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MEDICAL SCHOOL OF COLUMBIA UNIVERSITY: INNOVATIVE ACTIVITY FROM ITS ESTABLISHMENT UNTIL THE LATE 19TH CENTURY

The article deals with the innovative activities at the Medical School of Columbia University from 1767 to the late 19th century. Moreover, the author points to the prerequisites for the establishment of the Medical School in New York. Firstly, in 1750 young and skilled doctors moved to New York and started to conduct private classes for those wishing to master medicine. Secondly, in 1760 according to the law, every doctor and surgeon had to obtain special permission – a license for practicing. As a result, in 1767, the Medical School of King’s College appeared. It should be noted that it changed its official name many times for many reasons. Finally, in the late 19th century it became the Medical School of Columbia University. There was intensive development of both individual and collective innovations in the 1840s – 1850s.

Key words: *American medical education, license for private practice, King’s College Medical School, innovations, College of Physicians and Surgeons, individual innovative activity, mutual innovative activity, Medical School of Columbia University.*

Introduction. Today, Columbia University Vagelos College of Physicians and Surgeons is one of five U.S. oldest medical schools. According to the official website of the education institution (<https://www.ps.columbia.edu/>), for over 250 years the medical college has been developing professional education, research, and patient care not only in New York but all over the world (*The History of the Vagelos...*, n.d.). However, this medical college has come a long way – from medical school with six professors to a powerful center of innovative education and medicine. It should be noted that from the beginning, in the 1760s, it was the King’s College Medical School. Over time and due to many factors, including innovations, the education institution received the name “Medical School of Columbia University” in the late 19th century.

Analysis of relevant research. In different years the following researchers discussed the activity at the Medical School of Columbia University with the description of innovations: V. Mott (1850), J. Dalton (1888), F. Lee (1904), M. Smith (1904), B. Stookey (1967), D. Humphrey (1976), A. Griesemer (2010) and others. However, in the domestic pedagogical thought, this issue still needs to be considered.

The study aims to cover innovations at the Medical School of Columbia University from 1767 to the late 19th century.

Research methods. In the study we have used the following methods:

- *bibliographic* – to search for scientific and pedagogical sources on the activities at the Medical School of Columbia University in the mentioned period;
- *content analysis and systematization of scientific and pedagogical sources* – to clarify the state of the problem and identify the necessary factual material in the world pedagogical discourse;
- *problem-chronological* – to determine the prerequisites for the establishment, and activity at the Medical School of Columbia University (the second half of the 18th – the late 19th century), namely implementation of innovations.

Results. According to D. Humphrey, “the campaign to upgrade Medicine in New York City, which eventuated in the founding of the King’s College Medical School, grew out of the city’s success in attracting talented and well-trained physicians during two decades after 1745” (Humphrey, 1976). J. Bard, P. Middleton, and J. Jones were well-known and successful New York physicians of that time. Although in 1750, J. Bard and P. Middleton performed an autopsy on the executed criminal in New York to train young people engaged in medicine. Moreover, they inflated the vessels of the body using the Ruysch method (Smith, 1904, Stookey, 1967).

In 1760, the first colonial law was passed. It introduced a procedure for licensing doctors and surgeons. However, over time, it had the same fate as many laws of the time. In 1763, S. Clossy began lecturing on anatomy for New York physicians. In this regard, the representatives of King’s College offered him the position of the professor of natural philosophy and to hold such events on the territory of the education institution. It was the first university course of lectures on anatomy led by an experienced anatomist as part of the curriculum at any American college. From 1764 to 1766 S. Clossy was teaching anatomy and pharmacology (Stookey, 1967, Humphrey, 1976).

Taking the opportunity to introduce the law, P. Middleton, J. Jones, S. Bard, and S. Clossy decided to establish a medical school at their own expense, but with the support of the King’s College. Then this initiative group persuaded the representatives of the King’s College to open a medical school, justifying the urgent needs of that time, such as:

- granting graduates a degree that was equivalent to a license to practice – without further examinations at the licensing agency;
- the importance of degrees that testified to the merits of a doctor and distinguished competent and incompetent specialists;
- strengthening the requirements of the adopted law (Humphrey, 1976).

Therefore, in November 1767, the King's College opened a medical school and it was the first institution in the North American colonies to award the degree of Doctor of Medicine. Initially, the college management introduced six professorships related to anatomy, surgery, theory and practice of medicine, chemistry, pharmacology, and midwifery. At the same time, there was the mechanism determination of getting medical education. It was similar to the one introduced by the College of Philadelphia in 1766 (*Announcement of the College...*, 1940; Humphrey, 1976). References indicated that the King's College Medical School was not the first medical school in the United States, but the first to be associated with the college (Matthews, 1904). J. Jones became a professor and head of the Surgery Department. He was the first man to receive this title in the American colonies (Griesemer et al., 2010).

Thus, students had the opportunity to obtain a Bachelor's degree after three years of study if they attended at least one full course of lectures of each professor, passed all the necessary exams, took an extra exam in Latin and philosophy (those who did not have B.A.). Those who were medical students for three years had the opportunity to obtain a Bachelor's degree in two years. Those wishing to obtain the degree of Doctor of Medicine had to fulfill the following conditions: a year after receiving the Bachelor's degree in medicine, to be 22 years old, to attend two courses of lectures of each professor and defend a dissertation on medical issues in public (Lee, 1904; Smith, 1904; Humphrey, 1976).

The first to graduate from Medical School were R. Tucker and S. Kissam, who got Bachelor's degrees in medicine in 1769 and became Doctors of Medicine in May 1770 and 1771. Medical studies lasted annually from November to May. In April 1776, the Medical School was closed due to the American Revolution (Lee, 1904; Smith, 1904; *Announcement of the College...*, 1940; Humphrey, 1976).

It should be noted that in 1769 the teaching staff was the first to declare the teaching of medical disciplines in hospitals (Lee, 1904; Smith, 1904).

As for individual innovative activities of that time, we need to mention S. Clossy and J. Jones. An experienced practitioner, S. Clossy carefully prepared for each class in anatomy and followed the method of human body examination according to A. Vesalius. The American professor first examined dry and fresh bones with cartilage, ligaments, and membranes, then muscles, arteries, veins, nerves, and finally the internal organs. During the lectures, he was demonstrating his own preparations. S. Clossy confirmed the movement of blood from the arteries to the veins and performed many dissections (Humphrey, 1976).

J. Jones taught surgery and demonstrated various operations on dead bodies – dissections, removals, and suturing. He also recommended his students learn firstly from the dead to help the living. Moreover, he promoted the idea that surgery was as legitimate an area of professional medical practice as internal medicine. It is worth noting that he was the first surgeon to perform lithotomies brilliantly (Humphrey, 1976). In 1775, J. Jones published a medical book «Plain, Concise, Practical Remarks on the Treatment of Wounds and Fractures» (Lee, 1904, Smith, 1904). It was the first medical textbook in the United States to be used not only by students but also by the new U.S. Army (Griesemer et al., 2010).

A. Griesemer et al. note that «as the first professor of surgery at an American medical school, he was instrumental in shaping the face of surgical training in the young United States of America» (Griesemer et al., 2010).

In 1784, King's College was transformed into Columbia College. In 1785, medical school was restored. Of the first professors, only S. Bard remained, who later became the dean of the Medical School. However, only eight years later, in 1792, the Medical School was reorganized and began to accept students again. Such a stagnation in the development of the Medical School of Columbia College was due to the reluctance of the young people of that time to officially receive a degree and professional competences (*Announcement of the College...*, 1940; Humphrey, 1976). During 46 years of its existence, the Medical School of the King's College – Columbia College graduated 35 physicians (Lee, 1904; Smith, 1904).

At the beginning of the 19th century, New York became a powerful center where medicine developed. Thus, in 1807, an active Medical Society of New York County emerged. It had the authority to conduct examinations and issue licenses for independent medical practice. Moreover, due to the initiative of this Society in March of that year, local authorities were allowed to establish the College of Physicians and Surgeons (Lee, 1904; Smith, 1904).

Note that the teaching staff of this college was much more competent than that one at the Medical School of Columbia College. Seven professors were the best representatives of the then medicine and science. For example, N. Romaine, the first president of the college and professor of anatomy, was one of the co-founders of the first American medical journal, *The American Repository* (1797), a senator of the Congress, and a physician at New York Hospital. During the first year, there were 53 students. In the following years, the number of students gradually increased (Lee, 1904; Smith, 1904). There were five lectures a day in the college. Students had to be fully involved in the

educational process. Students were also allowed to attend E. Miller's lectures at New York Hospital from 12 to 1 p.m. One of the college professors, A. Bruce, founded the first in the United States scientific journal "American Journal of Mineralogy" (Dalton, 1888).

In 1811, S. Bard became the second president of the College of Physicians and Surgeons, uniting the Medical School of Columbia College with the College of Physicians and Surgeons in 1813. Professor Hosack's botanical garden "The Elgin Botanic Garden" was of value while teaching pharmacology (Dalton, 1888, Lee, 1904).

It should be noted that the joint medical education institution had comfortable rooms for the educational process and from time to time moved to new improved buildings. At different times, the cohort of faculty members included prominent representatives of American medicine.

For example, in 1818 Professor of Surgery V. Mott was at the origins of a new era of surgery, proposing the ligature of the arteria innominata. In terms of frequency and uniqueness of operations, he was ahead of all his contemporaries. Ligature of the primitive iliac, removal of the entire clavicle, resection of the upper jaw (Dalton, 1888) – there was an incomplete list of manipulations performed by Professor Mott within his professional activities.

V. Mott was utterly grateful to Professor Post. In his preface to the lectures, V. Mott mentioned, "Two great achievements are upon record to attest his powers. He was the first in this country to tie, successfully, on the Hunterian principle, the femoral artery for popliteal aneurism. On the second memorable occasion, I had the honor to assist him; it was a case of ligature of the subclavian artery above the clavicle, without the scaleni muscles, for an aneurism of the brachial, involving the axilla" (Mott, 1850).

J. Dalton noted that the period from 1837 to 1856 was successful and fruitful for the education institution, as "an important innovation introduced at this time was a change in the mode of selecting and appointing professors" (Dalton, 1888).

Thus, in 1837 the following mechanism was proposed: before obtaining the position of professor, the candidate had to be at least a year as a lecturer of the department. From the first years of the college existence from time to time the Board of Trustees hired ordinary teachers to give lectures in the absence or disability of a certain professor. However, in the late 1830s, no one could be appointed to a professorship until he received approval from colleagues in the department as a lecturer. Therefore, each

candidate underwent a probationary period, and the Board of Trustees didn't have sudden or unfair appointments (Dalton, 1888).

Besides, the educational process was supplemented by courses of Spring and Autumn lectures on special subjects, mainly of a practical nature. In 1841 the Spring course began with two or three daily lectures from March to June. In the autumn of the same year, a "preliminary course" was implemented. It lasted until the end of October – the beginning of the next semester in November. The student community appreciated such Spring and Autumn additional courses. Not only students but also graduates were satisfied because they could show their skills and knowledge in both practical and scientific aspects of medicine (Dalton, 1888).

Moreover, considerable attention was paid to illustrative material as a means of learning with the help of samples, drawings, models, wax preparations, plaster molds (Dalton, 1888).

Also, in 1841, a College Clinic was established at the initiative of W. Parker. Outpatients were brought to the college building for further examination, treatment, or various manipulations in the presence of students (Dalton, 1888).

Beginning with 1843, during A. Stevenson's presidency (1843 – 1855) the curriculum was expanded to four and a half months and the educational process began in mid-October, respectively, the previous course – in September. There was the Society of Pathology (1844), Department of Physiology and Pathology (1847). J. Dalton was the first who introduced an experimental method in physiology in America (Dalton, 1888, Lee, 1904, Smith, 1904).

The college subscription to foreign and American periodicals and the quarterly purchase of books and textbooks was another good innovation (Dalton, 1888).

In 1847 there was the establishment of the Academy of Medicine. It aimed to cultivate medical knowledge through oral and written communications, as well as the support of professionals. The Academy became a place where issues of medical interest were discussed, and new views, theories or observations emerged (Dalton, 1888).

In 1854, anatomy was legalized by the act of the legislature. The unidentified bodies of criminals who died in prisons were sources of anatomical material. However, they were useless for educational demonstrations (Dalton, 1888).

Moreover, in 1859 the Alumni association was established, which started the competition "The Alumni Award" for the best essay on medical topics and "The Cartwright Award" – for original research. These and other competitions

with monetary rewards stimulated students to learn better and be interested in many problems of medicine (Dalton, 1888).

During E. Delafield's presidency, in 1860, by agreement between the Boards of Trustees of the two institutions, an alliance was formed between the College of Physicians and Surgeons and Columbia College; since then, graduate diplomas had been signed by the President of Columbia College and the President of the College of Physicians and Surgeons. The College of Physicians and Surgeons received the official name "Medical Department of Columbia College". After this event, the academic year began to last five months and the growth of students continued (Lee, 1904; Smith, 1904; 1904; *Announcement of the College...*, 1940; Humphrey, 1976).

In 1878 there were 10 weekly consultations in the College Clinic. That year, a laboratory was also opened for educational purposes, including pathology. The academic year was increased to seven and a half months. In the 1880s, with the help of philanthropists, many institutions were built. That made the educational process better. In particular, there were the Sloane Maternity Hospital, the Vanderbilt clinic, numerous laboratories, etc. Moreover, teaching courses were improved, new ones were introduced, teaching staff became bigger, practical work in laboratories and hospitals was obligatory, the college management continued to equip departments with devices, models, demonstration and museum exhibits and so on. (Dalton, 1888). According to F. Lee, "the college was thus enabled to take a position of leadership in the medical world which it had never before held" (Dalton, 1888; Lee, 1904).

In 1879 there were conceptual changes in the procedure of final examinations. For example, to get the degree of Doctor of Medicine, one needed to pass written exams, which were conducted after the lectures in the College (Dalton, 1888).

In 1880, the educational process was extended to seven months, the number of lectures was increased, and students had more practice in laboratories and hospitals (Dalton, 1888).

In 1887, the first anatomical laboratory appeared (*Announcement of the College...*, 1940). In 1888 there was a new system of entrance examinations, which included English, Latin, arithmetic, algebra, and geometry. Moreover, a three-year curriculum was adopted. According to the curriculum, each academic year had its features, in particular:

– *first year*. There were didactic lectures on anatomy, physiology, physics and chemistry, dissection, normal histology, physiological and medical chemistry;

– *second year*. There were didactic lectures on regular training courses, dissection, general medical and surgical practice in the Vanderbilt clinic, and practical clinical classes at the relevant departments;

– *third year*. There were didactic lectures on pharmacology and therapy, pathology and practical medicine, theory and practice of surgery, obstetrics and gynecology; visiting special departments of the Vanderbilt Clinic and Sloane Maternity Hospital. The session period at the college lasted for one month (Dalton, 1888).

In November 1891, the Medical School became an integral part of Columbia University. In 1894, the fourth year of study was added to the curriculum. Together with the third academic year, it was devoted to clinical disciplines. In 1895 the building of the Anatomical Institute was opened, and in 1898 – the Department of Physiological Chemistry with well-equipped laboratories (Lee, 1904; *Announcement of the College ...*, 1940, Humphrey, 1976).

The next significant step of the Medical School of Columbia University was introduction of elective courses in anatomy, physiological chemistry, physiology, and bacteriology for students with B.A. degrees and Ph.D. students (Matthews, 1904). It should be noted that the Medical School of Columbia University has always been open to proven innovations.

Conclusions. So, analyzing the outlined problem, we have found out prerequisites for the establishment of the Medical School in New York. Firstly, in 1750 young and skilled doctors moved to New York and started to conduct private classes for those wishing to master medicine. Secondly, in 1760 according to the law, every doctor and surgeon had to obtain special permission – a license for practicing. As a result, in 1767, the King's College Medical School appeared. Applicants had the opportunity to get the Bachelor of Medicine degree, and a year after receiving this degree – the Doctor of Medicine degree. It should be noted that the medical school changed its official name many times for many reasons. Finally, in the late 19th century it became the Medical School of Columbia University. There was intensive development of both individual (S. Clossy, J. Jones, N. Romaine, V. Mott, J. Dalton, and others) and mutual innovations in the 1840s – 1850s.

We will highlight innovations in Dartmouth Medical College during the mentioned period as prospects for further research.

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РЕЗЮМЕ

Куличенко Алла. Медицинская школа Колумбийского университета: инновационная деятельность от основания до конца XIX в.

В статье сосредоточено внимание на инновационной деятельности медицинской школы Колумбийского университета с 1767 г. до конца XIX в. Кроме того, определены предпосылки основания медицинской школы в Нью-Йорке. Во-первых, это появление в 1750 г. молодых и умелых врачей, которые проводили частные занятия для желающих овладеть медициной. Во-вторых, в 1760 г. появился закон, который обязывал каждого врача и хирурга получить специальное разрешение – лицензию на частную практику. В результате в 1767 г. появилась медицинская школа Королевского колледжа, которая много раз меняла свое официальное название из-за ряда причин, став в конце XIX в. медицинской школой Колумбийского университета. Интенсивное развитие как индивидуальных, так и коллективных инноваций происходило в 1840 – 1850-х гг.

Ключевые слова: американское медицинское образование, лицензия на частную практику, медицинская школа Королевского колледжа, инновации, колледж врачей и хирургов, индивидуальная инновационная деятельность, коллективная инновационная деятельность, медицинская школа Колумбийского университета.

АНОТАЦІЯ

Куліченко Алла. Медична школа Колумбійського університету: інноваційна діяльність від заснування до кінця XIX ст.

Сучасний коледж лікарів та хірургів Вагелоса Колумбійського університету належить до одного з п'яти найстаріших закладів медичної освіти Америки. Цей медичний коледж пройшов тернистий шлях – від медичної школи з шістьма професорами до потужного осередку інноваційної освіти та медицини.

Статтю присвячено огляду інноваційної діяльності медичної школи Колумбійського університету з 1767 р. до кінця XIX ст. У дослідженні використано

такі методи: бібліографічний (для пошуку науково-педагогічних джерел, присвячених питанню діяльності медичної школи Колумбійського університету в окресленому періоді); контент-аналіз та систематизація науково-педагогічних джерел (для з'ясування стану розробленості проблеми й виявлення необхідного фактологічного матеріалу у світовому педагогічному дискурсі); проблемно-хронологічний (для визначення передумов створення, відкриття та функціонування медичної школи Колумбійського університету (друга половина XVIII – кінець XIX ст.), зокрема провадження інноваційної діяльності).

Передумовами заснування медичної школи в Нью-Йорку стала поява у 1750 р. молодих та здібних лікарів, які проводили приватні заняття для охочих опанувати медицину. У 1760 р., з'явився закон, який зобов'язував кожного лікаря та хірурга отримати спеціальний дозвіл – ліцензію на приватну практику. Як результат, у 1767 р. було відкрито медичну школу Королівського коледжу, яка багато разів змінювала свою офіційну назву через низку причин. Охочі мали змогу отримати ступінь бакалавра медицини, а через рік після цього – ступінь доктора медицини. Важливо вказати, що, по-перше, в закладі освіти відбувалася як індивідуальна (С. Клоссі, Дж. Джонз, Н. Ромейн, В. Мотт, Дж. Долтон та ін.), так і колективна інноваційна діяльність. Інтенсивний розвиток інновацій припав на 1840 – 1850-ті рр. Наприкінці XIX ст. заклад освіти отримав назву «медична школа Колумбійського університету» й став повноцінним структурним підрозділом зазначеного освітнього осередку.

Перспективами подальших розвідок вважаємо висвітлення інновацій у Дартмутському медичному коледжі в окреслений період.

Ключові слова: американська медична освіта, ліцензія на приватну практику, медична школа Королівського коледжу, інновації, коледж лікарів і хірургів, індивідуальна інноваційна діяльність, колективна інноваційна діяльність, медична школа Колумбійського університету.

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ОСНОВНІ ВИМОГИ ДО ОРГАНІЗАЦІЇ ПРОФЕСІЙНОЇ ПІДГОТОВКИ ФАХІВЦІВ З ФІЗИЧНОЇ ТЕРАПІЇ У ВИЩИХ НАВЧАЛЬНИХ ЗАКЛАДАХ ДАНІЇ НА ПРИКЛАДІ КОПЕНГАГЕНСЬКОГО УНІВЕРСИТЕТУ ПРИКЛАДНИХ НАУК

У статті проаналізовано зміст професійної підготовки фахівців з фізичної терапії у вищих навчальних закладах Данії на основі використання методів аналізу, систематизації, порівняння й узагальнення. Визначено перелік данських університетів, які проводять підготовку фахівців із фізичної терапії. Проаналізовано навчальний план підготовки бакалаврів фізичної терапії в Копенгагенському університеті прикладних наук, де навчаються фахівці з фізичної терапії. Висвітлено стратегічні цілі, види навчальних занять і кількість балів (ECTS) для підготовки фахівців із фізичної терапії в данських університетах. Уточнено компетентності фахівців із фізичної терапії та умови здійснення їх професійної діяльності.