While it is generally recognised that the “Studium generale” of Ferrara was famous in the fifteenth and sixteenth centuries (see also the “Encyclopedia Britannica”), the reason for this is usually not explained. In this connection, I believe that the following considerations are relevant. It is well known that in the last decades of the fifteenth century, Leonardo da Vinci (1452–1519) formulated and applied the experimental method in his solitary investigations, which remained unpublished until the beginning of the twentieth century. But it is unfortunately forgotten that, about the same time, Nicolaus Leonicensus (1428–1524) first asserted the necessity for independence from dogmatism and was also the first to introduce criticism of the classics and the necessity for experimental control, as can be seen from his work: “De erroribus Plinii aliorumque in Medicina” (1492).

Leonicensus was lecturer (Magister) in Medicine in the University or corporation of students of Arts and Medicine at the Convent of St. Dominic in Ferrara, where previously Guarinus Veronensis (1370–1460) had taught modern systems of education (Garin, Denis Hay). Not only did Leonicensus conduct philological investigations on the work of Galen and other classics, but he also introduced a new experimental principle into medical botany, which must have influenced other disciplines. These new principles were propagated by his pupil: Johannes Manardus (1462–1536) in his “Epistolae medicales” (which appeared in part in 1521, and in part in 1532) and A.M.Brasavola (1500–1555) in his “Examen omnium simplicium medicamentorum” (1536), both of whom remained in the field of clinical and medical botany. G. B.Cananus (1515–1579), and his relative A. M. Cananus (1490–1578), extended these principles to human anatomy with the “Muscorum humani corporis picturata dissectio”, which, although unfinished, appeared in 1541 or 1543 (see Muratori [1962]). The very titles of these publications show that the authors were inspired by new ideas.

Prior to Cananus, Berengarius de Carpi (who died in Ferrara in 1528, but was previously active in Bologna) had begun to discover new and important anatomical structures by means of human dissection (see also Linde and Roofe [1959]), and had introduced anatomical iconography. In fact, Falloppius (1561) refers to him as “The restorer of human anatomy”.

Manardus, Brasavola, and Cananus were all lecturers (“ma-gistri”) in Arts and Medicine at St.Dominic’s; as was G.Falloppius (1523–1562) who lectured on “simplicia medicamentorum”
or medical botany in 1547 (Muratori and Menini [1946]), before being called to Pisa and Padua. This contribution of medicine to the Renaissance of Science was important, although the experimental inductive-deductive method was not definitely formulated until Galileo, about one hundred years after Leoniceno.

Galileo, too, was first a scholar (in Pisa) and afterwards a lecturer (in Pisa and Padua) in the University of Arts and Medicine, in which humanities, natural sciences (including astronomy) and medicine were taught. Andreas Vesalius (1515–1564) from Brussels (Belgium), Nicolaus Copernicus (1473–1543) from Torun (Poland), Teophrastus Paracelsus (1493–1541) from Einsiedeln (Switzerland) matriculated in this University during their period of study in Italy. The latter investigators must certainly have been in touch with the antidogmatic Ferrarian viewpoint. Vesalius (1564) admits that he visited Ferrara, and while there most likely observed the new trend in anatomical investigation, which is expressed in his “Fabrica” of 1543 (the “Tabulae sex” printed in 1538 are, in fact, written in the mediaeval dogmatic tradition). Paracelsus is said to have graduated in Ferrara, as also did Copernicus in canon law on May 31st, 1503 (Pardi [1909], Righini [1932]).

From this, we can conclude that the enormous task of renewing the schemes and traditions of higher learning was performed in the fifteenth and sixteenth centuries in Italy by the Universities of Arts and Medicine, and that students, not only from Italy, but from all over Europe, participated in this effort.

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All these considerations point to the importance of the Convent of St. Dominic; here the University of Arts and Medicine was active from 1391 (when the Studium was founded by Alberto de Este, under the bull of Pope Boniface IX) until 1567 (Borsetti [1735]) exactly 4 centuries ago when the University was transferred to the "Paradiso" Palace.

It is interesting to see what remains today of the old monastery of St. Dominic, built in the 13th century, when the Saint was still alive. The great and small cloisters have been destroyed or transformed; the gothic church with the tombs of Leonicenus and Ben-tius Senensis (see Lockwood [1951]) was demolished in the eighteenth century and rebuilt in the baroque style, with the façade in the opposite direction. Only part of the ancient church which contains the tombs of the anatomist G.B. Cananus and his relatives, the premises of the monastic library with the sarcophagus of C. Calca-
gnini (1479–1541) and the classrooms remain, although they have been transformed in various ways. At this point, it should be remembered that the old archive of the “Studium” of Ferrara until the year 1620 was completely destroyed at the beginning of the nineteenth century.

In cooperation with A. Franceschini, I have had the opportunity of examining some unedited documents, preserved in the State Archives of Ferrara and in the Classense Library of Ravenna, documents such as various orders of payment of the lecturers of the Studium of Ferrara, a few lists of students of Arts and Medicine and an invoice of payment for the restoration of the windows of the classrooms of the University of Arts and Medicine (see Muratori and Franceschini [1966]). These documents belong to the period in which Cananus was active in research and teaching and, together with those published previously by Muratori and Menini [1946], enable us to identify the classrooms of the University and to reconstruct the academic career of Cananus.

According to our documents and to information from Borsetti (1735), there were four classrooms in the University of Arts and Medicine at St. Dominic’s. One was upstairs in a building called “Le Crocette” (fig. 1/2) and was rented by the Fraternity of the Holy Cross; according to Borsetti it was reached by means of a step, which still exists. The other three classrooms were rented by the monks of St. Dominic’s and are classified in the document as follows: 1. a small classroom adjacent to the church of St. Dominic; 2. a classroom called “dal Canton” (in the corner), both of which were probably in the building between the “Crocette” and the church (fig. 2); and 3. a classroom called “dove s’arca”, which was probably the library containing the sarcophagus of Calcagnini. At that time, University classrooms were located in very modest buildings (see Martinotti [1911]): in Padua, for instance, Vesalius taught in a building which was previously an ox-stall (“Hospitium bovis”) (fig. 3), but which was rebuilt, in the form it has now, in 1552 by the architect Moroni.

Calcagnini Celio (1479–1541), Ferrarian humanist lecturer in the University of Arts and Medicine. About 1520 (Lazzari [1936]), he wrote a monograph on the rotation of the earth “Dum coelum stet et terra moveatur”. Calcagnini asked to be buried in the library of St. Dominic’s (where he passed a large part of his life) in a white sarcophagus, placed at its entrance, with the inscriptions written by himself. He presented a large sum of money and all of his numerous books to the library, on condition that it became public.

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The academic career of G. B. Cananus appears in our documents for the first time in the list of students of Arts and Medicine for the year 1534 (when he was 19 years old), and subsequently in the lists of 1535 (as rematriculatus) and

Fig. 12. Reconstruction of the Convent of St. Dominic in Ferrara, based partially on the monumental map of the town by Bolzoni (1747). The convent was built in the thirteenth century, and from 1391 until 1567 it housed the University of Arts and Medicine.

1 = The “Crocette” building, in which a classroom was rented by the Fraternity of the Holy Cross. 2 = The building in which two classrooms were rented by the Dominicans. One of these classrooms was converted in 1551 into the anatomical theatre of G.B. Cananus. 3 = Part of the Convent, in which the library was placed downstairs, with the sarcophagus of Celio Calcagnini. The library was probably used as a class-room. In 1460 the lecturers in letters and philosophy were transferred to the “Loggia dei Callegari”, but the humanist Guarinus Veronensis taught at St. Dominic’s, as also did Leonicenus, Manardus, Brasavolus, Cananus, Fallop-pius, Bonacciolus; Paracelsus and Picus de la Mirandola were here as scholars. Today, only the part of the old
church with the tombs of G. B. Cananus and his relatives, the Calcagnini library and the building called “The Crocette” still exist. The church, rebuilt in the eighteenth century, has the facade in the opposite direction.

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Fig. 3. Reconstruction of the old building of the University of Padua based on the monumental map of the town by Vero Zanini (1509). Here, Andreas Vesalius held his public anatomies. The building was originally an ox-stall (hospitium bovis) in the centre of the town, and it was rebuilt by Andreas Moroni in 1552, even today it is still called “il Bo” (the ox). The original two courts and the tower were preserved but transformed by Moroni.

1537; he is designated as Ioannes Baptista de Canano de Ferrara. In 1538 his name also appears in a list of students, who maintained that the election of the vice-rector did not take place according to the statutes. In 1541 his name again appears in the list of August 8th (this time with his relative Jacobo Canano) as lecturer of Logic during the vacation (diebus festis), without salary and under the designation of “scholar”. In 1542, he still appears in the student list, but not in the list of lecturers of that year. Finally, as shown first by Pardi [1900] we find him among the graduates in Arts and Medicine of April 18th, 1543, promoted by Brasavola, in the privilege of doctorship of the notary Benedetto Silvestri.

In the following academic years from 1543–1544 until 1551–1552 Cananus appears as lecturer of surgery or sometimes of practical medicine, in charge of anatomical demonstrations.

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In these documents there are two important notes. According to the order of payment of September 19th, 1544, Cananus, then lecturer of extraordinary practical medicine, had his salary reduced because on May 1st, 1544 he left Ferrara and went to the imperial camp as physician of Francis de Este, brother of Duke Ercole II (quoniam die primo mensis mai anni presentis recessit ab hac civitate Ferrariae et se contulit in foelicissimis Castris caesareis pro medico Domini Francisci estensis). In the order of payment of August 31st, 1551, the expenses for the erection of a wooden theatre for public anatomies in the school of St. Dominic are noted. “The theatre was built with the approval of all the scholars and of the public doctors lecturers, for the common utility of all” (fig. 7).

“(The sum in order to pay)... assides et ligna pro teatro publico ... facto in scolis loco festis carnis privvis pro anatomis publicis fiendi; quod theatrum factum fuit de consensu omnium scholarium ac doctorum publice legentium ad communem omnium utilitatem...” Each year the students celebrated their carnival with money deducted from the salary of each lecturer. This document shows that in 1551 the students renounced their festivities in order to divert this money towards the erection of the anatomical theatre. 

Vesalius states, in his letter to Falloppius (1564), that he again met Cananus at the bed of Francis de Este at Regensburg (Ratis-bonae), and that Cananus informed him about his discovery of the valves of the deep veins; but he does not say in what year. According to the Ferrarian biographers of Cananus, this meeting took place in 1546 because in that year Charles V was in Regensburg and Vesalius was one of his physicians, but the document examined by Muratori...
In our documents, the numbers of students in the University of Arts and Medicine were 62 in 1534, 56 in 1535, 43 in 1537, 44 in 1541, 57 in 1542. The lecturers in Arts and Medicine, besides G. B. Cananus, were 32 (of whom 4 were humanists) in the academic years 1545–56 and 1547–48. In addition to G. B. Cananus, outstanding students in the years 1534, 1535 and 1537, were Augustinus Gadaldinus and J.B. Susius; and in 1542, Benedictus Varchius Florentinus, and Bodericus Ferdinands Portugesius (Amatus Lusitanus).

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and Franceschini shows that the year was not 1546, but 1544. On the other hand in the list of payment of lecturers of 1545–46 (Muratori and Menini) Cananus is quoted without any reduction of salary for absence.

It is possible also that Vesalius, writing his letter after 18 years, did not remember exactly where the meeting had taken place. But our document proves that by 1544 Cananus already made his observations on the valves of veins.

Fig. 4. The so-called “Paradiso” Palace, to which the University of Arts and Medicine was transferred in 1567, and in which an anatomical theatre was built and public anatomies held. The anatomical theatre still preserved on the ground floor in the part of the building marked with a circle was erected by the anatomist Agnelli and the architect Mazzarelli in 1731; in the same year the botanical garden (G) and the University Library were established. From Bolzoni’s map of Ferrara (1747).

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These documents also prove the existence of an anatomical theatre at the Convent of St. Dominic in 1551, in one of the classrooms mentioned above. In this theatre, Cananus performed his anatomical demonstrations at which the Duke of Ferrara and his court were also present, according to Boschi Hippolitus [1600], a pupil of Cananus. Cananus also carried out private dissections in his own home with the cooperation of Antonio Maria Cananus and of the painter Gerolamo de Carpi, and in the presence of other physicians and members of the faculty (see Picturata dissectio, introduction). Cananus’ house has been identified as the building at number 3, Piazzetta del Turco (Manfredini in cooperation with Muratori); here Cananus received as visitors Vesalius, Fallopius and Caius.

Cananus wrote his masterpiece “Picturata dissectio” and taught to the University (as reported above) while he was still a student. G. Fallopius also taught in Ferrara, Pisa and Padua without any doctor’s degree; in fact, he graduated in Arts and Medicine in Ferrara, promoted by Biasavola on October 3rd, 1552 (Pardi [1909]).

When the University was transferred to the “Paradiso” Palace (1567), another anatomical theatre was built there, according to a document of 1588 published by Muratori and Guidorizzi [1959]. Public anatomies were certainly performed in 1571 and 1575 because the orders of payment for these years show that the students again gave up their carnival festivities, subsidised, as mentioned, by grants from the lecturers’ salaries, in order to enable the dissections to be performed (Muratori and Franceschini [1965]).
Finally, in 1731, the anatomist Giacinto Agnelli and the architect Francis Mazzarelli built the anatomical theatre which still exists on the ground floor of the Paradiso Palace (figs. 5 and 6). The plan of this theatre is octagonal and it has special entrances for the students, for the lecturer and for the cadaver; it is also well lit by four large windows. It has a form which is intermediate between, and removes the imperfections of the well known theatres of Padua (oval in form and without light) and of Bologna (rectangular with only one entrance), (Richter; Wolf-Heidegger and Cetto [1967]).

Muratori and Bight [1964] have translated the “Picturata dissectio” of Cananus and the preface of the “Fabrica” of Vesalius; it is now possible, therefore, to compare the most remarkable assertions of both these anatomists5.

Cananus :
“... there are two ways of dissecting bodies: on the living, and on the dead. With the help of the former (if methodically performed) we shall learn the active functions of some (if not all) parts, which need to be known for their therapy. Of course, not performing the dissection on living men ... but on animals which in fact are very similar to man in many of their organs and above all in their function ... With the dissection of dead bodies, it is possible to know the form, the position, the succession and sometimes the relations and the functions of organs... informations indispensable to making a physician more competent.”

Vesalius :
“I have written ... the general treatise of the parts of the human body, in seven books; ... in it every small part of the human body is examined very particularly. Their number, situation, form, size and substance; their connection with other parts; their use, function and all the numerous other observations, which I am accustomed to investigate in the constitution of parts by means of dissection, of which the technique is exposed on the living and on the dead ...”

The reader will find other details on the life and the work of Cananus in the introduction to the translation into Italian and English of “Picturata dissectio” by Muratori [1962].

Cananus :
“... you (Bartolomeus Nigrisoli) have never refrained from exhorting me ... to publish ... the drawings concerning the parts of the human body ... In fact, you thought that it would be possible that he who practises medicine and is not able to know the parts of the body by means of accurate observation of dissections, would in this way be able to concern himself with human health with greater certainty ...”

Vesalius :
“Our drawings ... will delight much those who are not always able to dissect the human body ... by this means those who were present at dissection will have a guide to demonstrations ... On the other hand they will be useful to those, who are not able to see directly ... ; the drawings of all parts are inserted in the text in such a way as almost to put the dissected body under the eyes of the investigators of the creations of Nature ...”

Cananus :
“... In my youth, I instructed myself diligently in the dissection of living animals and of dead men as much as possible, and I esteemed it noble to divulge to disciples of medicine some of my newly-acquired knowledge. I have verified carefully with my own eyes many concepts already known and published in ancient books, and I myself have discovered some other new ones inherent to practical medicine.”

Vesalius:

“... in our time no lost science has been afterwards so completely reconstructed as Anatomy. However, I would never have been successful in this enterprise had I not used my own hands in this work of dissection when I studied medicine in Paris ... I, myself, after having devoted my attention to the dissection of some animals; ... I have performed in public ... the third dissection to which I had never attended ... I have tried afterwards to show, together with a more accurate dissection of the viscera, the muscles of the hand ... at Louvain ... I have exposed the structure of the human body more accurately than in Paris ...”

From these comparisons, the contributions of Cananus to the Renaissance of Anatomy appears evident: Cananus and Vesalius express the same ideas. Cananus is not a prevesalian, as Castiglioni and other authors believe because not only did he live at the same time as Vesalius, but he acquired and then divulged the same principles in his lectures, independently of Vesalius. Cananus was not a pupil of Marcantonio dalla Torre, as Castiglioni thinks, because the latter died in 1511 and the former did not study in Pavia.

Thus Cananus and Vesalius both contributed to the Renaissance of human anatomy, improving on the work begun by Berengarius de Carpi: Vesalius with his talent for complete and systematic writing of treatises and his contributions to anatomical nomenclature (Elze [1964], Steudel [1943]); Cananus with his zeal for the discovery of new anatomical structures of basic physiological interest (valves of veins). In this sense, these two great personalities are complementary.

It must be remembered also that coeval with Cananus and Vesalius in northern Italy, were anatomists like Eustachio (ca. 1510–1574) in Urbino and Rome, and Ph. Ingrassia (1510–1580) in Naples and Palermo. Therefore we must recognise that freedom, enthusiasm and the talent for anatomical investigation were widespread in Italy.

According to G. Favaro [1933], Ingrassia graduated in Padua in 1537, thus in the same year as Vesalius; therefore the latter did not influence the training of the former.

320 Mttratori The academic career and anatomical teaching of G. B. Cananus at that time. In the fifteenth and seventeenth centuries, as Burckhardt asserts [1866], the Italian public, as a whole, was interested in the study of nature; investigators were not threatened or muffled in silence, but could count on the consent of congenial persons. In my opinion, Leonardo da Vinci (see above) may be considered the greatest interpreter of the feelings and trends which were spontaneously diffused among the Italian people, as, for instance, in Ferrara where the head of the government (Duke Alphonsus I de Este), the upper classes and the common people of the town all acknowledged the merit of
Leoniceus’s scientific work; this is shown by the inscription on his gravestone in St. Dominic’s (Guarini [1621]).

These investigations and others of Muratori and Bighi still in progress on the work of the anatomists of the Renaissance bring us to the conclusion that the true significance of anatomical research in Italy in the sixteenth century was not completely understood by Vesalius and by many of his modern interpreters. In fact the Italian investigators were mainly interested in making new anatomical discoveries. On the other hand, many of the Italian authors of that era did not appreciate the systematic value of the work of Vesalius nor his great ability as a writer of treatises. These results show that our knowledge on the Renaissance of anatomy is still inadequate and conventional. Therefore an impartial evaluation of the Renaissance of Anatomy requires a more complete examination of the work not only of Vesalius but also of contemporary Italian anatomists, as well as further studies of the archives.

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Summary
Unedited documents preserved in the Archives of the State of Ferrara and in the Classense Library of Ravenna (including several orders of payment for lecturers, and matriculation lists of students of Arts and Medicine, as well as an invoice of the “Studium” of Ferrara in the sixteenth century) enable us to reconstruct the academic career of the Ferrarian anatomist, G. B. Cananus. He was a scholar in the University of Arts and Medicine at the Convent of St Dominic from the academic year 1533–34 until the academic year 1542–43, when he graduated in Arts and Medicine.

From the year 1543–44 until the year 1551–52, he appears as lecturer of surgery or of practical medicine, in charge of anatomical demonstrations. In the academic year 1541–42 he is shown as lecturer of logic without salary, although still a scholar.
These documents prove also that Cananus went to the imperial camp of Charles V as physician of Francis de Este in May 1544 and not in 1546, as previously assumed. Therefore he made his observations on the valves of deep veins before 1544. These documents also give information about the classrooms at the Convent of St Dominic, and show that in one of them an anatomical theatre was erected. In this theatre, Cananus carried out his public anatomies. From comparisons of the most remarkable assertions of Cananus in the “Picturata dissectio” and of Vesalius in the “Fabrica”, it is evident that both these anatomists, with their particular complementary talents, contributed to the Renaissance of human anatomy, improving on the work begun by Berengarius de Carpi.

Resume
En utilisant des documents inédits, conservés aux archives d’état à Ferrare et à la bibliothèque de Classense à Ravenne (renfermant entre autres plusieurs ordres de paiement pour des leçons, des listes d’immatriculation d’étudiants à la faculté des Arts et Médecine, ainsi qu’une facture pour la remise en état du «Studium» de Ferrare au XVIe siècle), l’auteur présente une biographie de G. B. Cananus, anatomiste à Ferrare. Il fut étudiant à l’Université des Arts et Médecine au couvent St-Dominique dès l’année académique 1533–34 jusqu’à l’année académique 1542–43, à la fin de laquelle il obtint son diplôme d’Arts et de Médicine.

Zusammenfassung

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