School, was one of many successful renegades from surgery. The names of Percy Furnivall, surgeon to the London Hospital, of Sir Robert Hill, late Director-General of the Naval Medical Service, of John Poland, of Sir John Thomson-Walker, and of Professor Rutherford Morison, of Sir Hamilton Ballance, were but lately familiar on our tongues. I must not forget two promising Fellows who, alas! have received brevet rank in this list—Henry Philbrick Nelson and Charles Shorney Webb. *Ave atque vale*. I rejoice to think that Sir D'Arcy Power, in his *Lives of the Fellows*, will supply the defects of this brief survey of our losses, and that nearly 300 new Fellows have taken their places in the unending procession.

It is a tribute to the broad-mindedness of my countrymen that John Hunter, the presiding genius of this College of Surgeons of England, was not an Englishman. Nothing, unless it be the Crown itself, could better illustrate the unity of this island of Great Britain or the beneficent exchanges between its Northern and Southern parts which have followed the Act of Union of 1707—exchanges which gave the Hunters to England and Lister for a time and at a later period to Scotland. It would

be a mistake, however, to regard John Hunter as a missionary from the North *in partibus infidelium*. His medical education was due entirely to London, and he received it primarily from his elder brother. William Hunter, also, though indebted to Scotland for his literary education, for his medical apprenticeship to Cullen—a physician of the old systematic school—and for one year's attendance at Edinburgh University, found his inspiration in his "darling London" in the house of Dr. James Douglas, the leading anatomist of his time and an admirer and disciple of William Harvey.

It is to-day my main object to trace the intellectual descent of Hunter from Harvey, for I believe it has been overlooked. You shall judge of the evidence and I will present it with a minimum of comment. I wish specially to speak of William Hunter, once a member of the staff of Middlesex Hospital, which I now am privileged to serve. Others who come into my story of the makers of Hunter are the brothers James and John Douglas, Cheselden of St. Thomas's and the Westminster Hospitals, pupil of James Douglas and teacher of John Hunter, and Mrs. John Hunter.

Surgery in the Early Eighteenth Century

The surgeon of the period following the Act of Union of 1707 was often a Scot, and he can be studied in the frank pages of *Roderick Random* by Smollett, who, like his hero, was a naval surgeon. This book had an instant success, and may have determined John Hunter's choice of a profession. It was published in 1748, the year he came to London, and its rough candour would be likely to appeal to him.

William Harvey

The discovery of America by Cabot and Columbus at the end of the fifteenth century discredited ancient geography and awakened in other branches of science the spirit of enterprise and inquiry, of first-hand observation and experiment. At Padua, when Harvey (1578–1657) went to that university about the year 1600, Galileo was reforming Ptolemy's astronomy. Harvey was the first Englishman to use the new highway to medical knowledge. The critical date when medical tradition in England began to be replaced by observation and experiment is 1628, the year when Harvey published his work on the circulation, *De Motu Cordis et Sanguinis*. Harvey says: "I have not endeavoured from causes and probable principles to demonstrate my propositions, but as of higher authority, to establish them by appeals to sense and experiment." In these simple words he announced a revolution of thought and made St. Bartholomew's Hospital the English cradle of modern physiology and morbid

*An abstract of the Hunterian Oration delivered before the Royal College of Surgeons of England on February 14.

anatomy. Harvey planned a book on "medical anatomy" based upon "the many dissections I have made of persons diseased, worn out by serious and strange affections, how and in what way the internal organs were changed from their natural form and appearances."

My main object is to show how, through James Douglas, his brother John Douglas, and William Hunter, John Hunter learnt the methods of Harvey, which he applied to surgery with such far-reaching results. According to Buckle the Scottish mind is deductive rather than inductive, and this was certainly true in the eighteenth century. Delighting in a complete and logical structure of belief, the deductive mind prefers to start with a set of general principles, instead of working up to them from particular instances. It is therefore something of an anomaly that the Harveian method was first applied to surgery on a large scale by a Scotsman. When John Hunter arrived in London at the age of 20 his mind was practically a clean slate, and his delight in nature was a vague boyish wonder. He said later: "When I was a boy I wanted to know all about the clouds and the grasses, and why the leaves changed colour in the autumn; I watched the ants, bees, birds, tadpoles, and caddis-worms; I pestered people with questions about what nobody knew or cared anything about." William Hunter showed him how to work, planting his feet firmly upon the shoulders of his predecessors.

James Douglas

James Douglas, the teacher and exemplar of William Hunter, came like the Hunters of the class of Scottish minor lairds which corresponds to the English yeoman class of which Harvey sprang. In 1706 from "the Blew Boar over against the end of Fetter Lane" he announced a course of human and comparative anatomy. In 1707 he published the first extant work on comparative anatomy, called *A Comparative Description of the Muscles in Man and a Quadruped*. He says: "I took all the descriptions from ocular inspection, in dissection, using twelve subjects to make sure. . . . I chose a dog for comparison, because young students of anatomy may readily procure so common a subject." After twenty-five lectures on anatomy, illustrated by his own dissections, he passed to comparative anatomy, and then to a detailed syllabus of physiology. This was forty-one years before John Hunter arrived in London.

Though not a member of the staff, James Douglas appears to have had the freedom of St. Bartholomew's Hospital, for he studied the anatomy of disease and was permitted to make necropsies there. It is recorded that, long before Laennec and his stethoscope, he heard in the hospital an aortic murmur. In 1715 he published a general *Bibliography of Anatomy "from Hippocrates to Harvey,"* and was appointed Arris Lecturer on the muscles at Barber-Surgeons' Hall. The book shows fair-mindedness and scholarship, and complete lack of egotism and self-glorification. It is of special interest as disclosing the source of his inspiration, not only in its title but in its references to Harvey, whom he calls *senex divinus*. The whole literary world, he says, deplores the loss of the manuscript treatises of Harvey, which disappeared in the confusions of the Civil War. His dislike of acrid controversy appears in his remark that "though reprov'd and provoked by many, Harvey forbore to reply except to Riolan, and to him gave criticism rather than rebuke."

James Douglas realized the need of surgery for anatomical knowledge, and had in his house a complete collection of preparations showing every possible surgical method of reaching the interior of the bladder and the

advantages and inconveniences of each method so far as these depend upon the structure of the parts. In 1730 he published his *Description of the Peritoneum*, for he is Douglas of Douglas's pouch and semilunar fold. His youngest brother, George, dedicated to James Douglas "with the utmost sincerity, gratitude, and respect" a translation of *Winslow's Anatomy*. The dedication declares: "To you I owe all that I know, not only of the Science, but of the stile of Anatomy, and there is not one good line in this Translation which is not the better for what you have taught me, or procured me opportunities of learning." Every contemporary reference to James Douglas appears to be equally cordial and friendly. Cheselden calls him "that most accurate and indefatigable anatomist," and Warburton, the biographer of Pope, calls him "a physician of great learning and no less taste." It is perhaps characteristic of the man that he left behind no portrait of himself. He was buried at St. Andrew's, Holborn, the parish in which he lived, but even his grave has disappeared. It lay somewhere beneath the present Holborn Viaduct.

John Douglas

John Douglas, doubtless helped by James, who was always ready to serve others, applied his brother's anatomical lessons to surgery and was the first surgeon to practise suprapubic lithotomy. He was led to the operation by instances within his knowledge of recovery after penetration of the bladder by the horn of a bull, by gunshot, and by a sword. Like James, John wished to acknowledge the merits of others, and at the end of his book *Lithotomia Douglasiana* (1723) he gave in full the early work of Rousset (*De Partu Caesario*, 1581), the French surgeon, who had suggested but not performed the suprapubic operation in the sixteenth century. Rousset was unfortunate. He says sadly: "The lamentable Fate of King Henry III (who had promised me four or more Persons that were condemned to Death to make the Experiment upon, and them their lives if they recovered) deprived me of the Opportunity."

William Cheselden

After a vogue of only about seven years the suprapubic operation of John Douglas was replaced by Cheselden's lateral operation. Cheselden cured fifty out of his first fifty-two patients at St. Thomas's Hospital and Westminster Infirmary, and his success greatly alarmed the surgeons of Paris. He was one of James Douglas's early pupils, and there can be no doubt that he owed his success largely to his master in anatomy. It is significant of James Douglas's open-mindedness that he became an advocate of Cheselden's method in preference to his brother's operation. He says: "Mr. Cheselden is much less solicitous for the credit of being an inventor than he is to have his operation understood and practised in a right manner for the good of the public"—a good keynote for the young profession of surgery. It was Cheselden who, in old age, gave John Hunter his first lessons in the art.

William Hunter (1718-83)

William Hunter, born at Long Calderwood, Lanarkshire, was a serious and quiet boy, ten years older than John. Quite early he took a firm grip of himself, which never relaxed. No hypocrite, he was emphatically a good boy who never gave a moment's anxiety to his parents and teachers. Mrs. Baillie, contrasting the characters of the two boys, preferred that tempestuous infant John, a

notorious cry-baby and rebel, to the good but enigmatic William. For five years William was a theological student at Glasgow. In 1740 for a year he studied medicine in Edinburgh under Monro the first, but in 1741 he decided to try his fortune in London. He was the pioneer who prepared the way for John. In succession to Samuel Sharpe of Guy's Hospital he became lecturer to a society of naval surgeons. He was fortunate in becoming assistant to Dr. James Douglas, whose career we have already traced. William lived in Douglas's house, and became affianced to his daughter. Her early death broke the romance, and he never married. His paternal instincts found an outlet in the education of his brother John, whom he vainly tried to make into an Oxonian, and later in his care of his sister's brilliant children, Matthew and Joanna Baillie. In 1746 William Hunter advertised his first private course of anatomy, as James Douglas had done forty years earlier, and to the end of his life anatomy and the teaching of it were his ruling interests. But he took up the practice of man-midwife and became Physician to the Queen. In this, as in many other respects—for instance, the collection of editions of Horace—he followed closely the footsteps of James Douglas.

In 1767 he was elected a Fellow of the Royal Society, and in 1768 professor of anatomy in the newly established Royal Academy. He now, in the quaint language of that day, "extended his views to fossils, and likewise to the promotion of polite literature and erudition." In a short time he owned "the most magnificent treasure of Greek and Latin books that has been accumulated by any person now living since the days of Mead." Upon the coins in his museum he spent more than twenty thousand pounds.

At this period of his life William Hunter had become almost a national figure—a famous anatomist, a friend of the Sovereign, and the trusted physician of the Queen, a celebrated dilettante and princely collector, meeting artists and literary men on their own ground. Little can he have thought that his brother John was destined to surpass him in reputation. He died in 1783 a few days after leaving a sick-bed to lecture at his Great Windmill Street school. He bequeathed his museum to the University of Glasgow, his old alma mater.

Can it be doubted that the mainspring of John's career was a fierce determination that he, the ne'er-do-weel of the family up to the age of 20, would show his ability to surpass William's brilliant achievements? The rivalry, at first unconscious and for many years quite friendly, exploded in the quarrel which separated the brothers in their latest years, only to be partly made up just before William's death.

The Great Windmill Street School of Anatomy

The Great Windmill Street school, comprising a spacious house, a lecture theatre, dissection-rooms, and a great museum, was founded by William Hunter in 1770 after the rejection by the Government of his generous offer to erect and endow at his own expense a national school of anatomy. It was the earliest complete anatomical school in London, and the first to adopt the Paris system by which the student himself dissects the whole body under supervision of the teacher. William Hunter had a passion for teaching, and says of himself: "To acquire knowledge and to communicate it to others has been the pleasure, the business, and the ambition of my life." He preferred to teach by word of mouth rather than by his pen, and continued to do so for thirty-six years.

The smallness of his literary output has tended to dwarf William's stature in comparison with his brother's, but for style and clarity John cannot compare with him. One classic work on the gravid uterus, two perfectly finished introductory lectures to his anatomy course, and a few scattered clinical papers are his only literary remains if we except his strangely named *Medical Commentaries*, a passionately controversial work wrung from him by what he regarded as an attack upon his honour by Monro the second. We must regret the nerve energy expended on this volume. Harvey was wiser, and left his detractors alone. William Hunter can be judged partly by the impression he produced upon his contemporaries; and Matthew Baillie said he was perhaps the best anatomical teacher that ever lived. But he should be estimated mainly by the history of his school and by its contributions to anatomy.

William Hunter and the Lymphatic System

William Hunter was the first to enunciate correct views, based upon rational grounds, of the structure and functions of the lymphatic system. In so doing he ran contrary to the doctrines of Harvey, who thought that the lacteals contained milk, not chyle—that is, fluid derived from the digestion of the food. William Hunter, who was inclined to think Harvey overrated, denied the absorption of fluid from the bowel by the portal venous system, and in this he was wrong. In other respects his views on the lymphatic system constituted a great advance. It was William Hunter who taught, trained, and paid Hewson and Cruickshank. After his death each of these two men published master-works on lymphatic anatomy. But for William Hunter their works would not have been written, and their writings rather than his own proclaim William Hunter the founder of lymphatic anatomy in this country.

William Hunter says: "But none of the Anatomists of those times could make out the origin of the lymphatics, and none of the Physiologists could give a satisfactory account of their use." He then proceeds to put forward unequivocally his own claims, as having been the first to form a correct general notion of the anatomy and functions of the lymphatic system. In his own words:

"I think I have proved that the lymphatic vessels are the absorbing vessels all over the body; that they are the same as the lacteals; and that these altogether, with the thoracic duct, constitute one great and general system, dispersed through the whole body for absorption; that this system only does absorb, and not the veins; that it serves to take up and convey, whatever is to make, or to be mixed with the blood, from the skin, from the intestinal canal, and from all the internal cavities or surfaces whatsoever. This discovery gains credit daily . . . and if we mistake not, in a proper time, it will be allowed to be the greatest discovery, both in physiology and pathology, that Anatomy has suggested, since the discovery of the circulation."

A little later he adds: "Since the days of Aristotle there have been only two great inventions in the physiology of our bodies: to wit, the circulation of the blood, and the absorbent system." He contrasts the triviality of the discovery of a new anatomical detail such as a duct or a muscle as compared with the importance of "a new general system, which is interwoven with and performs a peculiar and important function in every part of the body." Anatomists had believed that the lymphatic system was wanting in birds and fishes, and William Hunter, not satisfied on this point, kept it constantly in view.

"Accordingly, my brother Mr. John Hunter, whom I bred to practical anatomy, and who worked for me, and attended my dissecting-room, and read some lectures for me many years, found some lymphatics, first in birds, and then in a crocodile."

From John Hunter's experiments he inferred, erroneously, that the veins do not absorb fluids. Later William Hunter directed the work of his assistants and pupils Hewson and Cruickshank, and planned with Cruickshank a joint and richly illustrated work on the lymphatic system. Cruickshank in the preface to his *Anatomy of the Absorbing Vessels* (second edition, 1790) says: "In consequence of Dr. Hunter's death this business has now fallen on me. I should have had no small share in it had he lived, for I had made almost all the preparations from which the drawings were made."

Cruickshank recorded many interesting observations on the lymphatic vessels. He saw tributaries of the intercostal lymphatics emerging from the body of a vertebra and traced their ramifications in the bone. This is the most probable route by which spinal deposits reach the upper dorsal spine in breast carcinoma. I have shown that the glands of the anterior mediastinum may be infected as early as the axillary glands; thence the infection probably reaches the spine along the lymphatic vessels of the upper intercostal spaces.

It would be difficult to find a better instance of the surgical value of lymphatic anatomy, for, given precise knowledge upon the subject, the prevention and treatment of these late spinal deposits could be hopefully approached by radiologists and radio-surgeons. Spinal metastasis is increasing in frequency owing to the elimination of fatal local recurrence by improved operative methods. Pathologists are too busy with their vast subject to supply the help surgeons and radiologists need in this matter. Some young surgeon or radiologist with a research scholarship should devote two or three years to the solution of the problem, and become his own pathologist for his own special needs in the light of Cruickshank's observation. It may be doubted whether in any anatomical school in Great Britain freshly injected specimens of the lymphatics are to be seen at the present time, though I recall the lymphatic work of Professor Jamieson of Leeds, and the associated surgical work of the late J. F. Dobson and of Professor L. R. Braithwaite. At Charing Cross Hospital the late H. S. Clogg did notable work on the surgical lymphatic anatomy of the tongue. Mr. R. H. Burne, F.R.S., then Physiological Curator of our Museum, discovered in 1928 a new system of fine lymphatic vessels in the angler fish. But further intensive work on the anatomy and physiology of the lymphatic system is required.

In cancer research at the present time two theories of origin—the virus theory and the chemical (tar) theory—face each other in apparent contradiction, each supported by substantial evidence, and each ignoring the undoubted production of cancer by physical agents such as light. Attempts to reconcile them involve very difficult assumptions, such as the almost universal presence of the cancer virus, or the formation in the body of cancerogenic hydrocarbons. The observation made by myself (*Genesis of Cancer*, 1931, H. K. Lewis) that in areas of tissue about to become cancerous the lymphatic vessels are obliterated, has been ignored by pathologists, but it is the most likely clue to the unravelling of the tangle. If the whole character of the vegetation of a field can be radically altered by blocking of the pipes which drain it, it is hardly surprising if local chronic lymph-stasis in the body may ultimately breed a race of cancer cells. The virus

and the tar are in my view cancerogenic agents because they set up in the lymphatic vessels an obliterative lymphangitis.

Research scholarships specifically restricted to the lymphatic system are urgently needed, and this College would doubtless be willing to administer them under the able superintendence of Professor Beattie in our new Bernhard Baron Research Laboratories or at the Buckston Browne Farm. The work of William Hunter has been left half finished.

Mrs. John Hunter

In July, 1771, John Hunter married Anne Home, then aged 29, daughter of an Army surgeon in Burgoyne's Regiment of Horse. She seems to have been a lady of wonderful charm and social gifts. Charles Rogers (*The Modern Scottish Minstrel*, 1855) says of her:

"During the lifetime of her distinguished husband, Mrs. Hunter was in the habit of receiving at her table and sharing in the conversation of the chief literary persons of her time. Her evening conversazioni were frequented by many of the more learned, as well as fashionable persons in the metropolis. She was the life of her social parties, sustaining the happiness of the hour by her elegant conversation, and encouraging the diffident by her approbation. Amiable in disposition, she was possessed of a beautiful countenance and a handsome person. She wrote verses with facility, but she sought no distinction as a poet, preferring to be regarded as a good housewife and an agreeable member of society."

Among the lions of Mrs. Hunter's salon were the composer Haydn and Mrs. Montague, founder of the Blue Stocking Club—evidently a mixed club, for it took its name from the colour of the hose of Benjamin Stillingfleet, son of a bishop, traveller, naturalist, and oracle of the club. Mrs. Hunter supplied Haydn with the words of Haydn's *Englische Original-Canzonetten*, a book of twelve songs, of which the best known is "My mother bids me bind my hair," a touching ditty still familiar. She also wrote the libretto of Haydn's *Creation*.

Haydn, who speaks of John as "the greatest and most celebrated surgeon in London" (1792), appears to have intensely enjoyed his London visit. His last appearance in Leicester Square was, however, not too pleasant. John Hunter had frequently pressed him to consent to the removal of a nasal polypus which troubled him, but Haydn postponed the appointment from week to week. Learning of Haydn's imminent departure from London, Hunter invited him to come to Leicester Square for urgent but unspecified reasons.

"After the first compliments several stout fellows entered, seized me, and would have put me on a chair. I shrieked, shouted blue murder and let out lustily with my feet until I freed myself and made Herr Hunter, who stood ready with his instruments, understand that I absolutely refused operation. He was astonished at my obstinacy, and pitied me that I did not wish to be so lucky as to try his skill. I excused myself on the ground of lack of time in view of my approaching journey, and took my leave."

It may be added that only death parted Haydn from his polypus. It may also be presumed that the reactions of Mrs. Hunter's social evenings upon her husband's practice were usually more favourable. We are told that people were known to have consulted Mr. Hunter professionally in the hope of an invitation from Mrs. Hunter.

It was doubtless partly for her and her parties and the special coach and coachman he provided for her that her proud and generous husband needed the "damned guineas." Surgeons' wives who envy her should remember that she had a museum in each of her two houses. Her contribution to surgery was John Hunter's happiness. Let

us in recalling her memory, as of eighteenth-century pot-pourri, also more vividly recall what we owe each of us to his own wife. There should be a special petition in the Litany for the women whose domestic routine is daily at the mercy of the acute appendix and the perforated gastric ulcer.

CHEMOTHERAPY OF GONORRHOEA

BY

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Efforts in the past two decades have not reduced the incidence of gonorrhoea. That of syphilitic fresh infections, however, has been much reduced: arsenobenzol preparations have undoubtedly contributed to the reduction of syphilis. The advent of sulphonamide compounds has brought a ray of hope to sufferers from gonorrhoea and to those daily engaged in the treatment of such patients. These hopes were raised considerably when Dees and Colston (1937) reported cures with sulphanilamide in thirty-six patients out of forty-seven in five days. The publication of these results stimulated many workers elsewhere, and a number of reports appeared recording excellent rates of cure in gonorrhoea. Hanschell (1938) investigated ninety-nine male gonorrhoeal patients and found five failures. His observation, however, lasted only two weeks from cessation of treatment. At a meeting of the Society for the Study of Venereal Diseases in October, 1937, all the speakers reported highly of this drug in the treatment of gonorrhoea. Only Anwyl-Davies stated that he had had less than 50 per cent. of successes with sulphanilamide. The dosage of the drug, the total amount administered in a given time, the toxicity, and the minimum number of days of treatment had not been worked out, and on account of this it was difficult to ascertain the apparent or the real cure rate in gonorrhoea.

Before there had been time to work out these problems and to pool many results uleron and "delayed" methods of treatment appeared on the scene, and, later on, M & B 693. Meanwhile Cokkinis and McElligott (1938) published an analysis of 633 cases of both sexes treated with sulphanilamide and an account of their evolved "optimum technique" of administration, by which, at the time of publication, they expected an 80 per cent. cure rate. In describing this new technique these authors advise the use of gonococcal vaccines before and throughout chemotherapy, and state that chemotherapy should start on the eighth to the tenth day of disease. It is of interest to observe that they treated a large group of patients with sulphanilamide only, a larger group with sulphanilamide and irrigations, and a smaller group with sulphanilamide and vaccines, obtaining the best results in the smallest group. The actual number of cases investigated with regard to the optimum time to begin therapy was 404. In twenty-four of these treatment was started on the eighth to tenth day, nineteen being cured and five relapsing. The most important fact, however, is that in one course of sulphanilamide (twenty-one days) these authors cured 240 male patients out of 491—a permanent-cure rate of 49 per cent.

Realizing that gonorrhoea is a disease of the working out-patient population, and that the elusiveness of the gonococcus is notorious in the female sex, I resolved in

August, 1937, to carry out my investigation in male ambulatory patients rather than in women or in-patients. This does not mean that I have not treated in-patients or women and children with sulphanilamide. Investigation with prontosil album began in August, 1937, with uleron in March, 1938, and with M & B 693 in July, 1938. One hundred cases were treated with prontosil album ("immediate therapy"), fifty with uleron ("delayed therapy"), and fifty with M & B 693 ("immediate therapy"). All cases were fresh acute infections in the male sex, and the investigation began on the first visit of each patient.

Prontosil Album

TECHNIQUE OF ADMINISTRATION

The aim has been to treat each case for three weeks, to give 1 gramme thrice daily, to give a total amount of 63 grammes in twenty-one days and no more, and also to observe the disappearance of gonococci and to see how many cures could be made in twenty-one days. During chemotherapy each case had daily lavage of the whole urethra for the same number of days. Apart from the above items no other adjuvant treatment was given. In every case the diagnosis was confirmed bacteriologically. Patients were seen daily, urethral smears examined and recorded on each visit, and urines examined and charted. One day's supply of prontosil album was issued to the patients in order to encourage them to attend daily. All patients were advised to abstain from sexual excitement and alcohol; to avoid eggs, onions, garlic, and laxatives containing sulphur. Intolerance to the drug and extension of the disease were specially observed. On the twenty-second day treatment was stopped and the following tests were carried out:

- 1st week.—Beer given, followed by daily slides.
- 2nd week.—Aolan intradermally. The following day urethral smears and prostatic excretion were examined under the microscope.
- 3rd week.—Urethroscopic examination. Massage of the whole urethra over Watson's sound.
- 4th week.—Aolan as in second week.
- 5th week.—Silver nitrate 1 per cent. instilled into the posterior and the anterior urethra. On the following day smears and excretion from prostate examined for gonococci and pus. Also culture for gonococci.
- Rest for eight weeks.
- 13th week.—General clinical examination of the urethra, urine, etc. Gonococcal flocculation test.

If the patient passes the above tests in the scheduled time he is considered to be cured. This method of observation has been applied to uleron and M & B 693 cases exactly as above, and is our standard for all male gonorrhoea cases.

Results.—Of 100 cases treated with prontosil, in forty-six the anterior urethra only was affected and in fifty-four the posterior urethra. Of these 100 cases, two defaulted, two transferred to other clinics, fourteen abandoned treatment on account of severe reactions, and eighty-two completed the course. Of these eighty-two cases, thirty-eight were permanently cured—cure rate 46.3 per cent. (that is, under 50 per cent.)—forty-three relapsed, and one ceased to attend during observation. The disappearance of gonococci was erratic. Of the cured cases seventeen were anterior and twenty-one posterior at the beginning of treatment, and of the relapses twenty-one were anterior and twenty-two posterior. Posterior cases became anterior within three days of starting treatment. Compared with routine methods this is a great improvement.

Toxic Reactions.—Toxic reactions occurred in 34 per cent. of the cases. In 14 per cent. these reactions were