VESALIUS AND PARACELSUS

by

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Introduction

As we commemorate the four hundredth anniversary of the death of Andreas Vesalius, our thoughts may turn to another sixteenth-century figure who made an epoch-making contribution to medicine: to Paracelsus.[1] At first glance, they seem as much alike as fire and water. Their life and work had its setting in different cultural milieus. The tempestuous character of the German reformation era set its stamp upon the thought and career of Paracelsus. It is the influence of Renaissance humanism which gives its characteristic tone to the work of Vesalius and manifests itself even in his stylistic excesses.

What two personalities could be more contrasted than Vesalius, with his curled beard, his courtly bearing, his Ciceronian eloquence, and Paracelsus, coarse and strident, with the appearance, in stature and raiment, of a barber-surgeon? Some episodes from the life of Johannes Oporinus (1507–68), the Basle printer, whose path crossed that of both men, illustrated the contrast.

Paracelsus—Oporinus—Vesalius

When Vesalius decided to have his masterpiece printed, he did not choose to entrust it to the great Italian printing centre of Venice, but had the plates transported on muleback on a long and hazardous journey through the Alpine passes to Basle and to Oporinus. The *De Humani Corporis Fabrica*, when printed in 1543, carried a long and courteous epistle from Vesalius to Oporinus. There was an especially sympathetic relationship between them, and Vesalius knew that the Swiss printer would spare no sacrifice in order to produce the book in accordance with the highest standards of book production. In fact, the second edition of the work in 1555 was an even greater example of the sixteenth-century typographer's art than the first one, and it has been difficult to understand how Oporinus could have expected any returns from the venture.[2]

The same Oporinus had, in his youth, chosen to become the famulus of Paracelsus in the hope of imbibing some of his master's medical knowledge. The wandering existence of Paracelsus, which he shared for several years, was a severe ordeal for the timid scholar. When in later years in a letter that has become famous he penned an account of his experiences—the best eye-witness

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[1] A juxtaposition rather than a comparison of the lives and works of Vesalius and Paracelsus seems to have formed the subject of a small doctoral thesis, just over a century ago: Grundhoff, Ivan Hermann Werner, *Andreae Vesalii et Theophrasti Paracelsi instauratorum artis medicae Germanorum vitae et merita*, Berlin, 1860. It is listed by Julius Pagel, Zum hundertjährigen Jubiläum der Universität Berlin, *Janus*, 1909, **14**, 794–817 (p. 808), but was not accessible to the present authors. Their attention was drawn to it by Prof. J. O. Leibowitz of the Hebrew University, Jerusalem.

[2] Roth, M., *Andreas Vesalius Bruxellensis*, Berlin, 1892, pp. 224, 262. O'Malley, C. D., *Andreas Vesalius of Brussels*, Berkeley and Los Angeles, 1964, pp. 130 *et seq.*

account of Paracelsus we have—he wrote like someone who had awakened from a nightmare.[3]

Oporinus narrated how the master was in the habit of flourishing his sword at the ghosts he saw in his chamber; or how he would roughly pull his terrified famulus out of bed in the middle of the night to dictate to him. After an apprenticeship of four years, Oporinus returned to resume a more tranquil existence and became Professor of Greek at Basle.

It should be added, however, that Paracelsus set great store by the services rendered to him by Oporinus, especially in the upheaval which followed his sudden departure from Basle in January or February 1528. He remembered him as his trusted and faithful assistant. Oporinus, in turn, kept the memory of Paracelsus in high regard: to the Paracelsist Toxites, he apologized somewhat for the letter, implying that he had been prevailed upon to write it. In Toxites' words: 'Oporinum paenituit Epistolae, quam ad D. Vierum de Theophrasto scripsit, dixitque eodem tempore mihi ab ipso fuisse emendicatam epistolam.'

He would not have written it, had he known that it would be published. Toxites himself found in the letter more praise of Paracelsus than denigration, and called upon Oporinus to confirm the life-saving virtue of the laudanum of Paracelsus.[4] Finally, it was Oporinus through whom Paracelsian manuscripts came into the hands of the Paracelsians of the first generation.[5]

The 'Anatomy' of Paracelsus

Vesalius had no occasion to mention the older man in his writings.[6] Nor were the anatomical researches of Vesalius likely to have appealed to Paracelsus as marking a great advance in the art of medicine, had he lived to see the publication of the *De Fabrica*.

Paracelsus often mentions and is deeply concerned with 'Anatomy'.[7] It will be useful to set out the various meanings he attaches to the term, before dealing with the most important one for the purpose of comparison with Vesalius.

The nearest Paracelsus comes to using the term in its ordinary usage is when he says that wounds are to be considered in the light of the anatomy of the various members and systems.[8] He also uses the term occasionally for morbid

[3] Pagel, W., *Paracelsus, An Introduction to Philosophical Medicine in the Era of the Renaissance*, Basle and New York, 1958, pp. 29–31. Oporinus' account was in the form of a letter to Solenander and Wierus, the Latin text of which was given by Dan. Sennert, *De Chymicorum cum Aristotelicis et Galenicis Consensu*, 1619.

[4] *Onomastica II: I. Philosophicum, Medicum, Synonymum. II. Theophrasti Paracelsi*, Strassburg, 1574, p. 451 (sub: *Laudanum Theophrasti*).

[5] Pagel, W., 1958, p. 31.

[6] Johann Guinther of Andernach (1487–1574), among Vesalius' teachers on the Medical Faculty at Paris and an extreme Galenist, studied chemistry in his seventieth year and became a Paracelsian. See *Ioannis Gvintherii Andernaci . . . de Medicina veteri et noua tum congnoscenda, tum faciunda Commentarij duo*, Basle, 1571.

[7] In the seventeenth century, Paracelsus was credited with skill in dissection, e.g. Dr. Charles Goodall, writing of 'that profound chymist *Borrichius*', wrote that '. . . so far was this generous soul, from esteeming it an honour for *Paracelsus* . . . to be thought an adversary to Anatomy; that his learned pen hath been particularly engaged to vindicate him from that aspersion so unjustly cast upon him by *Conringius*; and therefore he acquaints the world with *Paracelsus* his great industry in the dissection of several Animals; and gives this following account of that great estimation, that famous chymist had for Anatomy. . . .' (*The Colledge of Physicians Vindicated*, etc., London, 1676, pp. 105–6.)

[8] *Buch Serogolia*, Sudhoff V, pp. 413 *seq.* (? genuine Paracelsian).

anatomy (pathological anatomy): 'in the brain there has been found through anatomy a small worm that has pierced *pia* and *dura mater* . . . also were found (some worms) in the heart through anatomy, also in the region of the spleen and gall, but not in urine'.[9]

Other meanings are:

Anatomy meaning the morbid disposition of individual organs: '. . . in this form anatomy should be observed, as diseases distribute themselves therein and which places are prone to which diseases. It is better to know how menstruation lies than how the uterus lies—for what causes the disease: the locus or the menstruum?'[10]

The true working mechanism of anything: it teaches 'woraus doch der mensch gemacht sei oder worin er stet oder was in im ist oder was er ist'. Ignorance of true anatomy accounts for ignorance of stone formation in the body, which is *tartarus*—unknown in medicine up to Paracelsus.[11] A similar meaning is that of anatomy as the intrinsic power and virtue of a thing: 'if the virtue which makes flesh errs and oversteps its anatomy, fungi will grow. . . .'[12] Anatomy as the functional disposition inherent in any object: a special form of salt has the property of 'distilling itself up and down in its anatomy, a process called *reverberatio*'.[13]

The acting mechanism and situation of the *various* (*mancherlei*) species of salt, sulphur and mercury by means of which the 'workman' that is active inside natural objects achieves his 'alchemy'—the 'archeus' or 'vulcanus'—has a certain anatomy. From such anatomy follows knowledge of herbs and their virtues.[14] It decides cure: 'if ye know what arsenic is, cure arsenic with arsenic according to its anatomy, as anatomy tells you. Gold strengthens the heart and the power, therefore in the anatomy of water, gold is the heart, luna the brain' (water being the matrix of minerals).[15]

Anatomy in the last-mentioned sense is connected with *Magic*: it belongs to magic and must be interpreted magically: 'as chiromancy is an inventor of art, if handled according to kabbalistic art, so also physiognomy and anatomy if treated according to magical interpretation—here lies the art of composition of recipes'.[16] Another passage states that magic is the anatomy of medicine. As a butcher dissects an ox, and it is possible to see everything inside, in the same way magic dissects the bodies of all remedies.[17]

Paracelsus also uses anatomy as 'form' (directing morphogenesis). The anatomy of coral and of syphita (i.e. a form of psychic disturbance such as chorea and somnambulation) is the same 'tree' and the same *form*, but not the same corpus. In this sense anatomy is the theory of medicine.[18]

None of the above meanings of anatomy have anything to do with *Anatomia*

[9] *Kolleg der Paragraphen 14 Bücher*, Sudhoff V, p. 215.
[10] *Buch von Blatern, leme*, etc., Lib. II, cap. 2, Sudhoff VI, p. 334 and cap. 3, p. 336.
[11] *Autogr. Entwürfe z.d. Büchern über Tartarus*, Sudhoff V, p. 136.
[12] *Spitalbuch*, tract. IV, Sudhoff VII, p. 407.
[13] *Opus Paramir*, lib. II, cap. 5, Sudhoff IX, p. 107.
[14] *Frag. von allen offenen Schäden*, Sudhoff VI, p. 298.
[15] *Paragranum*, I, Sudhoff VIII, pp. 87, 120, 157.
[16] *Zwei Bücher von der Pestilenz*, lib. II, 1, Sudhoff VIII, p. 386.
[17] *Labyrinthus Medicor.*, cap. 9, Sudhoff XI, p. 204.
[18] *Von d. natürl. Wassern*, Bk. IV, tract 3, Sudhoff II, p. 325.

Italorum, id est cadaverum, which appears to be a dig at Berengario da Carpi, Mondino, etc.[19]

That leads naturally to a discussion of the most important sense in which Paracelsus employed the term 'anatomy'—a sense which underlies some of the meanings which have been examined above. Anatomy to Paracelsus is above all *chemical* anatomy: the examination of the composition of various parts of the body in order to discover the affinity of individual parts with individual substances in the outside world. Paracelsus believed that man was the epitome of creation. All that exists outside man can be found in him. It is the task of the physician to unravel these correspondencies, for it is the behaviour of natural objects which will teach him how the organs work in health and disease. In other words, Paracelsian anatomy is the study of the parallelism between the greater and the lesser world, the macrocosm and the microcosm.

Not the dead anatomy of dead bodies (i.e. imaginary anatomy), but the distribution of parts in the greater world is the true anatomy which the physician must know.[20] For example, 'as gold lies distributed in the globe, according to the same anatomy pustules lie in the body, distributed at the same ratio of distances'.[21] Male and female principles in the world and in man stand for two anatomies: 'there we see two anatomies in the greater world in all natural growth, also two in man, the female and the male'.[22]

In accordance with his parallelism between the macrocosm and the microcosm, Paracelsus understands by astronomy the knowledge of the correspondencies between the parts of the human body and the various stars, their constitution and situation in space, and their functioning as expressed in their movements in time. A perfect doctor is found through these two: the mother, school and book of nature which is the open *physicum corpus*, and to which belongs the anatomy of the world and astronomy; the other part comprises the virtues of natural objects and alchemy.[23]

The study of cosmography was commended as essential for the physician:

> Let cosmography be an anatomy for ye . . . if ye understand the same thoroughly, ye will have the microcosm entirely in its essence. Look at *anatomia terrae*, how orderly hands and feet lie in it . . . the anatomy of water, look what its corpus be and how therefore the minerals are its members. . . .[24]

Again, the book of medicine is to search the *machina mundi* and then the microcosm also, so that both anatomies are grasped, which are otherwise called cosmography and geography.[25]

The cures of the physician depend on anatomy. Anatomy determines the

[19] *Ibid.*, p. 325.

[20] 'The physician must know and divide (*austeilen*) man through dividing heaven and not with the imaginary anatomy (*phantasirten anatomie*) of the dead which does not teach anything in the principles of true medicine.' *Fragm. ad De modo pharmac.*, tract III, Sudhoff IV, p. 477.

[21] *Entwürfe über Syphilis*, Sudhoff VII, pp. 429 *seq.*

[22] *Opus Paramir*, IV de matrice, Sudhoff IX, p. 185.

[23] *Gro. Wundarzney*, Bk. II, tract II, cap. 2, Sudhoff X, p. 291.

[24] *Buch von Blatern*, etc., Lib. II, cap. 5, Sudhoff VI, p. 340.

[25] *Buch der Tartar. Krankhtn.*, cap. 12, Sudhoff XI, p. 80; also cap. 18, Sudhoff XI, p. 108.

modus pharmacandi—not the anatomy of the schools, but *external anatomy*, i.e. the structure of the cosmos (and its members) and how they *correspond* to the structure, working and arrangement of the members and virtues in the human body.[26] Anatomy is seen as the form-giving virtue,[27] and hence it is said that the *iliadus* is located in the anatomy (iliadus meaning here the three form-giving principles of salt, sulphur and mercury).[28] The iliadus in this sense determines the *anatomia laxativa*, i.e. the way in which one laxative acts differently from another. The physician must know not *what* acts as laxative, but how the laxative action (*anatomia laxativa*) of an individual drug compares with the special property of the disease (*morbi anatomia*) to be combatted.[29] Similarly, it is said: 'Anatomy lies not in the knowledge of the cadaver, but in the knowledge of *tincture*, which tincture removes disease and not the cadaver, and is *astrum corporale* and *firmamentum materiale* (i.e. a virtue acting in the organism with the superior power of a star).'[30]

From the microcosm-macrocosm analogy comes the strange idea of 'anatomy' reflected in the urine, an idea later adopted by Thurneysser and Dorneus.[31] Urine is an indicator of *anatomia localis* and is called *anatomia microcosmica praefigurans*; as each member has its site in the body, the *liquor salis* or *sal resolutum* lies at the same site (in the urine).[32]

It is emphasized that *anatomia localis* cannot be learnt from the cadaver without previous knowledge of the *cosmic* or *external* anatomy (*eussere anatomien*). External here means cosmic and macrocosmic; it is not the external appearance of the dead body or its parts—an important point.[33]

In sum, it is through the 'Book Anatomiae majoris' that the physician learns the anatomy of the human body, through the '*concordanz anatomiae beider fabrication machinae mundi und physici corporis*'. 'He who knows how to understand and recognize the various "species" in the body, that this is sapphire in man, this mercury, this cypress, this wallflower, has well experienced and scrutinized the book of the body.'[34] For it is not sufficient to 'view the human body, to dissect, then to view again, and finally to boil it and look at it once again. To view in this way is to be compared with the unlearned peasant reading psalms: he reads only the letters and there is nothing more to say about him.'[35]

Instead, one should remember that the blood contains as many elementary 'species' as there are in water. Hence we must find the correspondencies between the individual constituents of the body and the individual elements. The distribution of the different salts in the outside world, for example, constitutes an anatomy of its own: the *Anatomia Elementata*. This is closely akin to

[26] *De Modo pharmacandi*, tract III, Sudhoff IV, p. 455.
[27] Perfect anatomy is situated in the virtue, *Annot. ad De gradibus*, lib. VII, cap. 6, Sudhoff IV, p. 131.
[28] *De gradibus*, lib. VII, cap. 5, Sudhoff IV, pp. 62 *et seq.*
[29] See *supra* (note [26]).
[30] *Von hinfallenden siechtagen der mutter*, Paragraphus III, Sudhoff VIII, p. 337.
[31] See Pagel, W., 1958, pp. 190 *seq.*, 195 *seq.*; and *Das Medizinische Weltbild des Paracelsus*, Wiesbaden, 1962, p. 19 (showing the priority of Thurneysser—an important point).
[32] *De Urinis*, lib. II, Sudhoff IV, p. 633.
[33] *Buch von Blatern, leme*, etc., Lib. II, cap. 1, Sudhoff VI, pp. 332 *seq.*
[34] *Labyr. Medic.*, cap. 4, Sudhoff XI, p. 183; Pagel, W., 1958, p. 143.
[35] *Ibid.*, p. 184.

Anatomia Essata, which is concerned with the 'seat' and distribution of various minerals and metals in the human body.[36]

Studied in this manner, 'anatomy' leads to a view of disease that is completely different from the ancient view. The essence of disease, from the latter point of view, was in the sick individual and in individual differences in humoral mixture. By contrast, Paracelsus regarded diseases as individuals in themselves, as 'parasites' besetting a particular site or organ, engendered by an exogenous factor and the metabolic disturbance which it causes. Hence it is from this Paracelsian view of anatomy that the local origin, the 'seat of disease' view emerges: that there is one disease in the bone, another in the flesh and yet another in the blood, just as there are certain worms in wood, others in greens, yet others in leaves—in short, that there are as many *genera morborum* as there are *species corporales*.[37]

This excursus on the 'anatomy' of Paracelsus has served to demonstrate, then, how different was the conception of anatomy entertained by Paracelsus in comparison with Vesalius. The contrast does not lose its force even when we recall that it was Paracelsus who gave its name to the fluid in the joints—the *Synovia* of present-day anatomical nomenclature.[38] For it should be borne in mind that to Paracelsus *sinovia* stood in the first place for the fluid in the joint *qua* seat of joint disease, i.e. podagra.[39]

Vesalius and Paracelsus at Basle

We thus seemed confined, in establishing any points of contact between the two figures, to invoke such accidents as the role which Basle played in the lives of both men. Basle was the scene of the triumphs as well as humiliations in the early career of Paracelsus. In 1527, his successful medical treatment of the humanistic publisher Froben brought him into touch with the circle of Froben, which included Erasmus. It also led to his appointment as municipal physician, with the right to lecture at the University. Ten months later he had to leave the town, whose citizens he seemed to have united in hostility against him. He was not to return.[40]

[36] *Anatomia elementata* in *Bertheonei*, Lib. II, cap. 5, Sudhoff VI, pp. 128–9. *Anatomia essata* in *Buch von Blatern*, etc., Lib. II, cap. 8, Sudhoff VI, p. 344. Anatomy should only serve for the knowledge of the 'confluence', i.e. the affinity of certain diseases and certain *loca*: 'ich acht auch das höchst einem arzet, die confluenz der anatomei wol zu verstehen, wie stet und krankheiten zusamen gangen', *ibid.*, cap. 4, p. 338. Anatomy of the dead body is of no use: 'so ir dann wollen den toten cörpel hin und her versieden und braten, schinden und ausstreken, in was weg wollen ir daraus nemmen das, so dem lebendigen cörpel zu nuz sol komen so von im das gewichen ist, das ir suchen?', *ibid.*, cap. 5, p. 339.

[37] Local origin and organ affinity of diseases: *Labyrinthus. Medicor.*, cap. 4, Sudhoff XI, p. 183.

[38] See on the derivation of the term from the Greek, *syn* ('together') and *ovum* (*gleich dem eierklar*), Weimann, Karl-Heinz, 'Paracelsus u. der deutsche Wortschatz', in *Deutsche Wortforschung in europaeischen Bezügen*, Giessen, 1963, vol. II, pp. 359–408 (p. 379). Paracelsus himself did not regard the term as a creation of his own: 'der gluten, der bei den alten wundarzten *synovia* heisst . . .' (Sudhoff V, p. 138); but Hyrtl already (*Onomatologia Anatomica*, 1880) accepted it as Paracelsian.

[39] Paracelsus says that the correct name by which gout (*podagra*) should be indicated is *sinovia*, for it is in the fluid of the joints, i.e. the Synovia, that the cause of the disease is found. Podagra has its seat in the fluid of the joint (*sein rechter nam aber ist sinovia, das ist aus der ursachen seiner krankheit genomen . . . also ist podagra ein krankheit, die sich sezt im leib und iren stul hat im glitwasser*): *Vom Podagra* (*Elf Traktat* ab. 1520), Sudhoff I, pp. 132–3. *Gutta est synovia suae partis a qua parte procedit. Paragraphorum*, lib. VII de gutta, Sudhoff V, p. 244.

[40] Pagel, *op. cit.*, 1958, pp. 19–22. For detail see Blaser, R. H., *Neue Erkenntnisse zur Basler Zeit des Paracelsus*, *Nova Acta Paracels.*, 1953, VI, Suppl. 90, pp. 96 *seq.*

Vesalius' connection with Basle was less direct. His brief first visit to the Swiss city seems to have taken place in 1537, just after the completion of his baccalaureate at Louvain. He had his thesis reprinted by Robert Winter, who became an intimate friend.[41] His second visit was early in 1543. He stayed for at least seven months, supervising the printing of the *De Fabrica* as well as the German translation of his *Epitome*.[42]

Paracelsus' Criticism of Galen and Traditional Medicine

The contrast drawn so far between the personalities and thought of Vesalius and Paracelsus may make it appear that the gulf between them was unbridgeable. A closer examination reveals numerous points of agreement between them and makes it possible to attempt an instructive comparison of the two thinkers.

The first and most obvious similarity lies in their opposition to the conservative and orthodox Galenism which ruled over the medicine of their time. Paracelsus' attack on Galenic doctrines was frontal and direct, and couched in violently polemical terms. Never before had the Galenic system been assaulted so brutally or rejected so completely. Galenic pharmacology was a 'foreign' system, which had developed in Greece and Arabia, and, by dint of 'peregrina arrogantia' and 'patriae error', had been permitted to penetrate into other countries and flourish even into modern times.[43] Like Aristotle before him and Avicenna after him, Galen had approached the study of nature through the unsuitable and corrupt pseudo-science of logic.

Indeed, logic and dialectic are *against* the physician and obscure the 'light of nature'.[44] The physician whom God has created is not a corrupted schoolmaster, administrator, apothecary, clergyman, monk and such like.

> Ye are created by the universities, by Leipzig, Tübingen, Vienna, Ingolstadt. What little ye tasted of Astronomy, Philosophy, Logic is neither hot nor cold. Would the Astronomer put away his divining, the philosopher his unreasonableness and *the logician his lies*, ye may yet find some ground in medicine. It is a perversion that ye let Machaon, Apollo, Aristotle, Galen, Averroes, Avicenna, Rhases be answerable. Instead ye must *first probe whether they have lied or not*.[45] [Our *italics*.]

Galen is thus called an 'orator',[46] who 'fights nature' and substitutes writing

[41] *The Paraphrasis of the Ninth Book of Rhases*. See Roth, *loc. cit.*, p. 129.

[42] For detail see Sigerist, H. E., Albanus Torinus and the German edition of the Epitome of Vesalius, *Bull. Hist. Med.*, 1943, **14**, 652–66 (esp. pp. 660 *et seq.*). O'Malley, *op. cit.*, pp. 136, 186.

[43] *De gradibus*. Letter to Cluser (10 November 1527), Sudhoff IV, pp. 71–3; see Pagel, *op. cit.*, 1958, p. 243.

[44] '. . . was sucht ir in der logik und in eurer dialectic, die all dem arzt zuwider seind und hinderung des liechts der natur?', *De Caduco Matris* (*de caducis* lib. II), para. I, Sudhoff VIII, p. 321.

[45] 'dan das got den verderbten schulmeister, procurator, apoteker, pfaffen, munch und dergleichen zu einem arzt beschaffen habe, das ist nicht. euch hat Leipzig, Tübingen, Wien, Ingolstat beschafen also seint ir auch, wie der schoffer der euch da geschaffen hat. es ist nicht minder ir schmeckent etwas in der astronomie, etwas in der philosophia, etwas in der logica, aber das ir schmeckent ist weder kalt noch warm. wan der astronomus sein sortilegium hinweg tet und der philosophus seine irrationabilia und der logicus sein lügen, so wer es wol das ir in der arznei ein grunt hettent. das ir euch wollen verantworten mit Machaone, mit Apolline, Aristotele, Galeno, Averroe, Avicenna, Rhasi, Mesue etc. ist weit fel; ir müssent am ersten probiren, ob sie gelogen haben oder nicht.' *Opus Paramirum*, lib. IV de matrice, Sudhoff IX, p. 229.

[46] '. . . de quibus agit Hippocrates noster, in aphorismis, de virtutibus naturae, contra interpretationem *rhetoris Galeni*.' *De Gradibus* Appendix B, Sudhoff IV, p. 92.

for medicine.[47] He is productive of 'blue talk' and hunter's gibberish.[48] He is a master of the soup-kitchen, a sophist who falsifies the genuine art and perverts it into prattle; he has collected berries and converted them into pebbles.[49]

The methods required for studying the 'Book of Nature' are different from those of book-learning. 'He who wishes to explore nature must tread her books with his feet. Writing is learnt from letters, Nature, however, (by travelling) from land to land: One land, one page. Thus is the Codex Naturae, thus must its leaves be turned.'[50]

In a passage already cited above,[51] Paracelsus speaks of the 'Book of the Body' which can only be elucidated by a study of the correspondencies of the parts with objects in Nature at large—the 'Anatomy' of Paracelsus. It is particularly interesting to note that this phrase, the 'Book of the Body', was also used by Vesalius, who has been credited with having been the first to do so.[52] It is unlikely that he was influenced in this by Paracelsus; but the latter can claim priority, although it is well known that the phrase is much older.[53]

Paracelsus' verdict on traditional medicine was conveyed in the prophecy that the time was near when the credit of Galen and Avicenna would sink with all physicians, and 'the stones will crush them'.[54] It is tempting to contrast Paracelsus very sharply with traditional and academic medicine, and to distinguish his unconventional appearance in life and literature from the academically robed physician and professor of his time. But it must be borne in mind that one source of his 'new' medicine was ancient and traditional medicine which he had to, and did, know down to the minutest details. The picture of the ignorant and barbarous inventor, whose main source was his lively imagination, is not applicable to Paracelsus, however often he may have been cast in this image. Yet, though much of traditional medicine is still recognizable in his

[47] 'Galenus tut fechten wider die natur; ist sein schreiben ein arznei?' *Drei Bücher der Wundarznei, Bertheonei*, Vorrede, Sudhoff VI, p. 53.

[48] '. . . die blauen ret Galeni. . . .' *Ibid.* (as in note 47), *Das erste Buch der Wundarznei*, cap. III, p. 73. '. . . die weidsprüch Galeni . . .' *ibid.*, cap. VII, p. 148. 'Weidsprüche' means 'fiction', 'falsification', as the German *Jägerlatein*, i.e. tall stories told by hunters (*Waidmann*)—personal communication by Bibliotheksrat Dr. K.-H. Weimann (19.3.1964).

[49] 'Galeno und anderen küchenmeistern . . .', *Von blatern*, etc., lib. I, cap. 10, Sudhoff VI, p. 325. '. . . denen ir rechte warhafte kunst durch solche *sophisten* ganz gefelschet und verendert und euer in ein geschwezwerk gezogen, das sich der Galenus sonderlich befleisst, der berlin aufgelesen und kisling daraus gemacht hat'. *Ursprung und Herkommen der Franzosen* (1529), lib. I, cap. 10, Sudhoff VII, p. 198.

[50] *Defensiones und Verantwortungen*, IV, Sudhoff XI, pp. 145–6; Pagel, 1958, pp. 56–7, note 152.

[51] *Labyrinthus Medicor.*, cap. 4, Sudhoff XI, p. 183. *Vide supra*, note 34.

[52] Edelstein, L., Andreas Vesalius the humanist, *Bull. Hist. Med.*, 1943, **14**, 547–61 (p. 556) with reference to: 'Atque haec, quae Galeni placitis penitus renituntur, et vere paradoxa *ex hominis haud mendaci libro* deprompta sunt, neutiquam praetermittere convenit, quin rabulas illos susurronesque appelles, qui quum a sectione absunt, apud alios tam acriter se Galeni decreta tueri arbitrantur: inter secandum vero et praesenti corpore prorsus, ac si quis linguam illis praescidisset, silent.' *Fabrica*, Lib. VI, cap. 16, 1st ed., 1543, p. 600.

[53] The metaphor originated in the Latin literature of the Middle Ages, and is to be found in such authors as Bonaventura, Konrad von Megenberg, Raymundus de Sabunde, and Bernardus Sylvestris. For the development of the metaphor from theological oratory and mystical speculation to a variety of usages, see Curtius, E. R., *Europaeische Literatur und Lateinisches Mittelalter*, Bern, 1948, pp. 321–7, also for early examples of the *Book of Creatures*, the *Book of the World*, etc. On Konrad von Megenberg's *Buch der Natur* as a source for Paracelsus see Pagel, W., Paracelsus and Techellus the Jew, *Bull. Hist. Med.*, 1960, **34**, 274–7 and *idem*, Die aetherähnlichen Praeparate des Paracelsus und ihre pharmakologische Auswertung bei Hühnern-Sprachgebrauch ('henbane') und Konrad von Megenbergs Buch der Natur als mögliche Quellen, *Gesnerus*, 1964 (in press).

[54] *Vorrede über d. Buch Paragranum*, Sudhoff VIII, pp. 65–6; Pagel, *op. cit.*, 1958, p. 111, note 294.

work, its mainspring certainly is his intention to supersede and to break away from it.

Nor was Paracelsus at any time in his career entirely out of the orbit of academic medicine. There is every reason to assume that as a young man he had frequented universities, particularly in Italy. His personal deposition that he had been made a *Doctor utriusque medicinae* at Ferrara University we have means neither of proving nor disproving. It was accepted at the time in lieu of the oath by the magistrate at Basle, when Paracelsus and his servant gave evidence in legal proceedings between two Strassburg burghers, one of whom had been a patient of Paracelsus.[55] Also, Dr. Wolfgang Thalhauser, municipal physician at Augsburg, addressed Paracelsus as 'Theophrasto von Hohenheim *beider arznei doctori*' in the famous introductory letter to the *Grosse Wundarznei* (24.7.1536).[56] Thalhauser, a physician in an official position, at any rate had no doubts about Paracelsus' doctorate. He also mentions Manardus of Ferrara as a master of true medicine, whose sound teaching[57] has not been heeded and was forgotten—possibly a reminiscence of student days and probably occasioned by Manardus' death in 1536.[58]

What is perhaps more important is Paracelsus' thorough acquaintance with the traditional medical syllabus, its doctrines in general and its topics in great detail. Nor could he remain uninfluenced by it, however vigorous his endeavour to break away from it. One notable example is the doctrine of *Tartar*, so fundamental to the 'new' medicine of Paracelsus. It is based on the Galenic idea that cheese and similar 'compact' food (*edesma pachyn*) causes the stone.[59] For central to the doctrine of tartar is the wide power accorded to exogenous factors taken in with certain foodstuffs. These can no longer be completely digested, but form solid deposits—the result of a coagulation in which acid (*spirit of salt*) plays a leading part. The Paracelsian *Tartar* in the first place meant stones, gravel and other calcified, notably arthritic deposits, but in a broader sense any anatomical changes of organ substance into something new, a 'parasitic', a 'foreign' formation such as tubercles or new growth. Galen had taught that milk and cheese render the urine 'dense', thus causing a predisposition to calculus, particularly of the bladder in children.[60] What was new in

[55] '. . . den hochgelerten hern Theofrastum von Hohen Heym, der arcznye doctor, stattarczat zu Basel . . . Nemlich her doctor Theofrastes by dem eyd den er an sin doctorat der löblichen hohen schul zu Ferraria gethan . . .' quoted from *Staatsarchiv Basel, Gerichtarchiv D 24, Kundschaften*, as first analysed by Burckhardt, Albrecht, Nochmals der Doktortitel von Paracelsus, *Corresblatt. f. Schw. Ärzte*, 1914, pp. 884–7. For the full text and notes, Wickersheimer, E., Paracelse à Strasbourg, *Centaurus*, 1951, **1**, 356–65. See also Bittel, K., Die Elsasser Zeit des Paracelsus, *Elsass-Loth. Jahrb.*, 1944, **21**, 158–9.—*Idem*, Paracelsus am Oberrhein, *Strassb. Monatshefte*, 1943, **7**, 226–33.

[56] Sudhoff X, p. 12.

[57] See Manardus, *Epist. medicin.*, Argentor., 1529, fol. 23 verso *et seq.*

[58] For further reasons in favour of Paracelsus' doctorate, see Blaser, R. H., 'Amplo stipendio invitatus': Zur Frage der Stellung und Besoldung des Paracelsus in Basle, *Arch. Gesch. Med.*, 1957, **41**, 143–53 (p. 146), and *Nova Acta Paracels*, VI, suppl., 1953, pp. 32, 66, note 57.

[59] Galen, *Method. medendi*, lib. XIV, cap. 16, ed. Kühn, vol. x, pp. 997–9; Comment. III to Hippocrates, *Epid.*, VI, cap. 15, ed. Kühn, vol. XVIIb, p. 47. *De sanit. tuenda*, lib. V, cap. 7, ed. Kühn, vol. VI, p. 344. In Hippocrates, *De humoribus*, III, 4, ed. Kühn, vol. XVI, p. 366. Pagel, *op. cit.*, 1962, p. 97; 1958, p. 154.

[60] Paracelsus, *Buch von den tartar. Krankheiten*, cap. VIII, Sudhoff XI, p. 56 (*local* origin of coagulation); *Opus Paramir.*, lib. III, tract 1, Sudhoff IX, pp. 122 *et seq.* (food and 'stercora'). *Ibid.*, tract 3, Sudhoff IX, pp. 140 *et seq.* (tartar obstructing tubular systems). *Ibid.*, tract 4, Sudhoff IX, p. 151 (obstruction of bronchial tree by calcified—old tuberculous—concretions).

Paracelsus' doctrine of *Tartar* was not therefore the recognition of exogenous —dietary—metabolic disorders, but the wide range of diseases covered by this concept. What had been a chapter of *special* pathology assumed the role of a principle in *general* medicine: the causation of disease by faulty metabolism and the establishment of its local origin as against a primary fault of the humours.[61]

Vesalius on Galen

Vesalius' criticism of Galen did not have such a root-and-branch character. He hesitated for a long time before voicing his dissent from Galenic teachings, and the task was not a light undertaking for anyone who wished to claim the serious attention of his fellows in the medical profession. Galen's authority had been strongly reaffirmed in the first half of the sixteenth century: with attempts to purify medicine from the corruptions supposed to have been introduced by the Arabs, the authority of Galen became supreme.[62] The preface to the *De Fabrica* has all the boastfulness of the author's youth and his consciousness of being a great innovator.[63] But the criticism of Galen is muted and confined to his teachings on the human anatomy, rather than with the Galenic system of medicine as a whole.[64]

This applies particularly to Galen's physiology and most noticeably so to the traditional Galenic ideas concerning the heart and the blood. Vesalius himself admitted this in a long paragraph which he inserted in the second edition of *De Fabrica*.[65] Here he confesses to a lack of that self-confidence which would have enabled him to furnish a reformed account. Hence, as he says, he 'accommodated' his text to a large extent to the doctrines (*dogmata*) of Galen. Indeed, he did not dare to deviate by as much as a nail's breadth from the opinion of Galen, the Prince of Physicians, in this matter; not because he believed it to be true, but because he did not feel equal to the task of reform. He explains thus the difficulties he faces with regard to the transfer of even the smallest trace of blood from the right ventricle to the left, through a compact fleshy septum which at the time of writing he is quite sure is devoid of any communicating passages. Among other Galenic doctrines expounded by Vesalius we may mention the liver as the centre and origin of the venous blood, the pulmonary artery as the convector of nourishment to the lung and nothing else, and the emission of smoky excrement through the left auricle and the lung.[66]

[61] Pagel, W., *op. cit.*, 1958, pp. 153 *seq.*

[62] Vesalius himself contributed three revised texts to the first complete printed edition of the works of Galen. The edition was by the Venetian printing house of Giunta under the general editorship of Joannes Baptista Montanus and Augustinus Gadaldinus, published during 1541–2, and reprinted by Froben at Basle in 1542. O'Malley, *op. cit.*, p. 102.

[63] There is not a little of the 'Mir-nach' in Vesalius, e.g. 'Verum id studium neutiquam successisset, si quum Parisiis medicinae operam darem, huic negotio *manus non admouissem ipse*, ac obiter . . . visceribus aliquot superficie tenus ostensis, acquieuissem. *adeo enim perfunctorie* illic, ubi primum medicinam prospere renasci uidimus, *Anatome tunc tractabatur*. . . .' Praefatio, cap. 10 (italics supplied). Cf. Edelstein, *loc. cit.*, 1955, p. 551: 'The Humanists (including Vesalius) were not "Mir-nachs" like Paracelsus or Telesio or Cardano, they did not constantly shout: I say, I have discovered for the first time. Their slogan was: "The truth was long since found, and has united noble spirits, do but grasp the ancient truth."' See also section on 'Vesalius, Paracelsus and Humanism' in text below.

[64] See also Ashley-Montagu, M. F., 'Vesalius and the Galenists', in *Science, Medicine and History*, Oxford, 1953, vol. 1, pp. 374–85 (pp. 380 *et seq.*).

[65] *De Corporis Humani Fabrica*, lib. VI, cap. 15, 2nd ed., Basileae, 1555, p. 746.

[66] See further detail in Pagel, W., Vesalius and the pulmonary transit of venous blood, *J. Hist. Med.*, 1964 (in Press).

Vesalius' carefully limited dissent from specific Galenic teachings about the human anatomy was based, as he said, on empirical investigations, which forced him to conclude that Galen had made illegitimate inferences about the human body from the dissection of animals. It was quite clear to him, 'from the revival of the art of dissection, from a painstaking perusal of the works of Galen, and from a restoration of them in several places . . . that Galen himself never dissected a human body lately dead'.[67] The dissection of monkeys had led him to criticize unjustly ancient doctors who had themselves practised the dissection of human bodies.

Galen's observations were full of errors even with regard to his monkeys. Of the innumerable differences between organs of the human body and those of the monkey, it was astonishing that Galen noticed none except in the fingers and the bend of the knee: even these he would have no doubt overlooked, had they not been obvious without dissection. Vesalius claimed that in a single course of anatomy which he exhibited in the schools, he was able to show that in more than two hundred instances Galen had failed to give a true description of the interrelation, use and function of the parts of the body of man.[68]

Nor did Vesalius conceal his contempt for the followers of Galen, who had uncritically and blindly surrendered to his authority. These followers, among whom he placed 'Oribasius, Theophilus, the Arabs and all of our own writers whom we have read to date' were quite averse to attempting the dissection of bodies:

> They placed an absolute trust in I know not what quality of the writing of their chief, and in the neglect of dissection of the rest, and shamefully reduced Galen to convenient summaries, never departing from him by so much as the breadth of a nail, that is supposing they succeeded in arriving at his meaning.[69]

Strongly critical though these remarks may appear in isolation, they are counterbalanced in the *Praefatio* by many encomia of Galen, 'easily the foremost among the teachers of anatomy'. Vesalius did not wish to be regarded as 'disloyal to the author of all good things and lacking in respect for his authority'.[70]

Vesalius was anxious to confine his criticisms to Galen's anatomical doctrines. In doing so he was contributing to a rising volume of criticism, which drove extreme defenders of Galen's anatomy to desperate expedients. Vesalius' former teacher of anatomy at the University of Paris, Jacobus Sylvius, provides an interesting example. In a vicious attack on Vesalius in 1551, he undertook to vindicate Galen's authority completely. He dismissed most of Vesalius's specific charges in a cursory fashion. Still faced, however, with explaining away the more glaring discrepancies between Galen's descriptions and direct observation, Sylvius took refuge in the argument that man had degenerated somewhat

[67] Praefatio, *De Humani Corporis Fabrica*, Basel, 1543; trans. quoted from B. Farrington, The Preface of Andreas Vesalius . . . *Proc. roy. soc. Med.* (Sect. Hist. Med.), 1932, **25**, 1357 *et seq.*
[68] Praefatio, 4; Farrington, *op. cit.*, p. 1363.
[69] *Ibid.*, 4; Farrington, *op. cit.*, p. 1362.
[70] *Ibid.*, 4; Farrington, *op. cit.*, p. 1363.

since the days of the ancients. Even if Galen's statements were no longer true today, they must have been so when he recorded them. Thus even Sylvius was compelled to admit the anatomical discrepancies.[71]

Comparing Paracelsus with Vesalius, we note that there is a contrast regarding the extent to which Galenic teachings are rejected, as well as the grounds on which they are rejected. In Paracelsus it sprang partly from the religious motive which is fused with the empirical approach in his work. Galen, like Aristotle and Avicenna, was guilty of the sin of spiritual pride in employing the corrupt and blighted faculty of reason and the associated instrument of formal logic in medicine.[72]

Paracelsus and Vesalius on the Relationship between Medicine and Surgery

A second point of resemblance between Vesalius and Paracelsus is concerned with manual work, experimentation, and surgery. A charge which Paracelsus tirelessly urged against Galen and other ancient physicians was that, by the extensive use of logical argumentation, they had obscured the 'light of nature', and rendered empirical observation and experimental work disreputable. Medicine was not to be learnt from the books of the ancients; it demanded unwearying toil and search through nature.[73]

It is in this light that the uncompromising attitude of Paracelsus regarding the relationship between medicine and surgery must be viewed. The traditional medieval interpretation had led to the separation of medicine and surgery, which had been united in ancient medicine. The medieval doctor had assumed the rank and dignity of a *scholar*—as against the ancient doctor who had been *craftsman*; in this manner the former had found access to the ecclesiastic and scholastic hierarchy. The slogan, 'it is against the professional code for a doctor to use his hands'—*Inhonestum magistrum in medicina manu operari*—epitomizes the academic and social position of medieval surgery and its relegation to ignorant barbers and quacks. The efforts of such learned as well as ingenious surgeon-scholars as Theodoric Borgognoni (1206–98) and Henry de Mondeville (ab. 1250–after 1325) had little success in bridging the gap which separated physicians and surgeons.[74]

Paracelsus asked: Where is the surgery that a physician can dispense with in his doctoring and where is the medical disease that does not require the surgeon? Medicine is but theoretical insight into nature, and surgery the cure, of *all* diseases.

. . . How can ye establish it as another faculty and profession? Ye wood doctor and fool! . . . In *judicando* ye are a physician, in *curando* a surgeon. The patient asks for cure—surgery—and not

[71] Sylvius' pamphlet was entitled *Vaesani cuiusdam caluminarum . . . depulsio*, 1551; see Roth, p. 382; H. W. Janson, Titian's Laocoön caricature and the Vesalian-Galenist controversy, *Apes and Ape Lore in the Middle Ages and the Renaissance* (Studies of the Warburg Institute, vol. 20), London, 1952, Appendix, pp. 355–68, has suggested that the famous *Laocoön* parody, with three apes, of ab. 1550, was a 'pictorial rebuke to the Galenists in general and to Sylvius in particular . . .' (p. 361).

[72] See above, notes 43, 44, 45.

[73] See above, note 50.

[74] Pagel, W., Medical history at the end of the XIXth century, to commemorate Jul. Pagel (1851–1912) and his discovery of medieval sources, *Proc. roy. soc. Med.*, 1952, **45**, 303.

for theory—medicine—it is the doctor who needs the latter. That is: there can be no surgeon who is not also a physician; the latter begets the surgeon and the surgeon tests the physician by the result of his work. Where the physician is not also a surgeon, he is an idol that is nothing but a painted monkey.[75]

The belief that contempt for manual work and experimentation was one of the greatest deficiencies in the physicians of his time is powerfully echoed in Vesalius' *Praefatio*. In bygone times, after the Gothic deluge (in the West) and (in the East) after the reign of Mansor in Persia, there occurred in the art of medicine a 'laceration' so deep that its primary instrument, the employment of the hand (*manus operam*) in healing, was relegated to vulgar and ignorant fellows.[76] The threefold therapy of diet, drugs, and manual operation had been common to all the three ancient sects of medicine, especially the last one, manual operation, which 'above the rest, nicely proves the saying that medicine is the addition of that which is defective and the removal of that which is in excess . . . time and experience have taught, by the benefits it has conferred, that it is the greatest aid to human health'.[77] The divine Hippocrates had brought splendid proof of this, in various works. Galen himself, after Hippocrates the prince of medicine, had gloried in the fact that the care of the gladiators of Pergamon had been entrusted to his sole charge. Even at an advanced age, he was reluctant for the monkeys he had for dissection to be skinned by the slaves. He has impressed on us 'his joy in manual dexterity and how zealously he, in common with the other doctors of Asia, employed it'.

Alas, especially after the ravages of the Goths, all the sciences, which before had flourished gloriously and were practised as was fitting, went to ruin. '. . . (The) more fashionable doctors, first in Italy, in imitation of the old Romans, despising the work of the hand, began to delegate to slaves the manual attentions which they judged needful for their patients, and themselves merely to stand over them like master builders.' Little by little, without abating their own claim to honour or profit, they fell away from the standards of the ancient doctors: diet was left to nurses; compounding of drugs to apothecaries; manual operations to barbers.[78] Doctors had relegated to those whom they called surgeons, and scarcely regarded as slaves, 'the chief and most ancient branch of the medical art, and that which principally (if indeed there be any other) bases itself upon the investigation of nature'.[79]

[75] *De Podagricis*, lib. III, Cura, Sudhoff I, pp. 341–2; *Spitalbuch*, Preface, Sudhoff VII, p. 374; Pagel, *op. cit.*, 1958, pp. 15–17.

[76] Praefatio, 1; Farrington, *op. cit.*, p. 1358.

[77] *Ibid.*, 1; trans. from Farrington, *op. cit.*, p. 1358.—Vesalius here refers to the definition of medicine in Galen's *Thrasybulos* (Galeni *ad Thrasybulum liber utrum medicinae sit an gymnastices hygieine*). Galen is concerned with the denominator common to the varied practices of healing and finds it in the removal of excess and the addition of what is wanting ('to ge katholou pasin ergon koinon. ho te gar aphairon ti tou somatos hos peritton, ho te prostheis hos leipon, hen ampho poiousi katholou, ten kata physin ekporizontes to somati symmetrian, hetis en hygieia', cap. 25, ed. Kühn, vol. v, p. 852). This definition of medicine (prosthesis kai aphairesis—prosthesis ton elleiponton, aphairesis ton hyperballonton) was also quoted by Paracelsus.

[78] *Ibid.*, 2; Farrington, *op. cit.*, p. 1360: '. . . uictus praeparationem aegrorum custodibus, medicaminum compositionem pharmacopolis, manuum uero munus tonsoribus reliquentes.'

[79] '. . . quod praecipuum et antiquissimum est medicinae membrum, quodque naturae speculationi (si modo quod aliud) praecipue innititur, depellentes. . . .'

Criticism of Apothecaries

Vesalius was mainly concerned with the neglect of surgery; but he was sufficiently exercised by the relegation of the compounding of drugs to apothecaries to return to the theme later. He wrote that with that step, doctors immediately lost the absolutely essential knowledge of simples. They were responsible for the fact that the shops of druggists became filled with barbarous names and false remedies, and also that 'so many elegant compositions of the ancients were lost to us, several of which have not yet come to light. . . .'[80]

This part of Vesalius' criticism immediately recalls Paracelsus' sustained depreciation of the apothecaries—the purveyors of ineffectual medicines, or 'soup-messes' (*Suppenwust*). 'Apothecaries and barbers will not give up their soup-messes, and whatever confidence ye may have in your pharmacies, ye are fools. That is shown by the number of your prescriptions; for one can see whom ye cure and how and where and when.'[81] Neglect of the herbs and their virtues (which display their virtues in accordance with the movements of the stars) had led to the 'extinction of the art with the physicians'.

In fact, the composition of recipes came into being owing to the loss of the ancient and true knowledge of drugs. Instead of taking the *Simplicia* from indigenous gardens, drugs and herbs had been fetched from far-away countries, as if what is good there must be helpful here. Thus the apothecaries arose, and as long as there are apothecaries and mortars, there is no art in medicine other than child's play (*schützerei*), confusion (*filzerei*), and drunken revelry (*bachanterei*).[82]

All effective medicine is *arcanum* and *arcanum* is volatile. How then can the apothecary and 'dirt-cook of soup-mess' presume to be dispenser and cook?[83] The *arcanum* remains, the body decays, unless it is kept alive by the *arcanum* in it. Elixir and the highest fermentation, followed by digestion and building up —these are the processes required from him who wants to be a servant of nature and work as she does. Otherwise, he is but a mess-cook and dishwasher. But what fermentations, putrefactions, digestions and sublimations are effected by the apothecaries and their doctors? None—only soup-messes and the deception of the people.[84]

[80] '. . . necessariam simplicium medicaminum cognitionem amiserunt: atque ut tot barbaris uocibus, et falsis etiam pharmacis officinae scaterent, totque elegantissimae ueterum compositiones nobis pariter deessent, ac adhuc complures etiam lateant. . . .'

[81] Notes to the first and third section of the *Paragranum*, Sudhoff VIII, p. 124.

[82] *Paragranum* (1530), second tract, Sudhoff VIII, p. 172. Also in *Von den natürlichen dingen*, cap. VIII (Vom Vitriol), Sudhoff II, p. 147: 'nicht von nöten ist sovil büchsen und scatulen und krueg und gleser in der apotheken zu haben . . . wiewoll bei in allen falsch und betrug und nichts guts oder gar ein falsch darin. also sol sich der arzt fleissen, das er nicht in vile der büchsen lige, nicht in den arzneien die von weiten landen komen' (for vitriol, which occurs everywhere in nature, could fill a quarter of all the pharmacy shops because of its wide-ranging curative properties).

[83] *Ibid.*, third tract, Sudhoff VIII, p. 186.

[84] *Ibid.*, pp. 188–9. On Paracelsus and the apothecaries, see the comprehensive account by Schneider, W., Paracelsus und die Apotheker, *Veröffent. d. Internat. Geselsch. f. Gesch. d. Pharmazie*, Wien, 1957, vol. x, pp. 48–60. Paracelsus vociferously accused the apothecaries of having adulterated medicines prescribed by him and of having impeded his curative efforts, largely because of the brevity and conciseness of his prescriptions, which meant financial loss to them (sixth of the *Defensiones*, Sudhoff XI, p. 154). Paracelsus also accused the pharmacists of ignorance of alchemy (chemistry) which he considered essential, of arbitrarily replacing one ingredient by another that was not even remotely related (*quid pro quo*) and of tampering with weights and measures. For a vindication of the pharmacists, who had to adhere to traditional medicine and pharmacy and to dispense what was available, see Schneider, *loc. cit.*

Divergent Motives of Paracelsian and Vesalian Criticism

Concerning the supposedly menial operations which the physician ought himself to perform, we may recall the famous statement of Paracelsus that the 'spagyric' physicians do not go about with raiment, gold rings on their fingers and white gloves, but labour night and day at the furnace, wear leather clothes and aprons, and put their fingers among coals, soot and dirt, busying themselves with the various chemical operations.[85]

Despite these convergences, it remains true nevertheless that the castigation of the physician's disdain for manual work and experimentation carries a different social emphasis in the works of the two thinkers. Vesalius wished to raise the practice of dissection to the status of a humane art, indispensable to the training of the physician. Surgery was a noble art which must be taken out of the hands of the servile and half-educated craftsmen, and restored to the physicians.

Paracelsus made the theme serve as an occasion for a general attack on the physicians. It furnished him with an opportunity for expressing his anti-authoritarian views and his exaltation of common men at the expense of the great and mighty. The university-trained physician, puffed up with intellectual pride, knew less than many a simple-minded and illiterate craftsman or old countrywoman. But the conclusion which Paracelsus arrived at was similar to that of Vesalius: it was scandalous that the physician should relegate surgery to the barber and the compounding of drugs to the pharmacist, considering himself too superior to perform such menial tasks.

Paracelsus, Vesalius and Humanism

Paracelsus has often been presented as uncompromisingly hostile to the ideals and spirit of Renaissance humanism. Two other points of similarity between Vesalius and Paracelsus may thus appear surprising, since they seem to reflect characteristic humanistic ideals. One is the interest both display in Hebraic wisdom: indicated in Vesalius' case by the use of Hebrew terms, and in the case of Paracelsus by frequent references to the *Kabbala*. The other is the yearning for the restoration of an ancient wisdom, comparable to a perennial (*prisca*) philosophical tradition stretching beyond the Greeks into remote antiquity.

It is evident that Vesalius' knowledge of Hebrew (and Arabic) was scanty, and his attempts to impress the reader with a display of Hebraic erudition has often been unfavourably commented upon.[86] Together with his preference for the Ciceronian style,[87] the interest in Hebrew had been nurtured in Vesalius at the *Collegium Trilingue* at Louvain. The three languages which served as the

[85] *Das Buch Paragranum* (1530), tract I, Sudhoff VIII, p. 153. Paracelsus' strictures on the contempt for manual experimentation were often quoted in the seventeenth century, e.g. Robert Boyle, remarking that nothing in nature was to be deemed too small or mean to be worthy of the natural philosopher's attention, cites the opinion of '*Paracelsus* himself, haughty as he was', *Usefulness of Experimental Natural Philosophy*, London, 1663, p. 18.

[86] Singer, C., and Rabin, C., *A Prelude to Modern Science . . . The 'Tabulae Anatomicae Sex' of Vesalius*, Cambridge Univ. Press, Wellcome Hist. Med. Museum, n.s., vol. 1, 1946, pp. lxxii–lxxxv.

[87] See Edelstein, *loc. cit.*, 1943, p. 550.

foundation for the College's humanistic curriculum, and were to open universal knowledge to the scholar, were Latin, Greek, and Hebrew,[88] in accordance with the humanistic programme of Erasmus.

In the Germanic lands, the 'northern renaissance' was marked by a special interest in Hebrew. There was a traditional emphasis on biblical studies, and the importance of Hebrew in these studies was strongly affirmed by Johannes Reuchlin (1455–1522). Reuchlin owed his interest in Hebrew learning to the direct inspiration of Pico della Mirandola and Marsilio Ficino, having been in close contact with the Florentine Academy during his sojourn in Italy. His own studies of Hebrew came to be concentrated on the Kabbala.[89] But even those humanists who could not share his preoccupation with the number-mysticism of the Kabbala took his side and defended Hebraic studies when their legitimacy for the Christian scholar was questioned, and the issue became one of scholastic against 'new' learning.[90]

The terms 'Kabbala' and 'Kabbalistic' frequently occur in the work of Paracelsus, and signify the quest for the 'divine seals' in objects and phenomena in general. This, however, is in Paracelsus' opinion no prerogative of the Hebrew Kabbala. He regards the latter as an original achievement not of Hebrew, but of Persian wisdom. Nor does he elaborate specific Kabbalistic methods and aims, such as the mystical interpretations of letters and their numerical value.[91]

The notion of a *prisca medicina* and *anatomia*, known to the ancients but lost from view after the Gothic invasions, pervades the preface to the *De Fabrica*. It furnished Vesalius with a standard for judging the medical art of his own day, and measuring the extent of decline it had suffered since antiquity.

He lamented the fact that, since the compounding of drugs had become wholly entrusted to the apothecaries, knowledge of simples had been lost; but the task of restoring the art of simples to its 'pristine' glory had now started.[92] He confessed that in deciding to bring this branch of natural philosophy, anatomy, out of the darkness which enveloped it, he hoped to restore it to the 'pristine' perfection it had enjoyed in the hands of the ancient doctors of dissection. In other words, Vesalius felt that his mission was not to destroy, but to restore. It was his task to recall from the world of the dead the knowledge of the parts of the human body which had died long ago, and to establish anatomy which, though not more perfect than ancient anatomy, at least stood comparison with it. In this task, Vesalius felt himself a contemporary of that blessed age which had brought renewal of life to all branches of knowledge and lifted up its head from utter darkness.[93]

[88] See Leibowitz, J. O., Annotations on the biblical aspects of Fulton's Servetus, *J. Hist. Med.*, 1955, 10, 233–8 (p. 238).

[89] See his *De arte cabalistica libri tres Leoni X dicati*, Hagenau, 1517.

[90] The Cologne Dominicans and Pfefferkorn versus Reuchlin, 1509–13.

[91] Pagel, *op. cit.*, 1958, pp. 213–17.

[92] See above, note 80.

[93] '. . . usqueadeo, uetus medicina a pristino decore ante plures annos desciuit. Porro quum illa iampridem in tanta huius seculi . . . felicitate cum omnibus studijs ita reuiuiscere, atque a profundissimis tenebris caput suum erigere coepisset, ut ueterum candorem . . . recuperasse uideatur . . . hoc naturalis philosophiae membrum (sc. emortuam humani corporis partium scientiam) ita ab inferis reuocandum putaui, ut si non absolutius apud nos, quam alias unquam, apud priscos dissectionum doctores uersaretur: eo tamen pertingeret, ut . . . cum antiqua illa conferri posse . . .'

To turn to observation was for Vesalius to return to the *prisca anatomia*. The knowledge of the true anatomy (*uerae anatomes*) was only to be gained by dissection and close examination of the parts of the human body by putting one's own hand to the business, as Vesalius had done at Paris.[94] The 'true anatomy' was not Galenic but pre-Galenic: that is implicit in Vesalius' comment that anatomy had not been cultivated at any university as much as it had been in the days of old at Alexandria.[95]

Paracelsus, too, saw himself as one who was to restore a lost ancient knowledge and wisdom. True knowledge came through the 'light of nature', and that light was just as good in ancient times, even before the advent of Christ, as it is today. Hence the ancients had been able to attain great advances in the knowledge of nature. The eternal wisdom which Christ brought superseded the light of nature, and 'astronomers, magi, diviners and others abandoned their art as the inferior light and followed Christ rather than nature'.[96]

Though a minor light, the light of nature was not abandoned by God, but given to those for whom nature destined it. Aristotle, Galen and Avicenna, through their doctrines, had obscured the light of nature as well as that of eternal wisdom. By uncovering the internal powers concealed in objects and phenomena, Paracelsus saw himself as hearkening back to a true knowledge of nature which had been lost from view through the pernicious influence of Aristotelian, Galenic and Arabian doctrines.[97]

The notion of a '*prisca*', as *prisca theologia*, had been prominent in the late fifteenth century among the thinkers associated with the Platonic Academy, which had flourished at Florence under the patronage of Lorenzo de' Medici.[98] It was given wide currency through Marsilio Ficino's writings, especially his translation and his commentary on the *Corpus Hermeticum*. It consisted in the assertion that even before the revelation which came in its fullness with Christ, God in His mercy had vouchsafed a partial revelation to the world through a chain of sages. The chain, in the usual Ficinian version, began with Hermes Trismegistus and continued with Zoroaster, Orpheus, Aglaophamus, Pythagoras and Plato.

Despite similarities between the approaches of Vesalius and Paracelsus to Hebrew wisdom and the '*prisca*', which may seem to show the impress of Renaissance humanism in each case, it must be stressed that the differences in this respect are much more important. Indeed, it would scarcely be an exaggeration to say that the contrast between the life-ideals and styles of thought of Vesalius and Paracelsus are nowhere more clearly illustrated than in their approach to these issues.

Vesalius did approach the study of anatomy and medicine as a *humanist*. He was descended from a long line of physicians and court apothecaries. He was

[94] 'nisi negotio manus admovissem ipse'.
[95] Praefatio, 4; Farrington, *op. cit.*, p. 1363.
[96] *Philos. Sagax*, I, 1, Sudhoff XII, pp. 26–8; Pagel, 1958, pp. 57–8.
[97] Pagel, *op. cit.*, 1958, pp. 57–9.
[98] On the *prisca theologia* see D. P. Walker, Orpheus the Theologian and Renaissance Platonism, *J. Warb. & Court. Ins.*, **16**, 1953, pp. 100–20; also The Prisca Theologia in France, *ibid.*, **17**, 1954, pp. 204–59. For a new and comprehensive presentation of all the relevant questions reference must be made to the important work by F. A. Yates, *Giordano Bruno and the Hermetic Tradition*, London, 1964.

educated both at the University of Paris and at Louvain, where, as already noted, the Erasmian ideal of humanism profoundly moulded his thought and literary style. He wrote consciously as a member of a cultured *élite* deeply imbued with the new humanism. Religious motives are not conspicuous in his anatomical studies; he is not concerned, as Galen was, to turn the thoughts of his readers to the evidence of design as manifested in the human frame, and hence to the Creator.

Vesalius employed the notion of a *prisca anatomia* and *medicina*. He believed the *prisca anatomia* to be pre-Galenic. But the idea of a chain of sages, possessed of the secrets of nature, does not find a place in his work.[99] While departing from the Ficinian idea of the *prisca*, he also goes beyond the humanistic notion of the knowledge and wisdom of classical antiquity: it is not sufficient to return to the works of the ancients, as if all that was to be known was to be found there. Knowledge was to be gained through manual operation, through dissection, through empirical observation, through criticism and correction of even the most revered authority: after all, Galen had frequently corrected himself, removed oversights in his earlier books after acquiring more experience, and sometimes taught contradictory views.[100] It was the return to experience and observation which constituted the real return to a *prisca*. Thus Vesalius propounds a point of view which, carried to a logical conclusion, would have entailed a considerable modification of the humanistic veneration for classical antiquity, and the claims made for the ancients, at least in natural philosophy. But it is as if, in the end, his humanistic bias places a limitation upon the development of this viewpoint, as seen notably in his comment on the interventricular septum, already referred to, that he felt lacking in that confidence which would enable him to give a reformed account which contravened the teaching of Galen.

Paracelsus, on the other hand, is in a different Renaissance tradition, that of Christian Hermeticism.[101] His social origins were different from those of Vesalius: he was probably the son of a nobleman's illegitimate son.[102] Although there are reasons for believing that he frequented universities, it is essentially from within the craft-tradition of the surgeon that he aims his great shafts at the academically trained professional physician.

Using Greek and Hebrew roots, Paracelsus coined many neologisms, e.g. Archeus, Truphat. But that such 'humanistic' showing-off of linguistic scholarship was well reconcilable with Hermetic trends is shown by the example of Leonart Thurneysser and his *Onomastica* (1574 and 1583).[103] Paracelsus' impa-

[99] The attitude of the humanists towards the Hermetic *prisca* was marked by a more critical historical sense. See Yates on the views of Erasmus, *op. cit.*, pp. 164–6.

[100] '. . . Galenus se frequenter corrigit, suamque negligentiam in quibusdam libris commissam, in aliis, postea exercitatior redditus, non semel indicat, contrariaque subinde docet . . .', Praefatio.

[101] On the distinction between humanism and hermeticism see Yates, *op. cit.*, 1964, esp. pp. 157–68.

[102] That Paracelsus' father was the illegitimate son not of the famous 'irate' knight but of his brother was suggested by Toxites, *Testamentum Ph. Theophr. Paracelsi*, 1574, and the view has recently been taken up by Greiner, Karl, *Paracelsus im Lande seiner Väter* (*Salzburger Beiträge z. Paracelsus-Forschung*, vol. 2), Salzburg. Internat. Paracelsus-Gesellschaft, 1961, pp. 5–7 and appendix, pp. 39–42. The usual opinion has thus again become doubtful, and the question is far from settled.

[103] A strong admixture of charlatanry and advertising, however, underlies this combination in the case of Thurneysser.

tience with humanism is to be seen in his assertion that it was the light of nature which made the physician and his experience: of these he knows little who wants to become municipal physician, lector or *professor ordinarius* . . . who are decayed in schoolmastery (*in schulmeisterei erfault sind*), or are swollen up in rhetoric, or have accustomed themselves to lying in poetry so that they are no different from letters come together—the letters which make many a greater fool.[104] A strong non-humanistic motive quite remote from the Vesalian motives is the emphasis laid by Paracelsus on the *Christian love of the neighbour*. He says, to give one instance, that in the face of such terrible diseases as epilepsy, 'cursed be all physicians, who leave and do not help, but like the priest in Jericho and the Levite went from the wounded and let them lie and only the Samaritan came to help . . . thus they are possessed by the devil, that they do not show the love of the neighbour'.[105]

Religious motives pervade the thought and work of Paracelsus. It is Christian, rather than humanistic, motives which serve him as justification for the physician's art and craft, prescribe the ends to which it is to be devoted, enter into the very structure of his medical doctrines, and form the background to his empirical and experimental attitude.[106] Paracelsus' was a Christian occult philosophy (as Cornelius Agrippa called it) which in no way excluded magical practices (talismans, *Imagines*—Paracelsus wrote a *de imaginibus*). In this he is a Christian Hermeticist, not unlike Ficino and Pico.[107] His yearning for the *prisca* is neither scientific-empirical, nor really humanistic, but interlocked with his Hermeticism and Christianism (a religious-cosmosophic attitude).

But though the Christian Hermeticism of Paracelsus is comparable to that of Ficino and Pico, it incorporates a stronger anti-authoritarianism and a more powerful emphasis on *manus opera*, which makes the Hermeticism of the latter appear literary and genteel by comparison. In this respect, Paracelsus reflects the changed character of the Hermetic currents beyond the Alps and especially in the Germanic lands in the age of the Reformation.

We have seen already how the insistence of Vesalius on the importance of manual operation and observation carries within it a threat to the humanistic veneration of antiquity, at least as far as the natural philosophy of the ancients is concerned, and carries Vesalius beyond the humanism of the literati. In similar fashion, Paracelsus' emphasis on *manus opera* and observation, guided by the 'light of nature', ultimately carries him far beyond the Ficinian *prisca theologia* and the chain of sages possessing perfect knowledge about nature. Both thinkers may, in this sense, be viewed as transcending the framework of the Humanism and the Christian Hermeticism of the Renaissance.

This comparison of Vesalius and Paracelsus may be concluded, then, with

[104] *Elf Traktat*, X, Vom fallend, Sudhoff I, p. 150.

[105] '. . . verflucht seind alle arzt, die do fürgehen und nit helfen, sonder wie der pfaff in Jericho und der Levit für den verwunden gingen und lissen in ligen und allein der samaritan kam im zu hilf . . . also hat sie der teufele besessen, domit das sie die liebe im nechsten nicht vollbringen. . . .' Von den natürlichen Dingen, cap. VIII, Sudhoff II, p. 155.

[106] Pagel, W., Religious motives in the medical biology of the XVIIth century, *Bull. Hist. Med.*, 1935, 3, 97–312 (pp. 99–111); for Paracelsus' *De imaginibus*: *see* Paracelsus and Techellus the Jew, *ibid.*, 1960. 34, 274–7.

[107] See Yates, 1964, p. 166, note 1.

this remarkable convergence of ideas on the methods by which man and the world of nature was to be studied and the science of medicine advanced—a convergence all the more remarkable in representatives of two very diverse traditions which went into the making of the scientific revolution of the sixteenth and seventeenth centuries.

Conclusions

Despite the impression they convey of thinkers totally opposed in personality and doctrine, Vesalius and Paracelsus display a number of interesting similarities:

1. Both attack the Galenic orthodoxy of their time. Paracelsus was the first Renaissance thinker to reject the Galenic system in its entirety. Vesalius' opposition was more limited, and confined to Galen's anatomical doctrines; but he strengthened the criticism of Galen, which had been growing in his own lifetime. In addition to pragmatic reasons, philosophical and religious reasons were important in Paracelsus' rejection; Vesalius' criticism was based on detailed and purely anatomical researches.

2. Both condemned the contempt for manual work and experimentation which they regarded as scandalous and a barrier to the advancement of medicine. In separating the physician from the compounding of drugs and the practice of surgery, a breach had been made with the earliest and best physicians of antiquity. Repairing that breach was essential for reforming the art of medicine.

3. An interest in Hebraic lore and in the notion of a *prisca sapientia* is characteristic of both Vesalius and Paracelsus; but their approach to these themes has its roots in two very different Renaissance traditions. Vesalius' approach is that of a *Humanist*, Paracelsus' that of a *Christian Hermeticist*. In insisting on *manus opera* and observation as the methods by which the human frame and the world of nature were to be studied, they transcend the two Renaissance traditions and show a remarkable convergence over the way in which the science of medicine was to be reformed and advanced.