

# THE LIFE AND WORKS OF GUILHELMUS FABRICIUS HILDANUS

(1560–1634)

by

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PART II\*

SURGERY

As a surgeon Fabricius was enterprising and skilful. Sudhoff (1910) said he had the intuition of Paré. He operated on all sorts of surgical conditions, both in the realm of general surgery and that of the surgical specialities as we would call them today. His contributions to amputation and lithotomy have already been mentioned; his activity in other branches of Surgery will be considered presently. His experience grew with the years, but he was careful not to let his enthusiasm run away with him. If he considered that the prognosis of a given case was hopeless he declined to operate. His great inventive faculty is revealed in the numerous instruments and pieces of surgical apparatus he either invented or improved to meet the exact requirements of a particular branch of Surgery. Almost all the instruments and apparatus illustrated in his works were of his own design. Ahrens (1865) stated that 200 such illustrations were included in the 1633 manuscript of the collected edition of his works—too many in fact to publish. Gurlt's (1898) textbook contains two plates of illustrations taken from the 1646 edition of 'Opera quae extant omnia'; seventy-two items are included.

He was familiar with the history of Surgery and collected old works in his library (Reber, 1909). He deplored the low standard of Surgery in his time and like Ambroise Paré he devoted himself to raising it from the handicraft of the barber to the dignity of a scientific profession. The status of Surgery was somewhat better in Venice than in Germany, but even in that town there were those called surgeons who came from the dregs of the population (letter to Fabricius from Wesling, quoted by Platt, 1905). In both Switzerland and Germany quacks and empirics were universal. These men had no scientific education and learnt as best they could. Fabricius knew an old lithotomist and rupture-cutter in Burgundy who was one of the most skilful of his kind. He started by castrating calves and pigs and progressed to stone-cutting, amputating limbs, removing tumours and extracting dead foetuses. The empirics cared little for human life and were prepared to gain experience at any price. Once when Fabricius refused to amputate a limb in a seventy-year-old marasmic man with senile

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gangrene, a barber came along and amputated it. The stump became gangrenous and the man died. On another occasion he declined to operate on a girl of ten who had a goitre the size of a goose-egg, affecting her voice and breathing. Fabricius considered that the danger of haemorrhage was too great. Soon afterwards she was seen by an empiric who promised easy and safe removal of the goitre; the girl died during the operation.

The regulation of Medicine and Surgery at Berne in 1618 was deplorably low. Ignorant men and even executioners practised Surgery and prescribed and prepared medicines. A woman given a potion by one of these men became blind and suffered from severe headache as a consequence. In his letters to his friends Fabricius expressed his strongest disapproval of the actions of these empirics and 'bunglers'. 'Christian pity and compassion often make me weep over the activity of these men', he wrote in a letter to Dr. Burgauer at Schaffhausen. He fought hard for the introduction of proper regulations governing the practice of Surgery, and had the courage to reproach the Authorities for allowing and even encouraging empiricism and bungling.

It would be desirable, [he wrote], that Princes and Governors and other ruling bodies, to whom this comfort and well-being of the community is entrusted, should deprive such inexperienced men of their practices and forbid and abolish their malicious doing (Pfennig, 1934).

Another means used by Fabricius to raise the standard of Surgery was the stress he continuously laid on the importance of a thorough knowledge of Anatomy. Other surgeons, notably Henry de Mondville in the Middle Ages and Ambroise Paré more recently, had done likewise but, as Fabricius wrote to Dr. Peter Uffenbach at Frankfurt, 'While the young surgeons should apply themselves to the study of Anatomy, they make music, read the owl-glass, drink, fornicate, enjoy themselves or adorn their rooms and waste their time.' His public dissections at Lausanne and Geneva and his book *On the Excellence and Use of Anatomy* were practical examples of Fabricius' efforts in this direction.

His contributions to various branches of Surgery will now be considered under the following headings: General Surgery; Obstetrics and Gynaecology; Oto-rhino-laryngology; Orthopaedics; Ophthalmology; Neuro-surgery; Genito-urinary Surgery.

### *General Surgery*

*Hernia:* Fabricius remarked upon the rarity of the radical cure of inguinal hernia and strongly favoured conservative treatment. Good trusses were available and in the 1620s locksmiths were making them from iron. By enforced rest and the continuous wearing of a truss for several months, one well-known person was cured of his hernia only to become 'ill of the stone' after the cure. Fabricius emphasized the risk of the development of urinary calculi which was inherent in this regime. He thought that medicines might be of use especially in the elderly, but only if the patient rested; adstringents were of doubtful value. Operation was a final and extreme measure and was not to be undertaken

lightly. He performed reduction of strangulated hernia with the patient's buttocks raised and his head lowered (Schaefer, 1898). He must have realized the risk involved in this manœuvre as he described a case in which a preternatural anus developed after a strangulated hernia.

*Gall-stones:* Fabricius is credited with the first surgical removal of a gall-stone in 1618 (Leonardo, 1943).

*Cancer:* If the growth was too large for excision, it should be treated with demulcents. He opposed the use of caustics having seen the severe damage caused by arsenic and ung. aegypt.; he was also against the use of emollients. Fabricius was the first surgeon to remove the axillary glands in cancer of the breast (Neuburger and Pagel, 1903). Platt (1905) stated that as far as the anatomical part of the operation was concerned, Fabricius' operation was much the same as that performed by American surgeons in the 1880s. Fabricius' case had a scirrhus tumour of the right breast with three axillary swellings, one the size of an egg and another the size of a hazel-nut. The details of the operation were given by Ahrens (1865). With the arm moderately raised, a longitudinal incision was made over the largest axillary swelling, which was then largely mobilized with the finger-nail, taking care not to injure the vessels. It was then grasped with ring-forceps and retracted. Vessels passing over it were ligated and the gland removed; the other two glands were similarly removed. The breast tumour itself was then removed through an incision which encircled it. The mass was partly shelled out with the finger and partly cut out; blunt dissection diminished the haemorrhage.

*Bites of mad dogs* were treated by scarification of the wound with a lancet and washing with a solution of theriac and sea-salt in vinegar. The actual cautery was also used. The wound was dressed with cotton soaked in tincture of theriac and a plaster applied. The scab was excised and twice daily dressings continued. He described the occurrence of mental derangement and generalized convulsions as a result of a bite by a mad dog. The convulsions persisted intermittently for forty days but four years later the patient was alive and well.

*Frenulum of tongue:* The operation of freeing the frenulum was not dangerous provided the incision was not too deep. Re-union was less likely if several incisions were made. Fabricius had seen tetanus follow this operation when performed clumsily by a quack.

*Liver:* In an abdominal wound with a piece of liver protruding through it Fabricius removed the offending piece of liver. The patient died three years later and post-mortem examination confirmed the absence of part of the liver (Schaefer, 1904).

*Weapon-Salve:* This had been popular for over a century before Fabricius' time and remained in use until the early eighteenth century (Graham, 1939). It consisted of moss from a thief's skull, mummie, human fat and blood, linseed and rose oils, bole (a coarse red pigment) and boar-fat. Dried earthworms, boar's brains and sandalwood could also be included (Ahrens, 1865). The salve could be used in all wounds inflicted with iron except those involving the brain

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and major vessels. It was applied, not to the wound itself but to the weapon which had caused it. The weapon was to be anointed every two or three days until the patient recovered; if the weapon were not available, a willow twig was introduced into the wound, moistened with blood and stuck in the salve. The wound itself was washed daily by the patient and usually healed well. Harvey Graham (1939) and Leonardo (1943) state that Fabricius believed in the mystical properties of the weapon-salve but I doubt this. He did it in fact discuss its use in a long chapter in 'Von dem Gliedwassersucht' (quoted by Gurlt, 1898), and wrote 'Diaboli autem instinctu a Paracelso superiore saeculo introductum fuisse, nemo negare potest' (It cannot be denied that this salve was introduced in former times through the incitement of the Devil and at the instigation of Paracelsus.) Gurlt stated that Fabricius rejected it absolutely.

*Issues and Fontanelles:* These were devices such as a pea or a metal cylinder inserted in the superficial tissues to produce suppuration (Underwood, 1955). Fabricius was a great believer in the efficacy of fontanelles. He made them by applying corrosives with a silver instrument to an area of skin which had been moistened with saliva.

*Seton:* This was a means for producing counter-irritation and Underwood (1955) defines it as essentially a cord of silk or cotton inserted through the soft parts and left to drain away the resulting pus for a period of a year or more. Fabricius described his own method of inserting a seton 'without fire' in Cent. I, Obs. 60 and I have translated it from *Wund-artzney* (Fabricius, 1652) as follows:

As there is no procedure in the whole of Surgery that terrifies the patient more than the burning hitherto used by the surgeon to insert a seton, I applied my mind several years ago to the invention of a more pleasant and acceptable method of doing this. I fulfilled my wish and used it on many ordinary and distinguished people in Cologne and Lausanne. This is how I do it: the patient is prepared beforehand by diet, purging and blood-letting as required by his illness and its duration. The forceps here illustrated are kept ready. (They have two holes opposite each other at the business end of the instrument, and the handles can be locked.) The patient is placed on a low bench and a line drawn in ink down the middle of the back of the neck; the points where the seton is to be inserted are marked by a dot on either side of this line. The skin over the 2nd and 3rd or 3rd and 4th cervical vertebrae is picked up by my assistant's fingers and held still so that the ink dots are visible through the holes in my forceps. I now stand in front of the patient and place my foot on his and press his head into my abdomen so that I have him under my control. Gripping the forceps in my left hand, I take up (with the right) not a red-hot needle, but a cold silver knife, small, pointed and double-edged like a lancet. With this I bore through the skin now grasped by the forceps. Then I draw through the hole so formed a needle to which is attached a round cord of white or purple silk of such thickness that it almost fills the hole. It is 4 spans long and goes round the neck and hangs on to the breast.

#### *Obstetrics and Gynaecology*

Fabricius deplored the low standard of Midwifery in his time. The midwives were a wretchedly ignorant lot, with no knowledge of the Anatomy of the female pelvis. If they called for medical aid at all, it was usually too late.

Maternal death in labour or during the puerperium was common and morbidity from the sequelae of difficult labours was high. Citing a case in which the placenta had been retained for ten days, giving rise to a putrid vaginal discharge, Fabricius wrote: 'O that all midwives had the skill to remove manually the placenta before the cervix closes, which experience has taught me can be done easily and safely' (Ahrens, 1865). Again in a letter to Dr. Croquerus, he said: 'If only midwives would recognize how very important retention of the placenta is, many mothers would be saved, who, rescued from Scylla, fall through the ignorance of the midwives into Charybdis'.

Fabricius was fortunate in having a wife who was a skilful obstetrician and who was often present at difficult cases. The commonest obstetric manoeuvre was the extraction of a dead foetus. Up to 1623 he had done this forty times and his wife thirty times. Often the foetus had been dead in utero for some time, as long as three months. On 29 April 1629 Fabricius' wife extracted a dead foetus instrumentally after failing to do so manually; it was the first occasion for this to be performed in Berne. Fabricius wrote little about his methods, partly because of the difficulty in laying down hard and fast rules for a complicated and difficult operation, and partly because he feared that empirics might abuse his methods. Indeed, empirics at Lausanne and Peterlingen had learnt of his operation and then mishandled and killed pregnant women. Fabricius condemned the use of sharp hooks for the purpose but sanctioned the use of non-cutting hooks or those guarded by an iron plate (*Defensorium*). He advocated traction on the head rather than the feet and performed cephalic version. He removed digitally a mole, the size of a foetal head which was adherent to the uterus. He considered the use of hooked instruments for this purpose to be dangerous and invented a spoon-shaped forceps. He recognized the danger of rupture of the uterus following the use of expellant drugs. The state of the maternal passages should always be determined prior to their use and if too narrow they should be made soft and slippery. He had seen separation of the hip-bones from the sacrum occur as a result of difficult labour. The following case-history gives a classical picture of rupture of the uterus as a result of obstructed labour due to transverse lie. The tragic outcome shows how inadequate the treatment was even in the hands of Fabricius' wife.

A gravida-3 went into labour at term with very severe pains. The membranes ruptured and blood flowed freely. Next, the right arm of the foetus prolapsed and the pains ceased completely after one hour. When seen on the *fourth* day by Fabricius' wife, the patient was febrile and complained of severe pain in the hypochondrium and was vomiting. The abdomen was anointed with fat and the prolapsed arm returned. The labour pains did not return after internal manipulation or the administration of purgatives, cardiac stimulants or anodynes. The patient eventually died on the seventh day. Post-mortem examination showed a transverse lie with the right arm prolapsed. The left hand and right leg were firmly fixed to the body by the cord which encircled the body twice. The uterus was ruptured and the left foot lay free in the peritoneal cavity. Fabricius also reported a fatal case of uterine rupture caused by a

fibroid obstructing labour. It is surprising that Fabricius, with all his surgical daring, did not resort to Caesarean Section in such otherwise hopeless cases. He certainly knew of the use of this operation to obtain a living child from a live mother but he seems to have reserved it for removing a retained dead foetus (Ahrens, 1865).

In the realms of Gynaecology, he prepared cork pessaries for the treatment of prolapse of the uterus; ball- and pear-shaped ones were used alternately and the cork was impregnated with molten wax. For the treatment of dyspareunia due to the disproportionate size of the phallus, he designed a piece of cork bent to the shape of the pubic bone and padded with wool. It was fixed in position with bands and a hole provided for the phallus. The thickness of the cork depended upon the size of the organ.

### *Oto-rhino-laryngology*

In 1595 at Geneva Fabricius removed a glass ball from the ear of a girl of fifteen. It had been there for five years during which time the girl had suffered from convulsions and paralysis of one side. She made a complete recovery after its removal. Fabricius designed an instrument for the purpose which was very similar to the one he used for removing shot from gun-shot wounds (see above); it consisted of two tubes and a borer. In 1605 he removed a fleshy excrescence from the external auditory meatus of a nineteen-year-old girl who gave a ten-year history of otorrhoea and deafness but no pain (Ahrens, 1865). Ligatures were placed round the pedicle of the tumour and tightened daily by special forceps of Fabricius' own design. On the seventh day of treatment the tumour came away and the root was cauterized twice daily for two days. Eight years later the patient was still well.

For deficiency of the palate due to ulceration he devised a palatal obturator which consisted of a silver plate with a sponge on its upper surface. Whereas previously the patient could hardly articulate, speech was now perfect.

Nowadays affections of the uvula are a rarity. Fabricius, however, was very familiar with them, and described enlargement of the organ and various forms of treatment. Conservative treatment was by the local administration of a styptic powder of the following composition: Flor. Ros. rubr.; Balaust; C. Granat; Fol. et Flor. Scabios; Ligustri Irid. flor.; Torment. Gallae. Lap. Calamin.; Alum. ust.

The powder was applied by a special instrument which consisted of a tube bent at one end, to which was soldered a small copper spoon for holding the powder. To the other end of the tube was fixed a small leather bag which acted as an insufflator. The instrument was introduced into the mouth so that the spoon lay close to the uvula. Strong drugs should not be used on the uvula, as Fabricius had seen swelling of the neck and even death follow their use. He advised excision of the organ in a case in which its swelling almost filled the buccal cavity. Forceps and scissors could be used for the purpose, or alternatively ligatures applied by a ring-shaped ligature-holder on a hollow handle.

Fabricius was also interested in the removal of foreign bodies from the pharynx. Sometimes they could be dislodged by induced vomiting but instrumental removal was more usual. He improved the instrument invented by von Ryff at Strasbourg which was essentially a tube  $1\frac{1}{2}$  feet long, the foreign body sticking in the lower end. Fabricius bent the tube and made multiple holes in it. A sponge or lead ball on a thread was lowered when the instrument had been passed; the foreign body passed through one of the holes and was trapped and removed by the sponge.

He also invented a complicated instrument for the removal of nasal polypi.

### *Orthopaedics*

Fabricius' interests extended to Orthopaedics, and in 1613 he was the only surgeon in Lausanne who treated fractures and dislocations (Ahrens, 1865). Fractures were reduced by traction and then immobilized by external splints. Fractured femurs were reduced by applying traction to the knee while an assistant exerted counter-traction on a sling which was passed between the patient's thighs. Alternatively, Paré's block and tackle, modified by Fabricius and called *instrumentum trochleatum* could be used. Fabricius also devised an instrument called a 'remorra' (named after a fish which clings to ships). It consisted of two legs which were screwed to the table and exerted counter-pressure against the perineum. Thin metal splints covered in cloth were used for immobilization. Fabricius decried the use of juicy green bark because of pain at the site of fracture caused by movement of the fragments. He disputed the current teaching that shortening of the leg and a limp were inevitable after fracture of the femur, and proved his point by healing a girl in 1623 who had no limp after a fractured femur.

In *de Vulnere* published at Oppenheim in 1614, the case is described (Ahrens, 1865; Gurlt, 1898) of a 23-year-old man who was hit in the thigh by a shot while hunting boar. His femur was shattered and the soft parts badly lacerated. The ball which had been split in two was removed but the wound became gangrenous. Twenty-four pieces of bone were either extracted or expelled spontaneously. Fabricius was against removing fragments of bone too early; some would adhere to the periosteum and contribute to the anatomical restoration of the limb. He strongly condemned softening well-formed callus (as advised by a Graubündten doctor in this case) and the chiselling away of its irregularities. The patient took the baths at Bad Pfäfers, spending seventeen hours a day in the water and was eventually healed with an enormous callus. However, sequestra were being expelled some years later.

Fabricius kept a collection of fractured bones showing malunion and ankylosis. Some had been removed from cemeteries at his instigation. The treatment of deformities afforded Fabricius ample scope for the invention and modification of several pieces of orthopaedic apparatus, e.g. for the correction of club-foot and genu valgum. The latter consisted of metal splints with two parts, corresponding to the thigh and leg connected by an iron hinge. Progressive tightening of a screw over a period of time obviated the deformity. Ankylosis

of joints was treated with baths, cataplasms, fat, aromatic embrocations, emollient plasters and stretching apparatus. The simplest form of physical treatment was a basket filled with stones which was to be lifted hourly by the patient with an ankylosed elbow. He remarked that patients with ankylosed joints possessed greater power in the affected limbs.

There were various treatments for kypho-scoliosis. A kyphotic child of two was cured by wearing an iron plate for a year. This straightened the spine by exciting constant pressure on the projecting vertebrae. Spinal curvature after fractures was treated by laying the patient on a bench and applying two thick linen bands, one above and the other below the site. While traction was exerted on each, the surgeon manipulated the spine. If this failed, open reduction was performed.

### *Ophthalmology*

The first extraction of a metal particle from the eye is attributed to Fabricius' wife. The story is told by Fabricius:

A countryman bought some iron and was striking two pieces together to prove its quality when a splinter flew into his eye and stuck in the cornea, causing him great pain. The local surgeons tried everything for many days but to no purpose and the pain and inflammation so increased that he came to see me (in Berne) on March 5 1624. I used all the means I could think of for some days but the splinter was so small that it could not be removed by instruments; when behold! my wife hit on the very thing. I kept the eye open with both hands while she held a magnet as close as possible to it, and after several trials, for he could not stand the light long, we saw the iron leap from the eye to the stone (Leonardo, 1943).

Although it is commonly thought that this was the first magnet extraction of a metal particle from the eye, Nettler and Nettler (1947) state that Hieronymus Brunschwig described it in 1462.

Fabricius' usual method of removing foreign bodies stuck in the eye was by the use of a special pair of forceps and an instrument rather like a long ear-pick. The latter was pressed firmly against the cornea with the concave side towards the particle, and the patient was asked to turn his eye in the appropriate direction; the object impinged against it and was then removed with the forceps. He condemned the use of corrosives or the knife for the removal of corneal scars. He devised an ingenious method for dealing with an adhesion between the upper lid, cornea and conjunctiva following the excessively tight bandaging of a wound. The Italian surgeons held that this symblepharon could be treated only with the knife but Fabricius' patient refused this. A bent sound with a knob at one end was therefore passed between the upper lid and eye-ball at the inner canthus; it then passed behind the adhesion to emerge at the outer canthus. A fine silk thread was then tied to the knob and the sound drawn back to the inner canthus. The two ends of the thread were tied below the eye and a lead weight of about 1 drachm allowed to hang from it by day. After eight to nine days of this treatment the adhesion was cut, leaving a small corneal scar.

Fabricius was an expert in cataract operations. He regarded grey cataract

as a condensed substance flowing from the brain or arising from the stomach. Operation was contra-indicated if the pupil was angular and immobile. For the greater comfort of the surgeon he devised a hollow support for the surgeon's elbow, which could be screwed to the table (Cent. IV, Obs. 17, Fabricius, 1652). In 1609 Fabricius constructed the first model eye for the use of students (Cent. II, Obs. 1, Fabricius, 1652). It was complete with sclerotic and nerves and could be taken to pieces. The six eye muscles were represented by strips of red leather. He was unable to copy the aqueous humour because of its transparency.

Fabricius' treatment of an intro-ocular tumour is described in Cent. I, Obs. 1 (Fabricius, 1652). His patient was the Mayor of Lutry (a village near the Lake of Geneva). He presented with a hard scirrhus tumour projecting from the right eye with severe external and internal symptoms. Fifteen years previously, in 1581, he had suffered from severe right-sided hemicrania. Medicines were without effect. Fever, vomiting and weakness of the heart followed, and after ten weeks of agonizing headache the conjunctiva was eroded by a tumour. For fifteen years the tumour lay quiescent behind closed lids. It then started growing quickly and protruded through the lids; within six months it reached the size of a goose-egg. It was irregular, bluish and covered by large vessels. Extirpation was effected as follows: the free portion was secured in a little leather bag (*crumena*) which laced up at one end like a money-bag. Using his own knife Fabricius removed the tumour in the time it takes a man to make ten steps with the loss of barely 2 oz. of blood. (Ahrens, 1865). The knife was bent to conform with the curvature of the orbit and fitted with a knob at the end to prevent damage to the bone. Haemostasis was secured with powder; the actual cautery was not used. The patient recovered. The case was discussed recently by Koelbing (1954), who states that the tumour was a slow-growing malignant melanoma of the uvea. Fabricius explained its causation entirely on the basis of the Gallenic theory of humours and postulated a series of three causes. The first was the patient's inordinate manner of living—excessive eating and drinking. Secondly, the winter of 1580 was very damp and the patient's limbs were no doubt filled with unused humours, which were driven to the head by the heat of the liver. This resulted in the patient's symptom of severe hemicrania. Finally, the humours which had been shut off in the head gushed out forcibly through the right eye. This theory acted as the basis for treatment, of which operation formed only a part. The patient had to endure two weeks' pre-operative purging, and after the wound had healed a seton was inserted into the back of the neck and a fontanelle made in the arm to allow the evil humours to exude.

### *Neuro-surgery*

Fabricius disagreed with Felix Würtz that depressed fractures of the skull should not be elevated, but rather left to Nature. In fact Fabricius produced an instrument of improved design, called an 'Elevatorium' expressly for the purpose of raising such fractures. The description of the instrument and the method

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of using it are given in Cent. II, Obs. 4 (Fabricius, 1652). He warns all surgeons operating on the head that a warm room is essential. When he himself operated on head wounds he always had a pan filled with coals brought near to the wound.

He cited cases to prove that insanity might result from cranial injuries (Leonardo, 1943), and was familiar with crossed paralysis and aphasia following these injuries. He emphasized that unexpected collapse and death might follow a relatively trivial head injury (Nettler and Nettler, 1947).

#### *Genito-urinary surgery*

Fabricius' master work on Lithotomy has already been mentioned. He treated carcinoma of the penis by amputation, controlling the haemorrhage with pressure and styptics. He operated on phimosis and found this condition to be a common cause of marital breakdown owing to impotence. From his experience of examining these cases for the authorities he advised premarital examination of the male.

For the treatment of urinary incontinence in the male he recommended the use of three urinals, one for each position the patient might adopt while lying. This was too cumbersome so he invented an urinal which could be used in all positions. It consisted of a tin, copper, or glass bottle with a bent neck, which could hold 1–1½ pounds of urine. Later, he invented one which could be worn for riding; this consisted of a cow's bladder attached to a curved wooden tube.

He operated on hydrocele by his own method. The whole integument was ligated with a double thread on a curved needle, care being taken to avoid the spermatic vessels. Each layer of the integument was incised longitudinally under the ligature and the fluid eventually released slowly. Tow soaked in albumen was then packed into the sac. Later, a digestive was applied to make a scar.

Another of Fabricius' inventions was a suspensory bandage which was attached to the shoulders.

#### CHARACTER

Fabricius was a remarkable man. Though restless and migratory by nature, he accomplished a prodigious amount of work of high standard, but his modesty was such that he wrote in 1617: 'My own things displease me more with time.' His medical ethics were an enduring example. He was on the friendliest terms with the physicians and always called one in before undertaking a major operation. He was loyal to his colleagues and detested all back-biting and unscrupulousness. On the whole he enjoyed the affectionate confidence of his patients, but sometimes they were ungrateful and their relatives disrespectful.

He had a rational view of disease and took into account such factors as the age, sex, constitution and habits of his patients. The time of year also had to be considered. Nevertheless, he was to a certain extent the victim of current mysticism. In a letter (*Epistola de prodigiosa puellae Coloniensis inedia*, 1604), he described the incredible case of a fourteen-year-old girl at Cologne who lived for three years without food or drink and without passing excreta. 'She

had a melancholic face but was not wasted.' He always carried a charm of arsenic and toad-powder around with him as a protection against plague (Schaefer, 1904).

As a scholar he was highly cultured and philosophical. He admired beauty, and had a warm feeling for the beautiful things in Nature. His kindness towards his patients and friends was proverbial. The superstition, obscurity and cruelty so common in his time particularly offended him, and he did not spare himself in trying to improve the lot of suffering humanity. In association with Dr. Wierus he fought openly, and with determination against witchcraft, and he had the courage to petition the Elders of Berne in no uncertain terms against the terrible tortures inflicted before trials. The picture of the agonies suffered by many innocent people is terrifying. He even prepared the skeleton of a tortured criminal, fixed the shattered pieces of bone with brass wire and presented it to the Elders.

Fabricius was a true Christian and was never ashamed to acknowledge his firm belief in Christ. His works are interspersed with numerous Biblical references. He believed in the divine right of physicians to practise and wrote:

Whosoever should be ungrateful to a faithful and industrious physician, being ordained by God, whether in word or deed, much more by keeping back his reward (of which sort I have seen many), he may easily persuade himself that God will be avenged of him for the labour and trouble which the Godly, honest and faithful physician hath undergone for the sick man's sake (Platt, 1905).

He corresponded with many theologians and recommended the offering of prayers before major surgical operations. Fabricius' own daily prayer is set out in *Lacrumae Aeternae* which was written by Fabricius' only surviving son John. A copy is given in German by Schaefer (1904) and I have translated it thus:

O, Everlasting, Most Gracious Father, who, after the sad fall of the first parents of all men, hast ordained that they should eat their bread by the sweat of their brows, and that all our care, toil and work without Thy Blessing are in vain, I pray Thee, O God, from the bottom of my heart that with Thy Grace and the strength of the Holy Ghost, Thou wilt succour me in this profession in which I serve Thee and my fellows according to Thy will, that whatsoever I have done, or set about today or throughout my whole professional life, it may prosper the Honour of Thy Holy Name, the growth of the Church, the profit of my neighbour and finally the salvation of my soul. Because Thou, O God, has willed that I should work in a profession that deals not with gold or silver but with the noble body of Man, give me, I pray Thee, knowledge and understanding that I may practise my profession with skill and truth and undertake nothing thoughtlessly, at random or hard-heartedly. And because every drug by itself is as it were without strength and the expected results cannot be fulfilled without Thy Blessing, I pray Thee that Thou mayest give power to all the drugs which I administer to my patients that they may work well, alleviate pain and restore patients to their former health. Finally, O Everlasting God, lighten my heart, shine light into the hearts of my patients, that we adhere not to outward things or arrogantly attribute recovery to our toil and diligence or to the peculiar power of drugs, but rather to the power and loving kindness of God, and therefore always raise our hearts and hands to Thee who art in Heaven, praise Thee, honour Thee,

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glorify Thy Name and wonder at Thee, so long as we are here on earth. This, O Bountiful God, I ask in the name of Thy Son, Jesus Christ, our own Master and Saviour.

SUMMARY

Fabricius was born at a time when the Renaissance of Surgery had started and was already under way. He practised both in his fatherland of Germany and in Switzerland, where he lived for a great part of his life. Up to an advanced age he had an irresistible passion for travelling and visited France and Holland, as well as covering a great deal of Switzerland and Germany. He was highly industrious, a talented scholar and a skilful surgeon. His mental activity was untiring, and he was still working on his books when death overtook him. Among his many contributions to Surgery may be listed his pioneering of amputation of the thigh for which he invented a special tourniquet, the use of the magnet for removing metal particles from the eye, the excision of involved axillary glands in a case of cancer of the breast, the first classification of burns into three degrees with appropriate treatment for each variety and the first description of a medical field-chest for military use.

He has been called the German equivalent of Ambroise Paré, the famous French surgeon who was born half a century previously. There are indeed many points of similarity between the two. Starting their professional lives as apprentices to barber-surgeons, they worked their way up eventually to occupy foremost positions in Surgery. Neither had the advantages of higher education; Fabricius at least had a good knowledge of Latin and was familiar with Greek, which is more than could be said for Paré. Both were skilful, enterprising surgeons who, besides contributing to the technical advancement of Surgery, devoted themselves to raising their craft to the level and dignity of a scientific profession. They shared an interest in Anatomy, Lithotomy and gun-shot wounds. Paré was a great military surgeon with vast practical experience in the field, but the fact that Fabricius had never been into action did not deter him from writing on military Surgery. They both possessed remarkable powers of observation and both were prolific authors. Their vast store of knowledge and experience was thereby disseminated to doctors throughout Europe. In spite of differing with Paré's views on the use of ligature for haemostasis in amputation, Fabricius thought highly of him and described him as 'a very industrious author and a most excellent, highly experienced and skilled surgeon'. To a greater extent than Paré, Fabricius interested himself with such purely medical (as opposed to surgical) subjects as Epidemiology and Spa Therapy. In fact Fabricius' field of knowledge was so extensive that it encompassed practically all aspects of Medicine. While fully prepared to accept the new, he was not so ready as Paracelsus to cast aside the old, and 100 years after Paracelsus had publicly burnt the works of Avicenna, Fabricius was still quoting his dicta. Fabricius' outlook on life was considerably broadened by his extensive correspondence with the scholars of the day and his philanthropy exhibited itself in many ways. His firm belief in Christ pervaded all his works.

For centuries Fabricius remained one of the foremost surgical authorities not only in Germany and Switzerland but throughout a large part of Europe. He was easily the most famous German surgeon of the Renaissance and well deserves the title of 'Father of German Surgery'.

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APPENDIX

FABRICIUS' WORKS

- De gangraena et sphacelo*, d.i. vom heissen und kalten Brande. Cologne, 1593; Geneva, 1598 (Latin), 1669 (French); Lyons, 1598, 1658, 1696; Basle, 1598 (with *Selectae obs. chir. quinque et viginti*), 1600, 1603, 1615; Oppenheim (10th ed.), 1617.
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- Ibid.*, centuria, in qua inclusae sunt viginti et quinque. Basle, 1606.
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