

**REVIEW**

# The Institute of Histology and Embryology in the most modern building of the Faculty of Medicine in Belgrade between two worlds wars

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**Summary**

The Institute of Histology and Embryology was founded in 1921, but it was moved into its own building a few years later, in 1927. The project of the building was done by the architect Svetozar Jovanović, and the pedimental sculpture in the gable of the building was done by the academic sculptor Živojin Lukić. The building housed two institutes: the Institute of Physiology and the Institute of Histology. Each of the institutes owned one wing, and they shared the central part of the building, which also contained an amphitheater. The building was equipped with the most modern technical devices and provided excellent conditions for scientific work and teaching. In addition, within the Institute of Histology there were the Photography Department, the Terminology Department, the central catalog of the books and journals of the Faculty of Medicine, and a museum was planned as well. The largest part of the building was destroyed in the German bombing on April 6, 1941. After liberation, according to the project of the architect Milan Sekulić, the reconstruction of the central part and the construction of new wings of the building were carried out.

**Keywords:** Faculty of Medicine in Belgrade, Institute of Histology and Embryology, Aleksandar Đ. Kostić

## ESTABLISHMENT, THE FIRST PROFESSOR OF HISTOLOGY

The Institute of Histology and Embryology “Prof. dr Aleksandar Đ. Kostić” was founded on November 21, 1921. On that day, Dr. Aleksandar Kostić was appointed a part-time lecturer of Normal Histology, by the minister of education. At that time, Kostić was a young doctor from Belgrade who had completed his studies of medicine in France and who was working as an assistant to Prof. Pol Bouin at the Faculty of Medicine in Strasbourg (1,2).

Shortly thereafter, he began working on the first collection of microscope specimens for his future students in Belgrade. Prof. Bouin, his professor, mentor, and friend, was a huge help and support in his work. It is interesting to mention that Prof. Kostić once wrote how Prof. Bue made it possible to get “human material” in a “rather exceptional way”. He took human tissue from the body of a person convicted to death by guillotine because of having robbed the post office (3). “Human material” was extremely valuable then, as it is today, due to the fact that some structural characteristics in humans cannot be seen in the material obtained from laboratory animals. By the end of December 1921, a collection of between 2000 and 3000 microscope specimens was completed. It was the first and very important asset of the Institute of Histology. In January 1922, Kostić returned to Belgrade with his wife and colleague Dr. Smilja Kostić Joksić (1,2), who became the first teaching assistant at the Institute of Histology and Embryology (1,2,4). In 1924, she was hired as an assistant at the newly opened Pediatric Hospital, where she later advanced to the title of associate professor.

## THE FIRST PREMISES OF THE INSTITUTE

In January 1922, the Institute was primarily accommodated in two rooms on the ground floor of the administration building of the Main Military Hospital (today, the administration building of the University Clinical Center of Serbia). Furniture was borrowed from the Danube Hospital Company whereas microscopes were taken from the Institute of Physiology and the Institute of Pathology. The first caretaker, Dimitrije Veličković, was employed on March 1<sup>st</sup> 1922 and student Momčilo Milojević was hired as the first demonstrator. In less than two months, everything was ready for classes to begin (1,5,6).

On March 6, 1922, Prof. Kostić held the introductory lecture for his colleagues, and the next day for students as well. That is why March 7 is considered the day when histology began to be taught at the Faculty of Medicine in Belgrade. (6). The Institute’s inventory grew over time, first with a blackboard and then with a table for demonstration microscopes. The 35 Zeiss microscopes ordered while Kostić had still been in Strasbourg finally arrived. In spite of all the efforts, enthusiasm and teaching equip-

ment, classes took place in extremely unsuitable conditions, and because of this, as soon as November the same year, the Institute was moved to the new building of the University, to the premises intended for the Physics Institute of the Faculty of Philosophy. Apart from improved teaching conditions, there were also favorable conditions for establishing a laboratory for the preparation of microscope specimens (7). During the time spent at University building, Kostić wrote and prepared the first book on practical laboratory work „Osnovi histološke tehnike” (“The basics of the histological technique”), published in 1923. It was his first printed textbook, which had two more editions: 1948 and 1953. The second book he prepared for the press was „Rečnik histoloških izraza” (“Dictionary of histological terms”), published in 1924 (1). The first exam in histology was held at the end of the winter semester, and the chair of the exam committee was Prof. Đorđe Joannović, the dean of the Faculty of Medicine at the time (7,8).

In January 1924, the building of the Nursing School of the Red Cross Society became the Institute’s new home. The entire third floor, as well as the attic of the School, were available to the staff and working conditions in the school building were much better (7,8).

For the first time, there was enough space at the Institute for organizing a library. In addition to the library, in 1924, Prof. Kostić also organized the work of the Photography Department. „Mikrofotografski atlas normalne histologije” (“Microphotographic Atlas of Normal Histology”), which was published the very next year, in 1925, was the first successful result of this department. In addition, that same year Aleksandar Šafranski, a photographer, started working at the Photography department. He was a Russian military and aviation photographer who came into the Yugoslav Air Force in August 1922. Prof. Kostić also founded the Belgrade Photo Club in 1928, and photographer Aleksandar Šafranski was one of its prominent members (6).

The Institute stayed in the building of the Nursing School of the Red Cross Society until February 1927, when it was moved to its own building (6,7).

## PROJECTS AND CONSTRUCTION OF THE INSTITUTE’S BUILDING

In 1921, the properties at the corner of Resavska and Višegradska Streets were purchased for the Faculty, so the first condition for constructing a building for two institutes (Institute of Physiology and Institute of Histology) was fulfilled and Prof. Richard Burian, the founder of the Institute of Physiology, started working on the preparation of the building’s project in early 1921. Six plans for that project have been preserved in the Archives of Yugoslavia, but it is unknown who drew them. The complex resembled the letter C and it included a central building with

an amphitheater and two wings. As the left wing, it was planned to use the existing building of the Department for patients with tuberculosis, built in 1912 according to the project of the first Serbin woman architect Jelisaveta Načić. In 1920, the Department was given to Institute of Physiology by the Minister of National Health. The second wing, intended for the Institute of Histology, as well as the central building, were to be built and connected to the existing object. The building was designed in an academic style, with the application of certain details characteristic of romanticism in architecture (6,9).

Although that project was rejected, the fundamental idea – constructing a building in the shape of the letter C and incorporating the existing structure as one wing – was used to develop a new project that was given to architect Svetozar Jovanović at the end of the year. Jovanović completed the project in January 1922, but it took more than two years for all the administrative work to be finished (determination and approval of funds from all instances, announcement of tenders, and selection of contractors). Svetozar Jovanović was chosen as the supervising architect, “because he is familiar with the site and the current structure”. Namely, Jovanović had been previously engaged in the project of reconstruction of the building of the Department for patients with tuberculosis, into which the Institute of Physiology temporarily moved in 1922. In the process of constructing the new building, Jovanović’s associate was Anatolij Hmara (Анатолий Ильич Хмара), employed as an architect-engineer in the Construction Department of the Municipality of Belgrade (6,9,10).

The construction of the building began on July 14, 1924, and it was scheduled to be finished on September 1, 1925. However, as is often the case, the deadline had to be extended for several reasons. As soon as the summer of 1924, it became clear that the building of the Department for patients with tuberculosis would not be possible to use because, despite the reconstruction, it was destabilized, with cracked walls and a tendency to fall down. At the conference of professors of the Faculty of Medicine held on September 7, 1924, a decision was made to demolish the largest part of that Department and build a new building in its place. Professors Burijan and Kostić agreed on the new organizational plan for the institutes. The right wing, which could have been completed earlier, would belong to the Institute of Physiology, and the left wing (on the site of the demolished building) was intended for the Institute of Histology. By the way, the construction was delayed due to unexpected work and waiting for funding that had not been originally planned. According to some data, the contract estimates were not complete and accurate; the construction was started too soon, without enough preparation, so changes were made during construction - “demolition, rebuilding and additions at the request of the professors because they wanted to introduce all the latest modern designs into the insti-

tute so that it would correspond to the requirements of science” (9,11).

A clearer picture is given by the document in which these works are listed with the necessary explanations: since it was clay soil, it was necessary to make stronger foundations, especially since the Faculty wanted to have the possibility to add another floor in the future; the gallery in the amphitheater, which had not been originally planned, was built for two reasons: to increase the number of seats and to lower the amphitheater’s height to improve the acoustics; the amphitheater’s seats, which were initially planned in straight rows, were arranged in the shape of an arch so that students could better see experiments and projections; an additional concrete booth was built in the amphitheater for the projection apparatus donated by the Rockefeller Foundation; the carpentry in the entire building was painted white, and one part was enameled “due to the need for absolute cleanliness”; the windows were adapted to the needs of microscopy (their height was adjusted to the height of the tables) and supplied with roller blinds; the floors were “adapted to the purpose” (four types of floor coverings were used in the building - concrete, terrazzo, xylolite for laboratories and parquet); the basement premises were expanded to house the gas installation and the department for burning waste and carcasses of experimental animals; around the building there was a communication for freight cars, and between the two wings there was a concrete pool for frogs. Among the unexpected costs was the amphitheater’s glass-iron roof, which, despite having been planned from the start, “fell out of the contract by mistake.” Additional funds were once again approved, and the total cost of building and equipping the building was 14,968,541.37 dinars, which was more than twice as much as planned. Based on the available documentation, it can be concluded that professors Burijan and Kostić, who worked closely with the architect Jovanović, paid attention to every detail during the arrangement and furnishing of the premises (6,9).

Professor Kostić documented the construction process of the central building and the wing intended for the Institute of Histology with a series of photographs that are kept in the Institute’s archives. Today, they are valuable testimonies of the construction process, the technical capabilities used during construction and the dynamics of the works.

The building was completed on December 29, 1927. It was a monumental building in the academic style, which was dominant in the architecture of public buildings at the time. The central part had a prominent entrance with Corinthian columns and a pediment decorated with a sculptural composition made by the academic sculptor Živojin Lukić. In the middle was the figure of Hygia, and on each side of it there were three figures. A standing female figure stood to Hygia’s right, and next to it there was a kneeling male figure with a child clinging to his body.

A standing male figure with his back turned stood to Hygia's left, and a seated female figure with a child in her lap sat next to it. Adult figures were linked together by vessels that they added to each other. The wings of the building were decorated with balustrades and cornices. Although the space in the back of the building served no public purpose, the facades on all four sides were treated equally. Compared to the building of the Institute of Pathology, completed in 1926, which was also designed by Jovanović, this building had a more luxurious external appearance. Owing to the carefully planned organization of space and excellent equipment, the institutes were provided with the most modern conditions for both scientific work and teaching (6,9,12).

### ORGANIZATION OF COMMON SPACE IN THE NEWLY BUILT BUILDING OF THE INSTITUTE OF HISTOLOGY AND PHYSIOLOGY

As it was said, the institutes had one wing each, but each one had some space in the basement, in the central building, on the ground floor, and on the first floor. The directors of the institute, Burijan and Kostić, each had a large, luxurious apartment in their own wing, and the building was also home to ushers/cleaners, laboratory assistants, custodians, and photographers. In the central building, there were rooms with various facilities, e.g. battery room, a room for an internal telephone switchboard, a water distilling department, a gas central, a laundry room, an ironing room, a room for wood, ventilation, and air heating plants. On the second floor, which existed only in the central part of the building, there was a corridor for the gallery of the amphitheater and the apartment of the caretaker of the building. In accordance with the regulations of the time, there was a fire extinguishing installation in the building (7,8).

According to Professor Kostić, the amphitheater was the largest in Belgrade and the most modern in Yugoslavia at the time. There were 312 seats in semicircular rows, and another 200 listeners could be standing in the gallery, at the level of the second floor. Such a large capacity was planned with the idea that in addition to teaching, it will be utilized for public lectures, gatherings, and film screenings. The width of the amphitheater is 20 m, and the height above the presentation desk is 13 m. The project did not include windows, but a specifically designed ceiling with a glass skylight measuring 9 x 7.5 m and a horizontal blackout curtain that was driven by an electric motor. At the level of the ceiling, there were also openings of the ventilation system, which, if necessary, conducted heated air. The installations and the curtain mechanism have been preserved to this day, but have not been used for decades. The presentation desk, which is still in use, has impressive dimensions, so there is enough space on it to carry out experiments. Behind the presentation desk

there were three glass panels driven by electric motors, then a paraffined screen separating the projection chamber from the amphitheater, and finally, an airtight projection screen for vivisection projections (5,6,9).

The projection chamber was equipped with an epidiascope for microprojections and a galvanometer for demonstrating bio- and thermoelectric phenomena. The vivisection chamber, which no longer exists, was on the upper platform of the amphitheater. It had the shape of a semicircular tower, four meters wide and three meters high, and it was equipped with a Primard epidiascope (*H. Primard, Paris*), specially designed for the projection of surgical procedures. The assembly and partial modification of the device were carried out by workers from the Mechanical Department of the Institute of Physiology (5,7).

### ORGANIZATION OF THE WORKSPACE AND WORKING CONDITIONS AT THE INSTITUTE OF HISTOLOGY

In the basement of the building, under the amphitheatre, there was a department for keeping and working with animals, i.e. a vivarium. Exceptional attention was paid to this area during the design and furnishing of the building. The vivarium was organized into several rooms: one was used for keeping and breeding animals, another for experimental animals, and the third for operations. The cages were built into reinforced concrete walls, with iron bars, and at the same time they could be cleaned and disinfected very easily. The capacity of the vivarium was for more than 1500 small animals. All animals were systematically marked with special plates on their ears. In addition to this labelling, there was also more detailed data for each experimental animal (1,5,8).

In the basement of the histology wing of the building, there were rooms for storing reagents, various equipment, and glassware, a workshop with all the necessary tools and a laundry room. In that part of the building, there were also two rooms for employees (5,8).

On the ground floor, in the central part of the building, directly next to the amphitheater, there were two large laboratories measuring 11 x 5 m. A corridor led to them, with cupboards containing instruments and laboratory glassware. The laboratories were designed for laboratory assistants, students, and doctors. They were divided into four compartments each by oak walls for isolation and undisturbed work. There was a spot for washing clothing next to the laboratories, as well as eight huge sinks that students utilized after workouts (5,8).

The greatest space on the ground floor of the side wing was occupied by a large student practice room spanning 21 x 9 m, with 90 workplaces. The long tables were oriented toward the windows, and each consecutive table was raised by 20 cm in respect to the one before it, allowing light to reach all microscopes. The conceptual solu-

tion for making the tables was given by Prof. Kostić. Each workplace was equipped with a microscope and a lamp, and two neighboring workplaces each shared a sink and a battery for staining the preparations. From the initial 35 microscopes that the Institute had had before moving to the new building, the number of 90 microscopes was reached due to war reparations. The student practice room was named Paul Buen, in honor of a recognized histologist, teacher and a great friend of Prof. Kostić. After the introductory classes, slides were projected “par transparence” from the chamber located next to the practice room. The darkening of such a large room with a large number of windows was ensured by simultaneously lowering the curtains using an electric motor. In addition to slide projections during introductory classes, learning was facilitated by a large number of posters presenting microphotographs of histological preparations, which covered the walls of the practice room, but also almost all other rooms at the Institute. By the way, the total number of histological preparations for the needs of regular exercises has increased over time to the number of several thousand. In the extension of the practice room, there was a laboratory for the research work of assistants (5,6,8).

Opposite the practice room there were Terminology Seminar, director’s office and laboratory, tissue culture laboratory, office, library and reading room. Immediately after moving in, impressive wood furniture was custom-made for the library, with floor-to-ceiling shelves and stairs that could be moved along the shelves. By 1935, the library included over 4.000 books, journals, and offprints largely in German and French. At the Institute there was also the central catalog of books and journals from all of the Faculty of Medicine’s institutions. In addition to the library, there was a reading room for students with a small library of histology textbooks in different languages, where exams were held during the exam periods (1,7,8).

## PHOTOGRAPHY DEPARTMENT

The Photography Department was located on the first floor of the central building, next to the amphitheater, and it consisted of six rooms and three darkrooms.

At the very entrance to the Department, there was a large corridor where an *Ascania* microcinematography camera with an accelerating device was and it allowed 200 shots per second (5,6).

On the opposite side of the corridor there was a studio, completely adapted to taking photos in both daylight and artificial light. Sufficient daylight was provided by a large window with opaque glass and blue mobile curtains, while artificial light was provided by strong reflectors (5,12).

Another important room in the Department was a room for chromophotography i.e. for making color photographs,

positives and slides. Color positives were made according to the *Jos-pe* system, and today at the Institute there are 43 color slides that have been saved. They are unique and very rare color slides not only in our country but in the world as well. Another room equipped with a large *Leitz Uma* microphotographic camera was in the Photography Department for making photomicrographs (5,9,13).

Next to two dark modern chambers was a room for magnifying photos equipped with a *Furor II* camera. The equipment for copying cinematographic films was also installed there, as well as the device for developing and drying films. Next to the room for magnifying photos there was a room for washing negatives and positives, and there were strings with clips for drying positives (5,6,13).

Kostić was well aware of the importance of the photography department, and that’s why he insisted on its modern equipment. He established cooperation with colleagues from almost fifty institutions. It is very important to emphasize that the first microphotographs not only in Belgrade, but in Yugoslavia, were made at this Department. In addition to photography, the Department enabled many University teachers to learn photography and it was a model for many later established photography laboratories at the University in organizing space and equipment (7,9).

In addition to the Photography Department, a laboratory for embryology and teratology was located on the first floor of the wing, and next to it, a room measuring 15 x 8 m was intended for the museum. By 1935, a large number of macroscopic preparations, embryos and fetuses, were collected and prepared, but the museum was not established. The museum room was given to the Institute of Chemistry for use. On the same floor there was the office of Prof. Kostić and the apartment of the Kostić family (5,7,9).

The modern building of the two institutes was the pride of the Faculty of Medicine when it was completed (**Figure 1**), but in order for it to remain so, greater investments were occasionally required in addition to routine upkeep. The last extensive reconstruction was undertaken to repair the roof due to problems with leakage. The works, which lasted for almost a month, were completed on April 5, 1941. The next day, on April 6, during the German bombing of Belgrade, the building was hit, although it had a prominent Red Cross sign on the roof. Both of its wings were almost completely destroyed, while the central part was significantly damaged (6,9).

## REBUILDING AND RECONSTRUCTION

After the liberation, a decision was made to rebuild both wings of the building and reconstruct its central part. The project was entrusted to the well-known architect Milan Sekulić. The works, which began on July 22, 1946 and completed at the end of 1948, were carried out by the



**Figure 1.** Building of the Institute of Physiology and Histology in 1927 (Archive of the Institute of Histology and Embryology "Prof. dr Aleksandar Đ. Kostić", digitalized in SASA Audiovisual Archives and Digitalization Center)



**Figure 2.** Construction and reconstruction of the building of the Institute of Physiology and Histology (Archives of Yugoslavia, Committee for the Protection of Public Health / Φ-31 / United Yugoslav Relief Fund of America, Extracts from Field Trip Report of Phillip E. Nelbach, Executive Director, May 13, 1948)

Construction Company *Neimar*, under the supervision of architect Đ. Grosović. The management of the Faculty wanted to get more space in the building in order to accommodate several institutes, and therefore the central part was expanded, wings of larger dimensions than the

previous ones were built, and the whole building got another floor (6,9). It was an impressive construction in the spirit of the modern architecture of that era. The building still houses the Institute of Histology and Embryology, which today bears the name of its founder (**Figure 2**).

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## INSTITUT ZA HISTOLOGIJU I EMBRIOLOGIJU U NAJMODERNIJOJ ZGRADI MEDICINSKOG FAKULTETA U BEOGRADU IZMEĐU DVA SVETSKA RATA

Nela Puškaš<sup>1</sup>

### Sažetak

Institut za histologiju i embriologiju je osnovan 1921. godine, ali se tek nekoliko godina kasnije, 1927. godine, uselio u svoju namenski projektovanu zgradu. Projekat je izradio arhitekta Svetozar Jovanović, a figuralnu kompoziciju u zabatu zgrade akademski vajar Živojin Lukić. U zgradi su bila smeštena dva instituta: Institut za fiziologiju i Institut za histologiju. Svaki od instituta je imao po jedno krilo, a delili su centralni deo zgrade u kome je bio i amfiteatar. Zgrada je bila opremljena najsavremenijim

tehničkim uređajima i pružala je odlične uslove za naučni rad i nastavu. Osim toga, u okviru Instituta za histologiju su organizovani Fotografsko odeljenje, Terminološki seminar, centralni katalog knjiga i časopisa Medicinskog fakulteta, a bio je planiran i muzej. Najveći deo zgrade stradao je u nemačkom bombardovanju 6. aprila 1941. godine. Posle oslobođenja, izvršena je rekonstrukcija centralnog dela i izgradnja novih krila zgrade prema projektu arhitekta Milana Sekulovića.

**Ključne reči:** Medicinski fakultet u Beogradu, Institut za histologiju i embriologiju, Aleksandar Đ. Kostić

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