An Oration

ON

THE REV. JOHN WARD AND MEDICINE.

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MR. PRESIDENT AND GENTLEMEN,—In a previous address¹ I gave some account of the Rev. John Ward, A.M., vicar of Stratford-on-Avon, whose commonplace books have long been amongst our treasured possessions.

I propose to-day to consider his medical knowledge—as he reveals himself to us—in somewhat greater detail. Even in his early days, when he was a resident Master of Arts at Christ Church, Oxford, he had a strong bias towards “natural science,” as we should now call it—a bias which was strengthened by the original work of Willis, Lower, Wren, Bathurst, Boyle, and Hooke, whose names are household words to the modern student of anatomy, physiology, chemistry, and physics.

At the Restoration, when those who had become inured to the rule of the Commonwealth found themselves somewhat out of harmony with the Royalists, Ward, like many others, determined to leave Oxford, and, having a competence, debated for some time whether he should become a divine or a physician. He visited London repeatedly in the year 1661–1662, and attended the lectures of Sir Charles Scarborough at the Barber Surgeons' Hall in Monkwell-street; visited St. Thomas's and St. Bartholomew's Hospitals, and made inquiries about the cost of foreign medical degrees. Botany² and chemistry as the foundations of medicine greatly interested him, but the call of the Church prevailed. He bought himself the Vicarage of Stratford-on-Avon, and remained there till his death in 1681. The bodies of his parishioners—dead as well as living—and especially their urines, interested him much more than their spiritual state, and where one page of his diary is devoted to texts, sermons, and theology, there are 20 dealing with medical topics. Like many medical students of the present day he loved a prescription, and he eagerly noted down the formulæ which he had heard or seen used by an eminent physician. Willis was facile princeps in his estimation, partly because Ward had known him at Oxford, partly because Willis was just acquiring a good practice and was called into consultation in the more serious cases which occurred amongst Ward's parishioners and neighbours.

Ward himself was like Boyle and Pepys, versatile and curious, a type of mind not uncommon amongst men of his generation. He wished to know all that could be known about everything he saw. If he went to a goldbeater's shop he desired to know exactly the processes used and the weight and thickness of the products; the pursuit of the Philosopher's Stone interested him greatly, not because he had any belief in the transmutation of metals, but because it led to chemical processes and was in the nature of experimentation. In this respect he was a true disciple of Boyle—the author of the Sceptical Chemist—for all things were put to the test of experiment. “Don't think, try,” was the watchword of the Oxford School of Science long before it was adopted by John Hunter, and in this school Ward was educated. Fortunately for us he had a bad memory and therefore committed his thoughts to paper; we are thus enabled to follow their train. In the long winter evenings he read much, and it was his habit to make a digest or running commentary upon what he read. Riverius, Fuller's Worthies of England, Velthuisius, Willis's De Cerebri Anatome, Lower, Boyle in all his works, and Highmore were his constant companions, and throughout the period under consideration—1660 to 1668—he must have given a standing order to his bookseller in Oxford to send him, not only

the new books on science as they appeared, but even the new editions. He must, indeed, have been in possession of a very good library.

There is no doubt that he prescribed for and treated his parishioners of the humbler ranks, although there was an apothecary and at least one physician living in Stratford during his incumbency. He considered it a part of his parochial duty and the services he rendered were gratuitous. Such treatment of the poor by the parson of the parish does not seem to have been unusual, for he says:—

“Watson, Parson of Sutton Coldfield in Staffordshire hath an extraordinarie way of cureing dropsies by ye help of pills and a dyet-drink. Hee hath likewise a kind of Unguent made, as I suppose, of Tarre and ye basting of a shoulder of mutton and of soot (as they tell mee) or some such thing and this cures any sore presently.”

This was clearly a crude form of Unguentum Picis.

From time to time, too, he did a little minor surgery, and he has a good surgical aphorism: “Allways lay a wound open whether it bee fresh or ulcerated.” He says:—

“Remember to get a speculum oris and other instruments fit for chirurgerie when I goe to London and a great case to hold them.”

There is a note:—

“Issues made in children's necks att 2 days old, good against convulsion fitts. Remember to cut ym with my owne hand and frequently to let blood with my owne hand. In making Issues use a green pea to draw, Ivie peas made of Gentian Roots; peas made of Hermodactyl as I have heard.” “Remember in Agues and feavors 1st. to bleed and then to giue my powder and plaisters to break ye neck of ye disease afterwards.”

He was observant of cases as they came under his notice and seems to have had some idea of the metastasis of cancer, for he writes:—

“Persons yt haue Cancers after a while haue glandules arising in other parts, wch may infect further, although ye other should be taken out.”

CONTEMPORARY METHODS OF TREATMENT.

The contemporary methods of treatment can be gathered from various entries. Thus, of pleurisy with effusion, Ward writes:—

“When an incision is to be made into ye Breast open itt betwixt ye 3rd. and 4th. true ribb reckoning upwards, yt is just aboue ye diaphragm and to yt purpose apply a Caustick wch is very strong and will eat through ye Muscle; yn make an Incision and keep itt open with Tents. This course was taken with one who had an hydrops pectoris and itt evacuated much water but at last itt ulcerated and ye man died.” “A Caustick if well made in two hours does ye buisnes.” “That person yt had a hydrops pectoris with laying one hand upon his breasts and another upon his back and shaking him, ye water swashed so about yt those that were by heard itt plainly.”

The treatment of lunatics was drastic.

“A good course for mad people (is) to bleed att both armes and att both feet and yn att ye haemorrhoids by Leeches; yn att ye Veine of ye forehead and tongue and nose and att ye temporal artery. Extract of Hellibor gr. x. once in 4 or 5 days very good for madness proceeding from melancholia. Many mad persons not cured till 60 times bleeding.”

Hysteria seems to have been a common and troublesome condition then as now. Dr. Willis and Dr. Highmore both wrote on the subject and Ward makes repeated reference to them. The cause was none the less mysterious because it was supposed to bear a relation to “the rising of the mother,” the deeply ingrained idea that the uterus was an animal with an independent existence and capable of independent movement in the body. Ward says of the cause of hysteria—

“Enquire whether hysterical fitts may not be caused by ye wombe rising upon an object which is beloved and likewise from wind; so ye erection of ye yard may proceed from a wind distending itt, wch wee call a satyriasis. Hysterical fitts are of several kinds some voluntarie as in (1) erect; virg; (2) some proceeding from wind; (3) some from ye suffering of ye matrix, either by emptying of a great Burden as after child-bearing or by doing itt wrong in wounding itt in bringing forth ye child; (4) or by fumes elevated; remember to peruse Dr. Highmore on this subject.”

Highmore, a friend of Harvey, is still known to us by the antrum of Highmore. He wrote a small 12mo. published at Oxford in 1660, with the title “Exercitationes duae De Passione Hysterica.” Ward evidently looked at the book, for on page 4 is “Sternutatio si superveniat cito paroxysmum claudit,” and a few pages further on Ward asks himself—

“Whether itt is not very proper to cause hysterical women to sneeze by putting up Orange pill [peel] into their noses or some other way.”

There was also—

“Aq. Histeric. and Cinnamomi for women in laboure or neel fainting fitts. Whether fitts of ye Mother are anything else besides a meer ventositie of ye wombe.”

¹ THE LANCET, 1916, ii., 665.

² The Annals of Medical History, vol. ii., 1919, p. 109.

The treatment differed with different practitioners; thus—

"Dr. Trig cured a woman yt was troubled with histerical fitts this way; he laid her uppon ye ground with her face downwards yn took up her coat and gaue her 3 or 4 good slaps on ye arse and they cured her, but I was informed yt he did this before much companie, which I scarcely believe."

"Dr. Willis used with histerical women this method;—1st. vomited ym; next gaue ym pills and cured several."

EPIDEMICS IN THE SEVENTEENTH CENTURY.

Small-pox, measles, and the plague appear to have been the chief epidemics from which the Stratford people suffered. Tubercle was rife as always; ague was endemic, as the Avon is liable to flood extensively and there are plenty of midges.

The new disease.—The following note was made in February, 1660:—

"Dr. Eliot sayd hee did obserue yt in some persons who died in ye late new disease yt their faces were very red, their eyes much blood shot, whence hee concluded they would die but before death they would spit blood and pisse blood; and accordingly itt fell out."

Small-pox.—There were several outbreaks of small-pox at Stratford between 1660 and 1666, for the disease was always present before the age of vaccination. It was looked upon as a disease which occurred in the ordinary course of events, and many of the professional beauties of Charles's Court owed their reputation to the fact that they were not pock-marked. Ward notes in January, 1665-1666:—

"Ye small-pox this year are less yn usuall as hath been observd by diverse: whence that may proceed?"

He writes almost directly afterwards:—

"R Aq. Theriacal. with Syrupe of Gylliflowers to bee giuen in ye Smallpox when they first come out. The smalpox this yeer haue skaled and yn Risen down againe." "It is an ordinarie thing to haue convulsions goe before ye Eruption of ye smallpox as in Mr. Taylor's Sonne, Mr. Tent's Boy; Remember to obserue itt." "Vomiting a usual signe of ye smalpox, if itt precedes as in David att Mr. Jhonston's." "The Small Pox this year doe ordinairly Rise twice. Some new ones come out after ye others are almost Ripe as in Mrs Townsend; Mrs Watts and Seuerall others; yet I haue not obserued any to die of them uppon whom they haue so Come out; whether Nature's disburthening ittself after that manner (Partibus vicibus) does not make itt more safe, whereas were ye eruptions all together itt might be more oppressive to Nature and consequently more daungerous."

"In ye yeer 1664 ye smallpox raged very much att Stratford-upon-Avon; some they came out twice uppon; others they neuer fully came out at all, only appeared a little and went in againe and left a kinde of scruf on ye face. I suppose ye alteration was accounted to ye masse of blood. I think they appear as soon in Whurles uppon ye face as any where; especially on ye cheek." "I haue observd yt people that haue had ye smallpox are more difficult to sweat yn others, whether itt bee yt ye pores are straightened by ye pox so yt they cannot so well come forth. I mean such persons some 3 or 4 years or more after ye smalpox sweat not so kindly as others who neuer had them."

Chicken-pox.—The difficulty of diagnosing between small-pox and severe chicken-pox did not escape Ward, for he said:—

"Obserue ye Chrystals what they are and how differing from ye smallpox and Measles and obserue somewhat about ye (origin?) of ye pox and other things about itt."

Measles.—It is somewhat remarkable that no thought of contagion entered into Ward's mind in connexion with small-pox and measles. The plague he knew was catching, but measles and small-pox he believed to be climatic or, at any rate, seasonal in origin.

"The meaisls a general disease in 1661 yet not much mortal: yt yeer was a cool spring and an exceeding hot Summer." "I obserued one yeer in Stratford after a cold winter, a cool spring and a very hot summer children had ye meaisls extremely and men about July had Agues and feavours in abundance." "The Children after ye meaisls were gone had violent griping pains and skreking in their gutts with starting and frightful fitts." "In ye meaisls a little before they came out children had strange fitts, very frightful and like convulsions so in ye small-pox." "After ye meaisls some had great paines in their bellies with wormes coming from them." "After ye meaisls went in people were strangely disordered, some with coughs, some with headache, some with one thing, some with another as doubtles in those diseases much of ye matter is left behind."

Diphtheria (?)—He also gives a note of a case which seems to have been diphtheria, for he says:—

"Whether ye woman, I think of Luddington, who had her tongue so swelled did not die of a Thrush or ye Aphthae, which are, whether in ye Roof of ye mouth and sometimes black ones, exceeding daungerous." "There were seuerall persons this last plague yt had itt in their throats, whereof many died yet some recouered."

The plague, 1665.

"Some in ye plague had 3 or 4 sores all att one time uppon them in this last plague." "When ye sicknes was declining one might obserue persons in London streets halting and holding their arms very strangely wch persons they concluded to haue ye sores uppon them. Dr. Wharton said all people yt died in ye Contagion died of

ye plague; yt hee opened one yt had no tokens nor sores, yet was full of tokens about ye Breasts. When ye Tokens only appear and not a Bubo itt is less infectious." "The Plague ordinarily begins with vomiting; There are in itt Buboes yt appear in ye Emunctories; Carbuncles wch come anywhere; ye Blanes wch are things like blisters; and ye tokens wch are spots of bright flaming red colour: inquire of Dr. Hodges."

"In every Parish in London there are 2 watchers so yt what euer disease a man dies of these 2 must see and signife ere ye partie bee buried. They are commonly two old women and they haue 4d. or 6d. for their paines; so an apothecarie in London told mee."

"Towards August in ye yeer 1668, when we had a strange winter, a strange forward Spring and a strange moist summer, men had frequent swellings about ye throat; pains of ye teeth and such like distempers."

VALENTINE GREATRACKES, THE "STROKER."

Ward gives some interesting facts about Valentine Greatrakes, the celebrated "stroker," or, as we should now call him, the Christian Scientist. Born in Ireland in 1629, and living until 1683, he was in the height of his fame when Ward's entries are made—no doubt from personal observation—in 1666. The Lady Anne Conway, to whom reference is made, was a metaphysician, the wife of Edward Conway and the daughter of Sir Heneage Finch, Recorder of London and Speaker of the House of Commons. After her marriage in 1651 she lived at Ragley, still the seat of the Marquis of Hertford, whose second son bears the title of Baron Conway. Van Helmont, her physician, was in constant attendance, as she suffered continually from severe headache, later associated with fits. In spite of this affliction Lady Anne wrote much and was thought to be one of the most accomplished women of her generation. Greatrakes, who had cured a great number of people in Ireland gratuitously by stroking the part affected, was summoned to Ragley in January, 1666. He was unsuccessful in curing Lady Anne, but during his three weeks' stay he relieved so many persons in the neighbourhood that Dr. Stubbes, the physician at Stratford-on-Avon, published a 4to volume at Oxford in February, 1666, with the title "The Miraculous Conformist." A counterblast was issued by David Lloyd entitled "Wonders no Miracles."

When Greatrakes failed to cure Lady Anne Conway she went to Paris in the hope of being trephined, but the courage of the French surgeons failed them and she returned to England unrelieved. She died in 1679.

Ward's allusions to Greatrakes and Lady Anne Conway will be readily understood in the light of these facts. He says: "The Lady Conway hath great pain in her head, her sutures open." This entry suggests that she may have been suffering from the form of chronic hydrocephalus associated with closure of the foramen of Magendie. In such cases, as my friend Mr. L. B. Rawling reminds me, the intellectual faculties are often increased. If this were so, the French surgeons were perhaps to blame for not having operated.

"Ye Lady Conway hath something like ye Irish ague. Shee is a great phylosopher. Henry Moore of Cambridge almost perpetually with her in her chamber."

This was Henry Moore whose uncle threatened to thrash him before he went to Eton at the age of 14 "for his immature fondness in philosophising concerning the mysteries of necessity and free-will." He had a high opinion of Lady Anne Conway, whom he used to call his "heroine pupil."

Ward heard—

"yt ye Ladie Conway is Sir Heneage ffinch, his eldest sister and a right ffinch—very proud. Yt she came into this miserie by a Brother of hers who had some skill in physick and Chymistrie and tried experiments uppon her; inquire whether itt was not ye same man yt travelled with Jeremy Clark." "My Lady Conway hath a tumour on one side and a scirrhus of ye Mesenterie as is supposed, as Mr. Stubbs says."

Ward had no high opinion of the veracity or methods of Dr. Stubbes, for he says:—

"Inquire who yt is wch hath wrote a Book of Mr. Gretoirixes his Cures wch is about as bigge againe as Mr. Stubbes on yt subject then peruse itt making to my own thoughts some censures uppon itt." "An issue made in ye side betwixt 2 Ribbs for a consumption by Mr. Stubbs, a conceipt sufficient. Some yt made issues under ye Axilla, as Mr. Stubbs said (if it bee not a loud lye) as also Dr. Bathurst's opinion of an issue yt itt givs a vent to nature as hee illustrated in a Barrell wch when itt hath vent, and yt ye eating of an onion or any such thing is discernible in ye issue. Hee talked of an extreme ebullition of water in ye Breast wch may Cause a Cough—a loud lye—and moreover yt hee hath tapt an hydropick person and there hath water come out of his bellie wch skalded ye hands—a loud one. His pretense of understanding ye distinction of feavours and of fluxes together with his rambling discourse of unnsual authors."

Ward had clearly formed an unfavourable impression of Dr. Stubbes, whose cloudiness of thought had probably led him to write the pamphlet, alluded to above, in favour of Greatrakes's cure. The methods of treatment recommended for Lady Anne Conway are probably the instructions given by Dr. Willis:—

"First purge per *ἐπικράσιν*; yn Bath her feet well; shave her head and apply to itt ye Lungues of sheep warme, new taken out of their bodie." "My Lady Conway took much of his (Dr. Willis's) ens Veneris and is much worse since ye taking of yt Hues his powder."

There are a few more references to Valentine Greatrakes, thus:—

"The way to cure a deaf ear taken by a Barber at Thrapstone;—first syringe ye ear well; yn drop in 3 drops of oil, I suppose itt was sallet oil, into ye ear; doe this 3 or 4 times and ye end of doing itt is to loosen ye matter wch stops ye ear; wch after by often syringing comes out; sometimes a skinne, some times ear-wax as bigge as one's finger-end; ye oil is either common sallet-oil or else some oiley infusion as appeared by ye smell. I think such a method safe and good praemising first purging and Mr. Greatrakes his Method to break ye Aposteme by shaking ye ear by putting ye finger into itt besids thus loosing ye ear-wax as I think. Deafness is either natural or else itt is catcht by sweating or after a feavour. Keeping ye head too warme a great cause of deafnes, said Mr. Gratrack; hence, said hee, there are 10 women deaf for one man and amongst women many cuntry women for one Gentlewoman."

This is evidence, I think, that the Irish used the shawl as a head covering and the Warwickshire women wore cotton bonnets as they still do.

"Mr. Getorix in curing a deaf ear used to lay his ear to ye parties and then thrust his finger yn and so brak ye Aposteme, but ye end of laying his ear to itt seemd to bee this to hear ye swaging of ye Aposteme."

This, however, was a faulty deduction on Ward's part, for the Stroker used a certain amount of mystery, and used to whisper in the patient's ear, "God Almighty heal ye for His mercy's sake."

CERTAIN CASES DESCRIBED.

Ward gives sufficient details of the illnesses of some of his neighbours and parishioners to enable a diagnosis to be made, though in other cases the nature of the disease is puzzling.

Dilated stomach.—The following appears to be a case of dilated stomach:—

"My Lord of Down yt. now livs at Roxall, every night vomits after his first sleep and to yt. purpose hath 2 chamberpots allways by him, one to pisse in and another to vomit in."

Enlarged prostate.—There is little doubt that the following was a case of enlarged prostate:—

"Dr. Gordon, Bishop of Exeter and lastly of Worcester died of a stoppage of the urine, wch was supposed to bee ye stone, wch was by a probe often before opened but after being opened no stone appeared but only 2 peices of flesh growing one against another in ye neck of ye bladder yt ye urine could not passe. This was strange yet true."

Hay fever.—The next case was one of hay fever.

"A strange sneezing wch Mr. Cary of Nobal was troubled with, hee would sneeze 2 or 300 times together, but as soon as ye first frost came itt would leave him in ye winter, yn come againe in Summer with extreme Vehemency, afterwards hee fell into a quartan Ague and an intollerable head ache, with a vomiting almost all he took, wch might be caused by a metastasis of ye sharp humour from one part of ye braine to some other part."

I would suggest that his accessory sinuses became infected and that "the quartan ague" was evidence of suppuration.

Hydatids of lung (?)

"Mylward beyond ye Bridge (i.e., Clopton Bridge at Stratford on Avon) brought mee ye bagge of an Imposthume wch came from her Daughter or Neece, ye thickest that euer I saw; ye wench felt it long under her left Breast and itt bled and trickled very warme, as shee thought; but about 9 days agoe ceased. This morning shee was taken with a Reatching and att last up comes a quart of blood and after yt ye Bagge wch Mrs. Tyler caught hold of and brought up—very thick."

"The question is whether itt comes from her Breast or not or whence itt should come. It is probable a Vein was opened in her Breast by straying herself to take up a payl and so ye mater collected and Imposthumated."

If I had to guess about the nature of this case I should hazard that it was an hydatid cyst, "the quart of blood" being blood-stained hydatid fluid, or else that the wench was hysterical and had produced a pig's bladder filled with blood.

Other cases.

"A Wench, January 28 (1663-4) vomited up blood, her name was Myllen, beyond ye Bridge; wee gaue her some opening pills, supposing it might bee her terms wch might flow yt waye."

"Another wench at Alderminster wch after heating herself and drinking sate downe to weed in ye Garden and was taken with such a paine in her joints yt shee could not stirre; she was likewise much swelled. Shee was a very fat wench before."

"Make some obseruations of Mr. frauncis Smith. First his stomach grew weak and hee vomitted up all he took; yn came a hiccough and lastly death came suddenly."

Clearly I think a case of intestinal obstruction due to carcinoma.

"Goodie Cole was so sick yt every one thought shee would haue died and wee gaue her:—Lenativ; Cremor Tartari; Resin Jalap, and some juniper berries and itt brought away ye wind and she grew very well quickly after itt; and withal now and then took a graine of laudanum or 2.

MIDWIFERY AND GYNÆCOLOGY.

One or two deaths after child-birth are noted thus:—

"Itt is daungerous combing a woman's hair in a short time after her lying-in as in my Lady Clopton's case wch was done a week after. In my Lady Clopton's case they would give her no opium for fear of fixing ye Tumour; they blooded her in ye feet and behind ye ears with Leeches."

It would appear from this that the careful arrangement of the hair previous to lying-in is not really for the comfort of the patient, as is usually thought, but is connected with a world-wide superstition of the intimate relation of the exuviae with the life of the individual.

"Mrs. Higgins first was extreme hot and Restless before shee was delivred, afterwards her Courses broke downe; ye child livd she was delivred with but in 2 or 3 days died. After her delivry shee fell into a Cough and phlegme followed her much and about a Month after her delivrie her Legges swelled and yn shee died."

In the course of his duties Ward saw much of his sick parishioners and the diseases of women and children especially interested him. He was constantly trying to improve his knowledge and learn helpful methods thus:—

"Inquire more distinctly of Goodie Rickets concerning ye Lochia and ye Waters, how usually they come and in what quantitie in or after delivuerie in child bed."

"I haue heard of a woman yt had a procidentia uteri 9 or 12 yeers together, and yet did not gangrene but shee did well and meeting with some Balls put it up and itt staid and she had seuerall children after yt time." "The Loosening of ye Ligaments or sometimes ye breaking of them is ye Cause of itt's falling." "A pessary made in a procidentia uteri of cork with a hole in itt to let passe ye faeces uteri and so couered over with wax and some astringent powders mingled with ye wax and putt up." "Whether ye 3rd. fitt in an ague or feavour is not more yn ordinarily daungerous as I experient in a woman—Old Midwife Webb of Snytterfield."

Ward occasionally made an effort to generalise from the particular—a faculty which was only just developing in connexion with medicine, for he says:—

"Whether a great desire to liue wch some persons manifest upon their sick beds, as also a willingness to take any thing wch before they Refused is not a sign they are tending to their long home; obserue itt more frequently than formerly.

AGUE.

Ague was of frequent occurrence and there are numerous references to it, but it should be remembered that whilst there was much malaria the term ague was used for many cases of fever due to other causes.

"I aduisd one yt had a Quartane to drink Scurvy-grasse drink and hee did so and found his well-days were much better yn before he drank itt."

Ward learnt this treatment from Dr. Bates—Oliver Cromwell's physician—who practised first at Oxford and afterwards in London, and was known as the "Scurvy-grass doctor."

"Allways take a surfeit or an Ague with a vomit in ye beginning. If pain in ye side bleed to bee sure." "What if a man should giue 3 or 4 drops of spirit of hartshorne or spirit of salt or any other volatile spirit constantly in a quartan ague to exalt ye blood by degrees, and so to get ridd of itt sooner. A surfeit or aguish feavour coming after a quartane, ye body not being duly purgd after ye Quartan, usually ends in death; observed in Mrs. Hopper of Loxly and Rowly of Eddington; attempt such people with a vomit first in cas I bee calld; bleeding does little."

In connexion with ague he gives an older variant of our adage, "Stuff a cold and starve a fever," for he says "Starve an ague and stuffe a cold."

DISEASES OF THE GENITO-URINARY ORGANS.

Diseases of the genito-urinary organs interested Ward nearly as much as the diseases of women and children, and a queer contemporary treatment is thus recorded:—

"A Bath usd by Mr. Canon of Bampton by advise of a Dr. when his water had been stopt 9 days; when hee first went in to this Bath hee felt easd; ye 2nd. time hee beganne to faint, but lying downe in his bed hee recouerd and yn pist with such violence yt ye stones might bee heard Rapping against ye pott side. Mr. Canon of Church-Bampton was often sett upon his head by his sonne-in-lawe and then throwne downe to trie if possible to shake ye stone out of ye neck of ye bladder but all would not doe."

Ward does not say whether he had any tyinges of the stone himself, but the mention of the bath in the case of Mr. Canon is followed immediately by the entry:—

"Gett a furnace to heat water in for a Bath and a Cock to lett itt into ye Bathing-Tubb, when hott." "For ye strangurie: Brew

some new Beer every morning for 12 mornings together and drink a quart of yt ye first (thing) Barne itt but doe not hopp itt; itt must bee fresh brewd every morning."

Another parishioner died of suppression of urine for—

"John Ventries told mee yt whilst his wife was sick no urine came from her in 11 or 13 dayes but her hands smelt of urine and all her bodie; yea, ye Curtains yt hang about ye Bed and ye hangings of ye Roome; yea, he said that when shee died she had nothing in her bladder notwithstanding shee was so long without urine. Whither should ye urine passe but per halitum."

Urinoscöpy.

In his own opinion and probably in that of his neighbours as well, Ward was very skilful in urinoscopy, and there are many entries on the subject.

"Remember still to prognosticate by women's urine pains in their back." "A woman who had miscarried 3 weeks before sent her water to me. I obserud in itt much white flying consistencies wch very quickly settled to ye bottome in a white substance: itt argued some distemper of ye womb; for itt somewhat resembled ye sediment of childing women." "Mr. Lingen's sonnes water was palish like yt of strangurian persons and had much settlement in itt; hee had an intollerable paine in his head wch was I suppose a Collection of water gathered there after a feavour, being neuer purged." "Whether ye black urine does not allways signifie ye stone or ye black Jaundice." "In feavours when ye water is first high, yn muddy itt is a good signe, but if itt continues high not so." "When ye water is white remember in judging urines to harp upon these things: ye wormes, paines or flux in ye bellie and paines in ye head." "There is great diversitie of urines: but yt of children and such as drink Rhenish is ye best."

Veneral Disease.

Syphilis and gonorrhoea were rife at Stratford-on-Avon during Ward's incumbency. He distinguishes clearly between them, but neither disease incurred his moral disapprobation. He looks upon them in a purely scientific spirit and as diseases to be cured. Of prophylaxis he says:

"The way to prevent ye pox is by syringing as ye Duke of Buckingham and some other madde fellows doe, or else by taking a horse and riding immediately after wch I haue heard is ye most undoubted way." "Mich. Palmer troubled with a gonorrhoea and a swelling in his groin wch swelling seemd to mee who handled itt to bee about ye upper part of vasa. deferentia towards ye bladder, itt is much swelled sometimes. Whether itt may not be caused by ye putrefying of some humours about ye part or rather ye sperme."

This appears to have been a case of gonococcal infection complicated with a hydrocele, but the term gonorrhoea was used in its etymological sense. It consequently included the discharge in cystitis, tuberculous disease of the kidney, prostatic abscess, as well as the specific inflammation due to the gonococcus.

ON EMBALMING.

Even death did not end the interest he took in the bodies of his parishioners. He gives details of the process of embalming, and it would not surprise me if an embalmed body were found some day in the churchyards of Stratford or Welford, the two parishes which he served.

Malignant Disease.

"In the Autumn of 1665 a cancer in Mrs. Townsend's Breast of Alveston was taken off by 2 surgeons. First they cutt ye skinne cross and laid itt back; yn they workt their hands in ytt one above and the other below and so till their hands mett and so brought itt out. They had their needles and waxt threads ready but never used them, and also their cauterising irons, but they used them not. Shee lost not above 3vi of blood in all. Dr. Needham said itt was a Meliceris and not a perfect cancer, but it would have been one quickly. There came out a flow of a great quantity of waterish substance as much as would fill a flaggon. When they had done fitye cutt off one one bitt and another another. Put a glass of wine in and some lint and so let itt alone till next day. Yn they opened itt again and injected Myrrhe, Aloes, and such things as resiste putrefaction and so bound itt up again. Every time they dressed itt they cutt off something of ye cancer yt was left behind. Ye chirurgions were for applying caustick, but Dr. Needham said 'No, not till ye last, since she could endure ye knife.' They prepared her body somewhat, yn let her blood ye day before. She endured itt with infinite patience all along, not offering to lay her hand upon itt to ease itt, but a warme cloth to ye other breast all ye time. The way how and where itt should be cutt away was markt out with Ink by one Dr. Edwards, who lives at Bridgnorth. Hee said iff they could prevent a Gangraena there was little fear, butt itt might be a cure iff she fell not into a feavour."

She recovered from the operation, survived an attack of small-pox, and died a year or two later. Ward records the post mortem.

"Mrs. Townsend of Alveston being dead of Cancer Mr. Edis and I opened her breast in ye outward part and found itt very cancerous; itt had been broken and a Melicerous part was yet remaining when wee saw itt; wch being Launct yeilded 2 poringers full or more of a very yellow substance wch came plentifully out of the Cautie of ye breast; yt flesh wch was grown againe after part was taken out was of a hard, grisly substance wch seemd very strong. The Ribbs were not purified as wee could discover nor anything within ye breast of a Cancrous nature for wee runne ye knife within side ye breast through ye intercostal muscles. Dr. Needham hath affirmed yt a cancer is as much within as without ye breast and hee hath seen a string, as I was told, going from ye breast to ye womb. I

suppose itt was ye mammillarie veins full of knots wch were cancerous and hung much like ropes of onions. The cancer was a strong one as was evident; wee wanted sponges and things conuenient or else wee had opend ye cauties of ye breast."

REFERENCES TO CONTEMPORARY PHYSICIANS.

Ward says of physicians generally—

"There are seuerall sorts of physicians 1st. some yt canne talke but doe nothing; 2ly some yt canne doe but not talke; 3rdly some yt canne both doe and talk; 4thly some yt canne neither doe nor talk and these get most money."

This was merely a jest, however, for some of the men he most revered were his friends and contemporaries, the great physicians of their age.

Perhaps the most interesting observations in Ward's note-books are his references to Dr. Willis, Dr. Lower, Robert Boyle, and others of his contemporaries who were personally known to him as graduates of Oxford. The references to the Hon. Robert Boyle, the chemist and physicist, are so numerous that they cannot be dealt with at present.

Dr. Thomas Willis.

Dr. Willis, described by Needham "as next to Dr. Harvey, the glory of our English nation," gave his name to the circle of Willis, and is now remembered as an anatomist. Ward, however, knew him as a practising physician, and throws much light upon this little known side of his life. Willis left Oxford in 1666 and settled in London, taking a house in St. Martin's Lane, where he soon obtained a large practice, not wholly to the liking of the other London physicians, for Ward says:—

"Sydenham and some others in London say of Dr. Willis yt hee is an injenious man but not a good phisitian and yt hee does not understand ye way of practice."

Be this as it may, Willis drew attention to wasting disease associated with sweetness of the urine, and may thus be claimed as the discoverer of diabetes mellitus. He also wrote on hysteria, and Ward says:—

"Dr. Willis used with hysterical women this method 1st. vomited ym; next gaue pills and cured seuerall."

Ward records:—

"Crabbs eyes powdered and put into vinegar where they will ferment, yn decant ye vinegar and after yt make use of itt. Dr. Willis his receipt. Remember yt I inquire of D. C."

D. C. was Court, who was "prentice to one Mr. De Laune an apothecarie in blackffryers in London." Mr. De Laune is now known to us as one of the early masters of the Society of Apothecaries.

"Remember to inquire about Dr. Willis his syrup of sulphur when I goe to Oxford and see and buy some of itt." "Whether a disturbed urine does not usually signifie some paines in ye head. Remember to trie itt." "Whether ye giving a clyster every day to persons in a malignant feavour with salt of wormwood and a spoonful of juice of Oranges is not very proper. Dr. Willis used itt with Mr. Levine." "Dr. Willis after his antiscorbutick electuarie made of cons. of Lujula, Cochlearia, Crabs eyes and spec. Diatria. santalon and juice of Lemon with troches of Rhabarb." "Prescribe juice of nasturtium, dandelion and juice of scurvy grass with white wine to take six spoonfuls of itt after ye electuarie. Dr. Willis hath an admirable way of making juleps but not by distilled water as many doe." "Remember to trie sulphur and honie for a cough and garlick pricked ful of holes and butter. Dr. Willis his balsame of sulphur some such thing." "Remember yt I inquire what Dr. Willis his dyet drink was and resolve to make much use of dyet Drinks in Hectiques and know like wise what Sallamans dyet drinke is and means." "Dr. Willis praescribed Vervaine water and ye powder of Vervaine for ye headache." "Salt of Tartar and Ginger ye best way of praeparing Apium withal, as Dr. Willis affirms."

Parsley was used in coughs and colds as well as a lithonryptic. The use of salt of tartar is an indication of Dr. Willis's adherence to the newer school of chemical physic as opposed to the older physicians who depended rather on herbs and roots for their remedies.

"Dr. Willis advised Mr. Treble to infuse filings of Iron in white wine yn mix with itt aq. Limacum composita and aq. Lumbricorum. When hee took ye water hee took pills constantly and an electuarie."

The iron tonic here recommended would probably have been equally satisfactory without the snails and earthworms, though there are some who still believe in the virtues of mucin.

"Dr. Willis much commendes Firres ale; I suppose because it holds sulphur in itt wch volatilises ye blood." "My Lrd. of Downe dead under Dr. Willis his hand in fluxing as I hear." "Dr. Willis hath rich peaces of plate presented him as well as great fees as Mr. ffraancis says." "Dr. Willis his purges generally are very gentle ones but on ye contrarie Dr. Speed's are very feirce." "Dr. Willis said yt ye Duke of Cambridge had mala vitæ stamina."

This was equivalent to saying, in the language of the present day, that he had "specific disease." It was

spoken of Charles, Duke of Cambridge, who died on May 5th, 1661, the eldest child of James II.—then Duke of York—and Anne Hyde, his wife. The statement is said to have cost Willis the Court practice which he was just acquiring, though, as Willis was a staunch Protestant, there may have been other causes to account for the loss. The child afterwards came under the care of Sydenham, for Ward says:—

"There was a great phlogosis in ye Duke of Cambridge his bowels; Dr. Sydenham kept ye Duke of Cambridge alive 3 weeks and the Dutchess thought hee would really have cured him; hee did itt by some cooling water or other wch hath got him some credit. Hee was also with Sir Richard Bishop for his gout, but did little except pultisse him with milk and crumbs of bread. Hee aduised Mr. Bishop to fast one day in a week for his Rheumatismus so yt humor would spend ittself."

Salt of vitriol is reckoned by Dr. Willis amongst such vomits as work gently.

"Remember yt I studie ye Braine more particularly with its office and use and diseases incident to itt according to ye new anatomie and not ye old stuffe (1663, October)."

In pursuance of this design Ward must have bought Willis's *Cerebri Anatome* as soon as it was published, for in February or March, 1664-65, he makes extracts therefrom.

Blood Transfusion by Dr. Lower.

There are various entries about Lower, and descriptions of experiments conducted by Lower or at his instigation.

"A dissection Thursday November ye 16 (1664) first of ye Testicles, of ye spleen, then of a bitch wherein wee saw many excellent things; ye parastate; vasa deferentia, prostate and so ye common passages." "Syringe some ink into ye Crural arteries and itt appears in ye vein wch argues an anastomosis."

It is clear from this that the anatomical proof of the circulation was not yet complete.

"Dr. Lower let one dog's blood into ye bodie of another by opening ye veins of one and ye arteries of another and putting in a quill into each and so letting one blood on ye other side; ye one died, ye other liud; another dog yt had 2 Vena Cavae as they say.—Dr. Lower."

"They had syringed in Beer into ye Crural Arteries and likewise Infusi Croci Metallorum."

The crocus metallorum, or liver of antimony, was a violent cathartic and emetic. It was given in doses of from 3 to 6 gr.

"After a dogge hath been let blood and lies dead at your feet you may let ye blood of another dogge into his veins and so reuiue him againe; inquire further into ye truth of it."

These experiments of transfusion are recorded by Ward in the year 1665. They refer to Lower's classical experiments on transfusion which were suggested by Christopher Wren's injection of various drugs and poisons into the veins. Lower passed blood direct from the artery of one dog into another in February, 1665, at Oxford, in the presence of Robert Boyle and others. Ward perhaps rode over to Oxford from Stratford to see the experiment. On Nov. 23rd, 1667, Lower transfused Arthur Coge at a meeting of the Royal Society, but it is only in the recent war that his methods have been employed so extensively as to have passed beyond the experimental stage. They are now firmly established as a remedial measure of great value in properly selected cases and with some modification of technique.

"The Diaphragma is a muscle and is of use in Respiration and I haue heard yt Dr. Lower says yt broken-windedness proceeds from a breaking some vessel in ye diaphragme and yt hee can make a dog suffer and appear as broken-winded by cutting them." "Linseed oil and oil of sweet almonds usd by Dr. Lower to bee likt with a stick of Liquorish for distempers of ye lungues." "Dick Lower told mee yt they had searcht ye Testicles of a Boar and could by no manner of means find yr any but one small nerve coming thither, whence they conclude yt ye sperme cannot be ye result of ye succus nervosus but somewhat else from ye arteries."

This was a part of the experimental inquiry which destroyed the long-established hypothesis that the fructifying power of the semen was derived from the nervous system in the form of a succus nervosus.

Sydenham, Scarborough, and Prujean.

"Dr. Sydenham aduises a vomit 2 hours after a gentle dinner; after vomiting hee giues a narcotick potion or Bolus to allay ye tumult yt ye vomit hath made."

Of Sir Charles Scarborough, to whom Dr. Harvey left his gown, Ward says:—

"Dr. Scarborough. There was a person dissected att London about October, 1664, who wanted the pectoral muscles, yet had ye right use of his armes, as I heard, wch Dr. Scarborough said was neuer heard of before."

Sir Francis Prujean.

"Dr. Prujean came from Lincoln to London; hee was a mean man at first and was faine to leave London twice or thrice because he could not get a maintenance there."

Many of us, no doubt, have felt the same. Sir Francis Prujean (1593-1666) was the son of the Rector of Boothby in Lincolnshire. He was a sizar of Caius College, Cambridge, and after graduating he practised in Lincolnshire till 1638. He then settled in London and acquired a large practice, attending Queen Catherine when she had typhus fever, and became President of the Royal College of Physicians.

Fraizer, Needham, Peachy, and Hollier.

"The Queen's distemper, I hear, is too eager flowing of ye menses and thereof she is aduised to go to Tunbridge waters wch Dr. Phrasier says will confirm and strengthen ye parts." "The King hath a hight opinion of Dr. frasier and says all ye physicians are fools to him." "A whey of Dr. phrasier for Mr. Bishop B. Marmor. Calabr. 3ij., Cremor tartari 3/s.; Serilactis lib. ij." "Dr. Phrasier gaue some pills to Mr. Bishop for his Rheumatismus likewise but I imagine not with much success as appeared by ye effects."

Sir Alexander Fraizer was a member of the Durris family and was born about 1610. He probably received his early education at Aberdeen and in 1635 he graduated M.D. at the University of Montpellier. Returning to London he was elected a Fellow of the Royal College of Physicians in 1641. He was an ardent Royalist and shared the exile of King Charles II., who appointed him physician-in-ordinary after the Restoration, and created him a baronet of Nova Scotia in 1673. He attended many members of the Royal family and was in charge of the operation of trepanning Prince Rupert's head in February, 1666. He died in May, 1681. Clarendon says of him: "He is good at his business, otherwise the maddest fool alive." Fraizer had such influence with the King that once when he was arrested for debt he caused the bailiffs to be apprehended, committed to the porter's lodge, and there, by the King's command, soundly whipped, from which the Justice himself very narrowly escaped.

Dr. Needham.

"Needham allways aduises to praescribe even in feayours something against ye wormes; hee hath proued itt successful." "Mr. Needham, a physitian, livs sometimes in Shrewsbury, sometimes out att Gentlemen's houses." "Needham saies there is use of old Commentators as there is old posts and stones: though itt bee but to show where ye old Road was." "Says Needham I resolute, only there bee very great urgencye or an immediate necessitie for sauing life, yt I will not open a vein. Hee adds, likewise, unles there bee some other extraordinarie occasion for Physitians make blood-letting but as a prologue to ye play."

Marchmont Needham (1620-1670) was the son of an Oxford graduate who married the daughter of mine host of the George Inn at Burford. Marchmont was a chorister of All Souls at Oxford and got his degree in 1637. Ward says at this period of his career he lived in the house of Dr. Bathurst, with whom Harvey used to work at Trinity College. Needham afterwards became an usher of Merchant Taylors' School and was admitted a member of Gray's Inn in 1652. He was essentially a pamphleteer, writing both on the Parliamentary and the Royalist sides. In 1665 he published the *Medela Medicinæ* which is here quoted by Ward. It created a considerable stir in the medical world and was answered by Sprackling and Castle.

Mr. Peachy.

"One Mr. Peachy of London cures quartan agues; hee first purges yn gius his haust 3 days when ye ague is to come; itt sweats somewhat and they must keep their beds; itt comes away by urine, as hee says." "Hee acknowledges Gentian roots and ye Jesuits bark in his haust."

If this is either of the two Peachys of whom an account is given by Mr. G. C. Peachey in *Janus*, 1918, pp. 121-158, it must, Mr. Peachey thinks, be John Peachi, Minister of S. Paul's, Walden, who afterwards became M.D. Caen, and an extra Licentiate of the College of Physicians of London.

Mr. Hollier.

"Mr. Holliard ye great Chirurgion in Warwick Lane was a poor boy in Couenterie, his father was a cobbler or at best but a poor shoe maker in Couenterie; and one Dr. Mathias (I think he was Queen Anne's Dr.) about yt time frequently coming to Combe Abby and using Couenterie much spoke to Abraham Ashby, an Apothecarie there, to help him to a boy to dresse his horses and ride along with him; and Mr. Ashby spoke to Mr. White ye school-master who told him hee could help him to one but his father was a foxing drunken fellow; and ye boy yt hee helpt him to was this Mr. Holliard ye Chyrurgeon; afterwards Dr. Mathias died and Mr. Holliard got himself a little monie and put himself prentice to Mr. Mullins his father of Shooe Lane and now hee comes to what hee is. Dr. Phipps likewise livd with this Dr. Mathias before Phipps went to travel."

This gossip about Hollier is interesting, and was evidently the contemporary belief. Hollier was the surgeon who cut Pepys for stone. He became Master of the Barber Surgeons' Company in 1673. I have given an account of him in "Occasional Papers of the Samuel Pepys Club," Vol. I., p. 58.

James Molines, to whom Ward says Hollier apprenticed himself, was "surgeon for the stone," and was reputed the most skilful lithotomist of his generation. He died in 1639, and he was succeeded both at St. Bartholomew's and St. Thomas's Hospitals by his son, Edward Mullins, a turbulent and quarrelsome person. Edward Mullins was accordingly dismissed from his post at St. Thomas's Hospital in 1664, his place being taken by Thomas Hollier. Edward Mullins, however, was reinstated as fourth surgeon to St. Thomas's Hospital in December, 1660, and died in 1663. Ward adds a few more details of Hollier, for he says:—

"Mr. Charles Danvers married to ye daughter of one Mr. Holliard, a chyrurgeon, in London. Remember to write to him for a pair of gloves speedily." "Remember to write to Charles Danvers and to get intimate acquaintance with his father Holliard and to see Amputation made and Cutting of ye stone." "Inquire what ye vomit was wch Mr Brooks says Holliard gaue him wch was but a spoonful mixt with some other stuff wch made him vomit half a dozen times."

OBSERVATIONS ON DRUGS.

The properties of opium, laudanum, and antimony were the subject of considerable inquiry in Ward's time, and he makes several allusions to these drugs.

Opium and Laudanum.

"The praeparation of Opium in ye Shops is Imperfectly done by adding saffron, cinnamon, and other aromatical druggs to make itt into a Laudanum, whereas ye correction is better performed by a digestion of opium in wine yt is impregnated with an equal weight of Salt of Tartar, ye great power of wch Salt is to correct ye violent as well as ye Narcotick part of ye Medicine as may bee seene in Mathews his pill, wherein there is a great quantitie of white hellibore, and Salt of Tartar is ye great Corrector."

"Laudanum dissolud in a little Treacle-water and a little syrupe added to itt is excellent in some cases—a graine and a half or thereabouts." "After ye taking of Laudanum, I obserud yt they rise againe very sick and hott and their sleep was only a slumber." "Starkey told me that ye sleeping properties of Opium may bee separated so as to make itt a hinderer of sleep but ye sudorific and anodyne qualities cannot."

Laudanum, therefore, was at this time a solid, and was dispensed by the grain.

Antimony.—The composition and properties of antimony were still the subject of much inquiry, because, under the influence of Basil Valentine's teaching, it was looked upon as a universal panacea. In 1678—12 years after Ward's notes were made—there were no less than 106 preparations of the metal in more or less common use. Crude antimony was thought to be a mineral consisting of (1) a sulphur partly golden and partly combustible; (2) an undigested mercury of the nature of lead; (3) of a saline and earthy substance. Ward writes that—

"Antimonie hath much salt in itt but little metallic sulphur only much arsenical sulphur." "An antimonial (cuppe) is made of Iron in ye fashion of a horne." "Antimonie is a rare bodie betwixt sulphur and Lead, somewhat higher yn sulphur but lower yn Lead. Mr. Bartley greatly aims att ye Mercury of itt, wch I belieue hee thinks would open ye bodie of gold: and his reason is this because wee see how itt mixes with gold and merges itt as in ye Antimonial. Hee can allreadie separate ye good Sulphur from Antimonie and itt maks him in great hopes yt hee shall doe ye Antimonie only; hee saies there is an Arsenicall sulphur wch yet hee cannot get out and yt hinders his separation of ye Mercurie." "Antimonie melted with gold will make ye gold look just like itself if itt bee put in just when it is melted, but yn melt ye gold uppon ye Test againe and yt contrariwise flies away, itt purges and makes brittle ye gold yt is very certain." "Take ye emetike qualitie from Antimonie and ye Narcotick from opium and what canne they not doe."

CONCLUSION.

These extracts show the Rev. John Ward as a man of great versatility at a time when the prevailing type of mind was versatile. In many respects he was a true disciple of the Honourable Robert Boyle. Interested in medicine he would have made a good practitioner; a friend of Lower, as a physiologist he would have advanced the science. Willis could have utilised him, and had he stayed a little longer at Oxford he might have come under the spell of John Mayow, the most gifted of the band. Boyle had interested him in the new chemistry, and his restless curiosity led him into metallurgy and the more dangerous quest of the philosopher's stone. But with all this he was a dilettante—spoilt, I think, by the possession of a competency, hampered perhaps by ill-health. He was certainly ruptured, and he died at the early age of 52, probably of phthisis.

THE APPLICATION OF BONE-GRAFTING IN THE TREATMENT OF FRACTURES.¹

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UNTIL recent years bone-grafting has been an expedient used only in exceptional cases. But lately, owing to the work of Albee in America, and also to the large number of cases where a serious loss of substance in the shaft of a long bone has to be made good, the application of bone-grafts for the repair of fractures has become comparatively common. In fact, bone-grafting has been so much in vogue that there has been a tendency for zeal to outrun discretion, and so many failures and disappointments have resulted that it is liable to fall into discredit. When used properly, with due regard to vital and mechanical principles, it not only gives good results, but results which cannot be obtained by any other method.

The proposal that recent simple fractures should be treated by a sliding bone-graft taken from the broken shaft is unlikely to be widely adopted for good reasons. It is an operation requiring special skill and experience, and appears to do either too much or too little. In the great majority of recent simple fractures correctly applied axial traction, followed by early movements of the joints, will give rapid functional recovery which leaves nothing to be desired. For such cases bone-grafting does too much. In other cases where there is a persistent tendency to displacement of the fragments (for example, in the middle of the shaft of the radius or at the upper end of the femur) the little slender graft is not strong enough to maintain the osteo-synthesis, and the limb has to be immobilised for a long time in plaster.

Intra-medullary Bone Pegs.

Those recent fractures which require operative treatment usually present a displacement, which is caused or kept up by muscular tension or static conditions. The treatment required will thus be correct apposition and alignment, with as little interference as possible with the vascular and osteogenetic sheath of the bone fragments. Such a method of treatment is found in the application of an intra-medullary bone peg—a method which I venture to think is not sufficiently known or applied. The operation finds its simplest and most typical scope in the treatment of a fracture of the radius, where both ends are displaced towards the ulna, a condition which is almost certain to lead to synostosis unless this displacement is corrected. The pegs, which are 1 to 2 inches long, are made in sets of 8, varying in thickness from $\frac{1}{8}$ up to $\frac{1}{2}$ inch. Each has a small boss or ring at its centre, by which it is prevented from being pushed too far into one fragment. Three conditions limit the scope of the use of the simple intra-medullary peg: (1) the case must be a clean one; (2) there must be no comminution of the fragments; and (3) the fracture should be nearly transverse. (Figs. 1, 2, 3.) If used for the femur the short intra-medullary peg will not serve to maintain correct alignment and bowing will inevitably occur unless a suitable moulded splint or a walking calliper is used.

The bone-peg constitutes the simplest and most efficient type of bone-grafting for fractures that can be devised. The peg becomes rapidly permeated by living tissues and is incorporated by them in a period varying from 3 to 18 months. The bone-graft may have a double function to perform. First, it has to act as a mechanical strut or splint, and for this it requires strength and accurate fitting; secondly, it may have to take the place of lost bone; if no bone has been lost the graft will become absorbed. It is a consideration of these facts which should determine the choice between a dead beef bone or living autogenous grafts. If the graft has merely to act as a temporary nail or peg then the advantage is with the dead bone,

¹ A lecture delivered at the West London Post-Graduate College on Feb. 13th, 1920.