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The good anatomist according to Jean Riolan Jr.

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Abstract

The important French anatomist Jean Riolan Jr. specifies in his work *Anthropographia* comprehensively for the first time in the history of anatomy several conditions which anatomy adepts should fulfill during their preparation. Good anatomists should be prepared for their work physically, mentally, culturally and ethically. The teacher of anatomy should abide by three rules: have experience in anatomical dissection, possess the proper skills and correct approach to dissection, and use an appropriate teaching method.

Key words

History of anatomy, Jean Riolan Jr.

Back in Antiquity the development of medicine induced several authors to discuss the question of what makes a good physician. The short Hippocrates' (430-350 BC) treatise called *The Law* contains a brief summary of the requirements for an Ancient Greek doctor (Hippocrates, edited 1998), and Galen (129-210 AD) wrote two pieces on this subject: *How to Recognise the Best Physician* (Galen, edited 1988) and *The Best Physician is also a Philosopher* (Galen, edited 1977). In the transition from Middle Ages to Renaissance, Zerbi in the treatise *De cautelis medicorum* designed rules for a good physician based on Hippocratic, Arabic and Christian authorities. However, only in the Modern Age, when anatomy became a central point of medical education, specific reflections on the necessary qualities of an anatomist first appeared. The question „Who is a good anatomist“ was tackled by Berengario da Carpi (1460–1530) (da Carpi, 1521; Bondio, 2010) and Vesalius (1514–1564) (Vesalius, 1543; French, 2003), but the author who set out these requirements most comprehensively was the important French anatomist Jean Riolan Jr. (1577/1580–1657). The father of this physician and anatomist was himself a famous anatomist, and he himself was an influential member of the Faculty of Medicine in Paris and personal physician to the French queen Maria de' Medici. He was productive as an author of medical literature, a known supporter of Galen (Siraisi, 2010), but he opposed Harvey's theory of blood circulation (French, 1994) and Bartholin's lymphatic system (Loukas et al., 2011). In the history of medicine he ranks among the anatomists who were called *princeps anatomicorum*, prince of anatomists, and he was addressed in this way also by his opponents,

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who nonetheless respected him, e.g. William Harvey (1578–1657) (Harvey, 1649). Traces of him remain in anatomical terminology, in the form of several eponyms: *anastomosis Riolani* (joining of *a. colica media* and *sinistra*), *musculus Riolani* (*m. cremaster*), and *ossa Riolani* (*ossa suturarum*) (Bartolucci and Forbis, 2005).

In one of his very first books Riolan tackles the issue of the various known ways of learning anatomy, concluding that they are basically three: *doctrina*, theoretical education, *inspectio*, the method of visual observation, and *operatio*, the manual work of dissection during autopsy. *Doctrina* is mediated through lectures and reading, but a better way of learning is *inspectio*, because watching a dissection is better than trusting in books of anatomy. The third condition for perfect knowledge of anatomy, however, is *operatio*, the autopsy itself, which must be performed by everyone who intends to master anatomy, so as not to be dependent on other people's eyes and hands (Riolan, 1608).

These ideas are developed in more detail in Riolan's most significant work on anatomy, *Anthropographia*, published in several successive editions. Referring back to Aristotle and Galen, in the introduction he divides medicine into the theoretical aspect aiming at *gnósis*, knowledge, and *theória*, theory, and the practical aspect aiming at *chrésis*, usefulness, and *praxis*, practice. The former are learnt through the ears and eyes, that is by means of lectures and reading, and the latter by means of manual work (Riolan, 1626). It is this, working with the hands, that the author emphasises, giving it a great deal of space in his introduction. Up until mid 16th century the traditional way of performing an autopsy was that the professor, *magister*, read out and explained the theory, the *demonstrator* identified and exhibited the body parts, and the third, the *prosector*, did the dissection. Development in science brought change, however, and there was increasing demand for anatomists to carry out these three activities themselves, i.e. the dissection, demonstration and explanation (Mandressi, 2011). Riolan's emphasis on the necessity of performing autopsies accords with the opinions of several of his predecessors: Berengario da Carpi claimed that anatomy could not be learnt solely by means of the voice (i.e. by listening) and the letter (i.e. by reading), but that it also required sight and touch (*visus et tactus*) (da Carpi, 1521). Jacques Dubois (known as Jacobus Sylvius) (1478–1555), Vesalius' teacher, wrote in his introduction to anatomy that autopsy should be learnt through sight and touch (*visu et tactu*) rather than by listening and reading (*auditu et lectione*) (Sylvius, 1560). In the introduction to his epochal work *De corporis humani fabrica*, Andreas Vesalius in turn described the categorisation of specialists based on the traditional form of treatment they provided (change in life-style, prescription of medicines and surgical operations) as misguided, because the anatomical description of a human being is the basis for the whole of medicine (Vesalius, 1543).

One chapter in Riolan's work *Anthropographia* is called: *Qualis esse debeat anatomiae studiosus*, i.e. What should the student of anatomy be like? (Riolan, 1526). The author specifies several conditions which anatomy adepts should fulfil during their preparation:

1. Everyone who wants to know anatomy perfectly must be trained from an early age; in Greek this was called *paidomathia*. This was maintained by the Ancient Greek authorities Hippocrates and Galen themselves, who emphasised working with the hands. Older anatomists who avoided "anatomical work", *labor anatomicus*, were quite happy with theory alone and overlooked the skills they had learned when young, with the result that they undervalued and neglected this art.

2. Anatomists must maintain their characteristic diligence, *philoponia* in Greek, and good physical health, so that they can patiently bear all the difficulties and strain which they have to deal with in anatomical work.
3. Anatomists must also be fearless, i.e. they must not be afraid of ghosts. Otherwise they might suffer the same misfortune as a certain Phaylos, who the Greek author Pausanias writes about in connection with the famous oracle at Delphi. Supposedly there was a metal skeleton set up there, a statue of a man made of bones and without flesh, like a person who had died of some fatal wasting disease. It was said that Hippocrates himself had donated the statue to the oracle. When Phaylos saw it, he had a dream the following night in which he resembled the figure, and shortly after that he really contracted a malignant disease and died (Pausanias X 2.6). Today we might understand this requirement in the sense that anatomists must not be afraid that they might be affected by some supernatural force during their anatomical work, i.e. they should not be prone to mental problems due to the fact that they work with corpses.
4. The whole of the next passage is in fact a compilation of many quotations from classical as well as modern age authorities, and Riolan appears here as an expert in classical literature. The fundamental idea which he develops here is that in anatomy, as in medicine generally, the most important thing is autopsy, seeing with one's own eyes. It is more advisable to trust in what one sees, rather than hearing other people's ideas or reading them in books. Aristotle however, in his treatise *On Breathing* appears to give priority to reading rather than autopsy when he says that the linkage between the heart and the lungs is studied with the eyes during dissection, and then in detailed reading (Greek *akribeia*) of his work *Historia animalium* (On respiration XVI). This apparent contradiction is taken from the commentary on Aristotle's works by the well known Swiss polyhistorian Conrad Gessner (1516–1565), and Riolan used Gessner's interpretation as well: it must be said that this description has not been passed down to us by just anyone, but by trustworthy writers who had seen it not once, not twice, but more often and very thoroughly (Gessner, 1586). In support of his opinion Riolan also quotes Galen, who stated that anyone who wants to practise anatomy properly should believe his own eyes rather than books (De usu partium II,3 : III,98 K).
5. The author goes on to emphasise that the human body must be viewed as a whole. He cites Pliny Senior, according to whom the strength and magnitude of Nature become less trustworthy if only parts of it are considered, and not the whole (Naturalis historia VII,1,7).
6. Riolan is also against anatomical pictures, which he alleges to show only figures of people and animals. He supports his claim by again citing Pliny Senior, who says that a picture is deceptive (*pictura fallax*), especially as far as colours are concerned, and it shows only the surface, not the inside (Naturalis historia XXV,4). So any *iconica anatomia*, or anatomy in pictures as Riolan calls it, can please and impress uneducated people, but the same comment applies to them as Hippocratic author makes in his treatise *Regimen*: Many admire it, but few understand (De diaeta I,24). Virgil takes a similar view of his Roman hero Aeneas, when he studies his shield: He admires it and, although he doesn't understand it, he is pleased by the pictures (Aeneis VIII,730). After further quotations from Roman authors Lucilius and Martial, Galen and Aristotle again, and Modern Age anatomists

André du Laurens (1558–1609) and Jacques Dubois, Riolan concludes by stating that many anatomists fill their explanations with symbols, registers and lists of their illustrations, but in his view that is an ineffective, unclear way of writing, and it would be easier to decipher the codes of the Spartans, the inscriptions on the statue of the Ephesian goddess Artemis or the stenography of Tyron, which were all classical examples of incomprehensible texts. Illustrations were a relatively new element in the anatomical literature, the first truly anatomic work with illustrations was the treatise *Isagoge breves perlucide ac uberrime in anatomia[m] humani corporis* (1530) by Berengario da Carpi. He is appreciated for his efforts to integrate text and illustrations, although they were not of the best quality (O'Malley, 1964). Later illustrations from Vesalius' *De corporis humani fabrica* have indeed become famous for their quality and beauty (Nutton, 2003), nevertheless, the value of anatomical illustrations was not unanimously recognised. Riolan was one of their opponents and he applied this attitude of his regarding illustrations of anatomical parts in his own work *Anthropographia* as well, which contains not a single picture. Riolan was no pioneer of this negative attitude to anatomical illustrations either, however, because his predecessor and countryman Jacques Dubois, in dispute with his own student Vesalius, had already criticised anatomical pictures, opining that they were purely for the amusement of women or the authors' own self presentation (Sylvius, 1548). Elsewhere he wrote that these pictures could be puzzled out only with great difficulty (Sylvius, 1561). In time, though, Riolan's strict rejection of illustrations softened, because his later work *Encheiridium anatomicum et pathologicum* included 26 tables with illustrations and explanatory notes (Riolan, 1649). Apparently we must understand Riolan's attitude as a demonstrative rejection of the study of anatomy based exclusively on lower-quality illustrations in textbooks without the practical support of dissection.

7. Moreover, it is not sufficient to see the structure of the human body once or twice, because we cannot know thoroughly anything which we have perceived through our senses, unless we see it frequently enough. Even those who have devoted their whole life to this art know to have erred in many cases, so what can be expected of those who started studying anatomy today, yesterday, or just the other day, and are convinced that something they have never seen before must always be the same and they do not need to see it all over again? Riolan cites Galen's observation that there were many things he had previously overlooked, and which he only recognised on repeated dissection (Anat. admin. VII,10 : II,621 K.).
8. The final requirement was the proper place to study, that is the correct choice of school. The point was that not many schools provided good opportunities for studying anatomy, because in Riolan's time apart from in Paris, whether in the rest of France, or in Italy, Spain or Germany, very few human dissections were performed. In each year there was probably only one corpse available, and in some places anatomy was even considered unsavoury and inhumane. In 1556 the Spanish king and emperor Charles the Fifth asked the University of Salamanca to confirm whether Christian physicians were permitted to dissect human corpses, and he received the reply that for physicians it was both useful and necessary. The University of Paris was fortunate in the sense that it had between ten and fifteen corpses at its disposal every semester.

In conclusion Riolan briefly summarises once again all the requirements which Galen supposedly set up: *paidomathia*, *filoponia*, *assiduitas*, *locus*, *exercitatio*. It is not possible to find one place in Galen's works where these requirements are assembled with such brevity, but similar requirements for those who wish to learn the art of medicine are contained in Hippocratic above-mentioned treatise *The Law*. These read as follows: *natura* (inborn ability), *doctrina* (teaching), *locus* (suitable place), *paidomathia* (learning from childhood), *filoponia*, *diligentia* (endeavour, diligence), *tempus* (appropriate time) (Hippocrates, 1998).

It is interesting that in Riolan's reflections presented so far on what makes a good anatomist, only "technical" requirements are considered, and no ethical content is mentioned, in contrast to thoughts on a good physician. In the 1649 edition however, Riolan adds precisely such content (Riolan, 1649). During dissection the anatomist must treat the human body kindly and mercifully, thinking all the while that he too is mortal and must soon die, and will then be a corpse himself, that "useless burden on the earth" as Homer puts it (Ilias XVIII,104). Moreover, he should not make jokes about the poor wretch who was alive until just recently, and may not speak shamelessly about the male or female genitals, which people are normally ashamed of revealing, let alone make fun of them and use vulgar language to refer to them. Finally the anatomist must carefully store away any pieces of muscle he removes to prevent dogs or cats devouring them, and he must not throw entrails out with the common refuse, but carefully gather everything away. When the dissection is completed, the remains of the corpse must be consigned to hallowed ground, accompanied by devout prayers and entreaties to God to preserve his soul and allow his body upon the resurrection of the dead to enjoy eternal glory and bliss.

Whereas this chapter sets out the requirements which should be fulfilled in the training of a good anatomist, the next chapter named *Conditiones doctoris anatomici*, dealing with the qualities or rules for the doctor, i.e. teacher, of anatomy, consists of unsystematically presented thoughts which are more or less just developments on the preceding part. It contains a large number of quotations from the literature of antiquity as well as the Modern Age, and ends with a summary of three rules which the teacher of anatomy should abide by: *peritia*, having experience in anatomical dissection, *encheirisis*, having the proper skills and correct approach to dissection, and *optima methodus*, using an appropriate teaching method (Riolan, 1626).

In conclusion we can state that for the first time in the history of anatomy, Riolan's works provide a comprehensive overview of what is required of good anatomists. The requirements are that they should be prepared for their work physically, mentally, expertly and ethically. Most of his rules for the good anatomist belong to the commonplace of medical ethics (diligence, good physical health, education, behaviour towards the patients), but Riolan updated them specifically for anatomy. Similarly as in other examples from the history of medicine, these principles can still serve well as inspiration for today's and future anatomists.

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