

## History of Venereology in Croatia

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**SUMMARY** The term sexually transmitted infections has a wider meaning than the older venereal diseases. It is known that gonorrhoea was present even in ancient times, whereas syphilis appeared in Europe at the end of the 15<sup>th</sup> century. Soon cases were observed along the coast in Zadar, Dubrovnik and Istria, and were treated by surgeons. The relatively late establishment of medical schools, along with wars and different governments, were some of the reasons why dermatovenereology as a specialty developed later in Croatia than in other European countries. Nevertheless, during the 19<sup>th</sup> century, many Croatian physicians and dermatovenereologists of the past century were interested in venereology. Among the most important personalities that worked at departments and dispensaries for venereal diseases were Cambieri, Kogoj, Božić, Nonveiller, Orhel, and many others. They introduced new diagnostic technologies and treatments, and wrote about these diseases. Significant progress was achieved in larger towns where medical schools had been opened. Croatian venereologists also organized several international congresses on sexually transmitted diseases and became members of the respective international societies. Nowadays, the interest of dermatovenereologists has been shifting towards chlamydial infections, herpes genitalis, human papillomavirus genital infection and human immunodeficiency virus infection, and their presence among homosexuals.

**KEY WORDS:** history of Croatian venereology, Cambieri, Kogoj, Božić, dispensaries, azithromycin

### INTRODUCTION

During the past decades, the concept of venereal disease has developed and changed its meaning into sexually transmitted diseases (STD), and then into sexually transmitted infections (STI). In fact, the latter term has a wider meaning than the old venereal diseases (1). During these decades, the introduction of HPV vaccines has

brought enormous progress in STD diagnosis, treatment and prevention. The subject of this paper is the history of STD in Croatia, i.e. the author has made an attempt to outline the most important events and achievements of the physicians engaged in the treatment of or fight against STDs, especially bacterial ones. Dermatovenereology in

Croatia appeared later than in other European countries, e.g., France, Germany, Austria, Italy and England.

Descriptions of the possible venereal diseases can be found in the oldest literature such as the Bible, ancient Chinese medical books, Indian medical books, the Corpus Hippocraticus (strangury was probably gonorrhoea), and Galen who in his works introduced the term gonorrhoea (2-4). During the Dark Ages, little was added to general medicine and so little occurred in the field of venereal diseases. Western medicine began to advance slowly when it returned to the classic works of the Greek physicians and started revising them during the Renaissance (5). Naturally, at that time there were no books on this matter in Croatian, although there were some medical Glagolitic manuscripts written by priests about symptoms, signs, or diseases and their treatment with prayers, exorcisms and prescriptions (6).

It is well-known that gonorrhoea and nonspecific urethritis were already present worldwide in the ancient times. One can find description of thick urine even on Assyrian tablets (7). Syphilis appeared in Europe at the end of the 15<sup>th</sup> century, being possibly imported by Columbus's sailors from America, and soon extended in many countries after the King Charles VIII of France army had conquered Naples (8). Soldiers, prostitutes, merchants, and seamen spread the "French disease" and cases of syphilis were soon reported in Croatia, especially along the coast.

### THE HISTORY OF SEXUALLY TRANSMITTED DISEASES IN CROATIA UNTIL THE 18<sup>th</sup> CENTURY

In 1496, Giorgio Summaripa, an Italian poet, reported that the new disease "*fatto ha in Dalmacia e Grecia gran spavento*", i.e. "gave a great fright in Dalmatia and Greece" (8). The disease was first observed in a soldier in Zadar (1500), then in Trogir (1501), as told by the Venetian chronicler Marino Sanuda in his Diaries (9), and in Dubrovnik (1502), where the first quarantine had been established as early as 1377. From 1527 to 1532, the surgeon Marianus Sanctus practicing in Dubrovnik, reported on patients with the French disease. Critical to the treatment used by the local physicians, he used ointments based on mercury, and also made forceps for treating the *stricturae urethrae*. Later, he published his *De ardore urinae et difficultate meiendi* (4,10). *Ardor urinae* was a synonym for gonorrhoea. The Portuguese physi-

cian Amatus Lusitanus (Joao Habib Rodriguez de Castel blanco) who graduated from Salamanca in 1530 and became a renowned anatomist and surgeon, worked in Dubrovnik from 1556 to 1558. He described patients affected with the French disease in Dubrovnik in book VI of his *Curationum medicinalium centuriam* published in 1566 (11). From these data and from documents of the State Archive of Dubrovnik we know that during the 16<sup>th</sup> century there were patients suffering from venereal diseases in the town and that the physicians cured them. The presence of the disease in Istria at the end of 15<sup>th</sup> century should be noted, testified by Joseph Grünpeck in an early poem (12). Later, syphilis spread to the inland parts of the country. In the 16<sup>th</sup> century, Paracelsus was the first to believe erroneously that syphilis and gonorrhoea were the same disease entity called *morbus venereus*. During his traveling across Europe, he visited Slavonia, Senj, and Dalmatia (13).

In the 17<sup>th</sup> century, the medicine science in Europe had a significant development, whereas in the 18<sup>th</sup> century its advance was somewhat retarded in terms of theoretical and experimental activities and treatment (14). During the 17<sup>th</sup> and 18<sup>th</sup> centuries, the Croatian regions were under the rule of the Habsburg Monarchy, Venetia, and Turkey. There are no traces of written works on venereal diseases in Croatian language, because in the towns the physicians were foreigners, mostly Italians along the coast, or Austrians, Germans or from other countries in the inland areas. At that time, there was not a single medical school in Croatia, or medical books in Croatian. Croatian students had to study mostly in Padua, Bologna, Vienna, and Budapest. The various parts of Croatia developed unequally under different governments, or the development was interrupted by wars or other obstacles. As for other parts of Europe, venereal diseases were commonly treated by general physicians or more or less educated surgeons, and barbers (15). The importance of surgeon in the treatment of syphilis is underlined by reconstruction of the nose in syphilitic patients introduced by Gaspare Tagliacozzi towards the end of the 16<sup>th</sup> century (16). In the 18<sup>th</sup> century, B. A. Krčelić, a historian, reported data on the diseases and syphilis in Croatia in his *Annae, sive historia* (17).

To better understand the problems encountered by Croatian physicians during the past centuries, we will report shortly the most important changes that happened in venereology and the milestones in its development. During that period, as well as

in the first half of the 19<sup>th</sup> century, the majority of physicians were under the grip of tradition, the theory of humors, and the belief that gonorrhea and syphilis were one and the same disease. This opinion was strengthened especially after Hunter's unlucky experiments of inoculation into animals and on himself (18). Internists treated the skin disease, while surgeons commonly treated venereal diseases (15). In the first half of the 19<sup>th</sup> century, the surgeon Philippe Ricord (1800-1889) after lively controversies definitely separated syphilis from gonorrhea through numerous experimental inoculations in syphilitics (19). He divided the course of syphilis into three stages and treated the patients with mercury. Ricord did not distinguish *ulcus durum* from soft chancre, and erroneously believed that the secondary stage was not contagious (20). Later in the century (1852), new venereal diseases were detected, e.g., *ulcus molle* (chancroid) that was differentiated from syphilis on clinical grounds (consistence, incubation period) by Leon Bassereau (21). The causative agents of gonorrhea (1879) and *ulcus molle* (1889) were also discovered in the second half of the century (22,23).

### THE HISTORY OF SEXUALLY TRANSMITTED DISEASES IN CROATIA IN THE 19<sup>th</sup> CENTURY

At the end of the 18<sup>th</sup> and the beginning of the 19<sup>th</sup> century, a terrible epidemic appeared in the Rijeka area. In 1800, the protomedicus Leopold Masich first made a report in Latin to the local authorities on the disease that he called *morbus venereoscabiosus* (24). In the next years, thousands of patients were seen, studied and treated by Giovanni Battista Cambieri (1754-1838), the Rijeka protomedicus. He believed erroneously it was a *morbus sui generis* and termed it *Morbus Scherlievo*, after a village near the town. The disease was also called *Morbus Fluminensis* (Mb. of Rijeka), or even *Mb. Croaticum*. It was probably endemic syphilis and was treated with mercury topically, by fumigations and internally, and also with medicinal plants (24,25). Cambieri rarely saw the primary lesion in patients and noted the absence of gonorrhea (25).

In the Rijeka area, four hospitals were opened to cure the disease, *morbus Scherlievo*. At mid-century, the Hospital in Kraljevica was visited by Ferdinand von Hebra, by Karl Ludwig Sigmund and later by Gustav von Pernhofer, the greatest Vienna specialists for syphilis. Interestingly enough, Cambieri and Facchinetti, a surgeon employed at

the Hospital of Kraljevica, tried to demonstrate by inoculations whether the disease was contagious only in its early stage or also in the later stage. They even tried, if possible, to cure patients with syphilization (26,27). Naturally, it was a serious error and an unethical experiment, but sometimes the research may seem to be more important than Hippocratic "*salus aegroti suprema lex*". Similar experiments were also performed in France, Italy and other countries (28). Later the disease expanded to Slovenia (29), and subsequently to Slavonia where a hospital was opened in Pakrac to treat syphilitic patients (30).

It is interesting to note that during the French occupation a medical school was opened in Zadar, from 1806 to 1812, but the textbooks for studying were not written in Croatian but in Italian or German (31).

Croatian physicians did their dissertations in Latin, and some were on venereal disease. Đuro M. Šporer (1795-1884) was among the first to dedicate his dissertation to gonorrhea. He later worked as a physician in Bakar, Split and Rijeka (32). In 1827, Franjo Zohar wrote his thesis on gonorrhea and *fluor albus* (33,34). He worked as a physician in Sinj and Zadar. In 1831, Ferko Gorjup published his dissertation on syphilis in Budapest but considered syphilis and gonorrhea as one disease (33,34). Later he became a district physician in Osijek and Virovitica. Naturally, we cannot find any new viewpoints in these publications.

In the second half of the 19<sup>th</sup> century, medicine science and organization in Croatia started to advance slowly. The period was characterized by significant events such as the opening of new hospitals, the foundation of the Croatian Medical Association in 1874, the introduction of the first Croatian Health Legislation (even if with numerous imperfections), the foundation of the Zagreb University by help of bishop J. J. Strossmayer (however, medical school unfortunately opened only some four decades later), and from 1877 onwards the publishing of the first medical journals *Liječnički vjesnik* (Doctors' Gazette) and *Glasnik društva slavonskih liečnika* (The Herald of Slavonian Doctors) (34,35). It is to underscore that the physician Gjuro Augustinović edited a Croatian medical journal as early as 1860, in Vienna and Rijeka, but because of economic problems it was stopped soon (28). Later, in 1894 and 1906, new sanitary regulations were laid down that paid more attention to the preventive and social measures (35).

Antonio Felice Giacich (1813-1887), an excellent internist and surgeon who studied medicine in Vienna and Padua, produced numerous articles and books, mostly in Italian and German. Employed at Civic Hospital of Rijeka, he became director of the hospital and wrote a large article in Italian about Škrljevo disease, and an article on the same subject was published in a Hungarian medical journal. In addition, he dealt with venereal diseases in a treatise for seamen entitled *Medical Lessons for Seamen*, used throughout the monarchy (36,37). He was also member of the Medical Academies of Marseilles and Constantinople.

In 1893, doctor Nikola Selak (1862-1891), an esteemed physician and a very prolific writer, working at the Hospital of Koprivnica, wrote on *Morbus Brenensis*, i.e. Škrljevo around Dubrovnik, a malady that the local folk called "Turkey disease" (38). He described the disease that raged there at the beginning of the 19<sup>th</sup> century and was imported from Bosnia. He also wrote several papers on syphilis in the medical journal *Liječnički vjesnik* (39,40). Unfortunately, he died very young, so that some articles were published posthumously.

By the end of the 19<sup>th</sup> century, Božo Peričić, a brilliant Dalmatian internist, surgeon and polyglot, wrote interesting and critical papers on Scherlievo in Dalmatia. He studied in Vienna and then served in Šibenik, Zadar and Split. He was the author of numerous papers on syphilis in German, Italian and Croatian (41-44), and published a Croatian-German medical dictionary (45). It is worth noting that he was member of the German Society of Dermatology and Venereology.

The town of Osijek and Slavonia were under the Turkey until 1687, experiencing a state of stagnation and remaining underdeveloped for some time. Until 1728, there was only a military hospital, with surgeons and barbers being the only sanitary workers (46). The sanitary conditions improved when a new modern hospital was opened in 1874 (the Huttler-Kohlhoffer-Monsperger Memorial Hospital) (47). At the end of the 19<sup>th</sup> century, venereal diseases accounted for about 30% of all patients at the Osijek Hospital and posed a great socio-medical problem. These patients together with those suffering from skin diseases were recovered at surgical division (47). The first surgeon-dermatovenerologist at the Osijek Hospital was Aleksandar Blašković (appointed head of the Venereal Division in 1911), who introduced Wassermann reaction and salvarsan in therapy for syphilis (47). Later, he went to Zagreb and became an eminent professor of urology. Notably, he was the

first president of the Croatian Society of Dermatology and Venereology, founded in 1920. Oskar Günsberger (1896-1979), a physician, worked for some time at the Osijek Hospital and published a few articles (48-50) and a brochure on venereal diseases (51).

Apart from the deficiency of physicians in Croatia, dermatovenerologists in particular, during the 19<sup>th</sup> century, illiteracy of the great part of the rural population (52), presence of charlatans, quacks and superstitions connected with venereal diseases in the folk, and the use of extravagant treatments, e.g., washing the chancre with the patient's urine and then powder it with the ash of a burning cigar, posed great problems. Lay people used to push the penis into a hole in a pumpkin for gonorrhoea or used some kind of coprotherapy (drinking beer previously lain in cow dung) (53). The folk also believed that coitus with a virgin would cure gonorrhoea (54).

An important personality in the fight against venereal diseases in Slavonia and Croatia was Fran Gudrum Oriovčanin (1856-1919). He studied medicine and graduated from Vienna Medical School in 1882. Then he worked in the northern part of Croatia in the town of Križevci and was interested in social medicine following the ideas of Professor J. P. Frank, saying that enlightened governments should promote the health of the people (55). He wrote some educational books and papers on venereal diseases, gonorrhoea, alcoholism, and prostitution (56-60). In 1908-1909, doctor Oriovčanin organized an inquiry about prostitution in Slavonia and Croatia, which demonstrated that prostitutes mostly were of Hungarian origin, were frequently affected with venereal diseases, and were alcohol and nicotine addicts (60). It is of interest to know that as early as 1894-1895, the physicians from the Osijek Hospital carried out an inquiry on the prostitutes and found one third of them to have contracted the disease from commercial travelers, and frequently from military personnel (47).

The Milosrdna braća Hospital (Brothers of Charity Hospital, or Foundation Hospital), the oldest Zagreb hospital, founded in 1804 with the help of Bishop Maksimilian Vrhovac, was oriented to patients rather than charitable work (61). There the surgeons treated venereal diseases and sometimes also wrote about new treatments of syphilis (62). Another important hospital in Zagreb was Sestre milosrdnice Hospital (Sisters of Charity Hospital) opened in 1846, later moved to Vinogradska cesta in 1894 (63). At that time, patients with venereal diseases were also treated by



surgeons, who sometimes surgically cured syphilitic lesions (64). These two hospitals were the largest hospitals in Croatia.

Towards the end of the 19<sup>th</sup> century, patients with syphilis and gonorrhea accounted for a major part of all hospitalized patients. A case of *ulcus molle* was diagnosed in 1894 (65). In hospitals, these patients were generally treated at surgery division, and in some cases at internal medicine division, e.g., in Šibenik (66). After the 1914-1918 war, cases of *lymphogranuloma venereum* were recorded in our country, especially along the littoral area and in Zagreb.

### **MILESTONES IN SEXUALLY TRANSMITTED DISEASES IN THE 20<sup>th</sup> CENTURY – LEADERS IN CROATIAN VENEREOLOGY**

In the 20<sup>th</sup> century, new bacteria and viruses causing STD were discovered. At the beginning of the century, substantial advances were made by several scientists. Among them, mention should be made of Fritz Schaudinn (1871-1906), a protistologist, who worked in Rovinj from 1901 till 1904, and who later in 1905 together with Erich Hoffmann discovered *Spirochaeta pallida* (now *Treponema pallidum*) (67). Another eminent physician was August von Wasserman (1866-1923), who introduced the first serologic reaction to diagnose syphilis (68). It facilitated the diagnosis of syphilis and the test was soon introduced to Zagreb, the capital of Croatia (69). Dark field microscopy, introduced by Karl Landsteiner, is still the most important diagnostic tool in early syphilitic lesions.

At the beginning of the 20<sup>th</sup> century, the first specialists in dermatovenereology appeared in Croatia, but peculiarly enough, only as a man's profession. It is to note that after World War I, statistical data from our hospitals showed a significant increase in the number of cases of bacterial venereal diseases (65).

Janko Thierry (1874-1938), a gifted physician, after graduating from the Graz Medical School in 1901, returned to Zagreb to work at first as a surgeon, then as the first dermatologist in Croatia, and the first head of Department of Skin and Venereal Diseases at Milosrdna braća Hospital in Zagreb from 1906 to 1937 (70). In 1910, Head Doctor Thierry's paper on the treatment of syphilis with arsenobenzol Ehrlich-Hata was the first article on the new treatment of syphilis with salvarsan (71); later, he published a book on contagious venereal diseases (72), and a few articles on syphilis (73-75).

In 1917, the foundation of the first School of Medicine in Croatia, in Zagreb, after long-lasting vicissitudes, was of paramount importance and contributed to the advancement of Croatian medicine and dermatovenereology too (76,77).

In November 1923, Professor Pavel Šavnik (1882-1924) held the first lecture on dermatovenereology. He was born in Kranj, graduated from the Innsbruck Medical School in 1912, and headed Division of Dermatology and Venereology in Soči during World War I. He served his residency in Innsbruck, in Munich (with Professor Zumbusch), and in Prague, where he became private assistant professor. In 1923, he was appointed Chair of Dermatology and Venereology at Zagreb School of Medicine, and became professor. He wrote mostly on syphilis for our medical journals, as well as for Austrian and Czech periodicals (78-82). As he died in 1924, the lectures were held by Professor Mašek (ENT specialist), who was head of Division III at Sestre milosrdnice Hospital, and by Professor Ivan Botteri (internist) (83). It is not clear why an excellent dermatovenereologist like Thierry was not proposed to take the chair of Dermatology and Venereology (84).

In 1926, Franjo Kogoj (1903-1983), who was Professor A. Tryb's assistant in Brno, came to Zagreb and was appointed Chairman of Dermatology and Venereology. Soon he became professor and head of Department (opened in 1928), and later dean of the Zagreb School of Medicine. Professor Kogoj is acknowledged as the founder of dermatovenereology in our country and the greatest authority in the field (77). Special outpatient clinics for skin diseases, for syphilis and for gonorrhea were established at Šalata Department (83). He organized all clinical work, lectures and research activity. Kogoj's work had particular importance not only for dermatology but also for the development of venereology in Croatia. He wrote about 230 articles on skin diseases, among them 40 on venereal diseases. Complete information on his writings can be found in his bibliography (85), to mention only some of them here: an extensive chapter on primary genital and extragenital ulcus in Jadassohn's Handbook (86), the book Treatment of Syphilis, in which he introduced the concept of "treatment of negativation", i.e. the moment of complete disappearance of all clinical signs and negative serology (critical point), followed by the treatment of stabilization (87). He was editor of the book Venereal Diseases – Their Etiology, Static and Dynamic Symptomatology, Treatment and Social-Medical Significance (88), which became

the most important textbook for Croatian dermatovenereologists.

Kogoj's first assistants were Srećko Bošnjaković (1900-1947), Vladimir Franković, and then Milan Schwarzwald (83). Bošnjaković studied medicine in Zagreb, Graz and Munich, graduated in Zagreb 1925, and soon became Kogoj's first assistant, then Assistant Professor at Zagreb School of Medicine. To enlarge his knowledge, he visited renowned centers in Austria, Sweden, Denmark and Norway (89). He wrote several articles on venereal diseases, especially on *lymphogranuloma venereum* (90,91), and on the legislation regarding venereal diseases (92). Together with Professor Dušan Jakac he wrote about treatment of gonorrhea (93,94). On the basis of Bošnjaković's data, we know that about 300 cases of *lymphogranuloma venereum* were registered in Zagreb during the 1928-1937 period. He died in 1946. Doctor Franković also wrote a few papers on the serology of syphilis and gonorrhoea (95-97).

We must underline that almost all the Department dermatovenereologists were more or less interested in STDs and wrote a lot about venereal diseases. Important events for the Croatian venereology were the opening of dispensaries for venereal and skin diseases, which contributed to modernization of venereology. Here, we must emphasize the role of Professor Andrija Štampar (1888-1958), who studied medicine and graduated from the Vienna Medical School in 1911. He promoted social medicine, stressed the importance of health education and prevention, and contributed to the opening of health centers, medical schools, dispensaries, and outpatient clinics for venereal diseases in numerous towns (98). In dispensaries, venereal patients were cured free. His work received large financial support from the Rockefeller Foundation between the two world wars and afterwards (98). This permitted the construction and equipping of the Health School in Zagreb (1927), where the first national drug against syphilis, Neofenarsan, was manufactured in the 1930s (99,100). He was active as a writer and also held lectures on venereal diseases and prostitution (101).

It is well known that before the introduction of sulfonamides and antibiotics, the treatment of bacterial venereal diseases was a great and long-lasting problem necessitating hospital treatment. Syphilis was treated with injections of arsenicals intravenously, bismuth intramuscularly, pyretotherapy and even ointments or injections of mercury, while gonorrhoea was cured with local instillations of *argenti nitrici* or potassium permanganate. After

World War II, it became possible to treat them easily with penicillin in outpatient clinics.

Professor Šime Čajkovac (1901-1978), Kogoj's successor at Department of Skin and Venereal Diseases, was first of all an expert in mycology and trichology, but was interested in all branches of dermatology. He graduated from the Zagreb School of Medicine in 1927, improved his knowledge visiting in 1953-1954 departments in Holland and Pavia, and from 1965 to his retirement in 1971, held the position of chairman of Dermatovenereology at Zagreb School of Medicine (77,102). He wrote a few chapters on venereal diseases in Kogoj's Venereal Diseases (103-106), edited the entry on *lymphogranuloma inguinale* in Medical Encyclopedia (107), published a booklet on venereal diseases (108) and an article on keratinization in gonorrhoea (109).

Milan Schwarzwald (1900-1984) graduated in 1927, became Kogoj's assistant and head of the Division for Actinotherapy from 1931 to his retirement in 1970 (110). He was elected Professor in 1965, wrote about gonorrhoea in the mentioned Kogoj's book and on *ulcus molle* in Medical Encyclopedia (111,112).

Head Doctor Ivana Orhel (1915-1973) graduated from the Zagreb School of Medicine in 1940 and wrote her thesis on immobilizins in rabbit syphilis (113). In 1950, she became head of the serology laboratory, a position she held until her death in 1973. After a period of study in Paris, she developed Croatian serology introducing the Nelson-Mayer test (*Treponema pallidum* immobilisation (TPI) test) for syphilis in 1952 (it was the second laboratory in Europe that performed this test!) (110). She also helped in the development of serologic laboratories in Africa, wrote articles on syphilis serology and on gonorrhoea in women in Kogoj's book on venereal diseases (114-117). After Ivana Orhel's death, the serology laboratory at Zagreb Department was for a short period headed by Vlasta Vukelić, who wrote articles on venereal diseases (118), and then (1976) by Professor Jasna Lipozenčić. The next head of the laboratory was Head Doctor Azra Balić-Winter. She introduced the TPHA and FTA-ABS tests with IgG and IgM as an innovative laboratory practice, important for diagnosing congenital syphilis (110) and published articles on syphilis serology (119-121). Later, the laboratory changed the name in Laboratory of Clinical Immunology, Immunofluorescence and Serology. Assistant Professor Branka Marinović was appointed head of this laboratory in 2007. She defended her thesis entitled Determi-

nation of the Presence of *Treponema pallidum* in Patients with Primary Syphilis and in Late Latent Syphilis in Zagreb in 2003 (77,110).

Professor Albin Brnobić (1916-2007) graduated from the Zagreb School of Medicine in 1943. He was mostly interested in allergology and was appointed Chairman of Dermatovenereology and head of the Department in 1974, a position he held until 1978. He defended his thesis entitled Blastic Transformation of Lymphocyte Test in the Diagnosis of Syphilis in Zagreb (77,110) and published some articles on venereal diseases (122-127). When he retired, Professor Aleksej Kansky was called to chair Dermatovenereology at the Zagreb School of Medicine and to head the Department of Venereal Diseases. He held the position from 1979 to 1990 (77,110). After graduating in Ljubljana in 1951, Professor A. Kansky improved his knowledge in Germany and USA. He was interested in many branches of dermatovenereology, and was Editor-in-Chief of the journal *Acta Dermatovenereologica Iugoslavica*. In 1982, he published with his colleagues the student textbook *Skin and Venereal Diseases* (77).

Professors Mašek and Blašković were followed by Head Doctor Ivan Beuc (1928) at Department of Skin and Venereal Diseases, Sestre milosrdnice Hospital. He published a few articles on syphilis (128-131). Then Head Doctor Ante Gospodnetić came, who also wrote on venereal diseases (65). After them, an outstanding professor of dermatology was Zorislav Žmegač (1919-1988). He graduated from the Zagreb School of Medicine in 1944. In 1965, he was appointed Chairman of Dermatovenereology at the School of Dental Medicine and head of the Department of Skin and Venereal Diseases at this hospital (then named Dr. Mladen Stojanović Hospital). He held the position until his retirement in 1980 (132). He restructured the Department, wrote numerous papers, among these some on venereal diseases (133-135).

The first dispensary for skin and venereal diseases in Croatia was opened in Zagreb in 1921, affording the patients free treatment. Janko Božić (1889-1975), who studied in Innsbruck and graduated in 1914, worked there for more than three decades. After World War I, he served his residency in dermatovenereology at Sestre milosrdnice Hospital with Professors Mašek and Blašković, and then he received professional training at departments in Paris and Vienna. He became head of the Dispensary in 1921 and held the position until his retirement in 1952. Head Doctor Božić was president of the Croatian Medical Association from 1930 to

1932 and one of the initiators of the opening of the Medical Home in Zagreb (136). He published numerous articles (137-140) and two brochures on the treatment of venereal diseases for general practitioners (141,142). Later, Professor Zvonimir Zambal (1922-1993) worked at the dispensary. He graduated in Zagreb in 1946, served his residency in Sarajevo (with Professor J. Fleger), came to Zagreb and was nominated professor. He worked for five years in Essen (Germany) and was an outstanding dermatopathologist, famed for his great knowledge (77,110). Together with Professor A. Kansky he was editor of *Aktualna problematika spolnih bolesti* (Current Problems of Venereal Diseases) published in Zagreb in 1980, in which he wrote about some rare forms of syphilis (143). Together with V. Vukelić he is the author of the brilliant entry on venereal diseases in the national Medical Encyclopedia (Suppl 1).

Other distinguished dermatologists like Head Doctor Štefanija Puretić wrote about congenital syphilis, R. Katunarić and Mirko Kastelic working in Zagreb published articles on venereal diseases (144-147), and Daniel Živković on male infertility.

In Rijeka, after World War I, the Civic Hospital was moved to the former Maritime Academy. The majority of patients were cured for venereal diseases at Dermatovenereology Department. The dermatovenereologists were Italians Casimiro Petranich, Gino Bossi, and Giorgio Maraspin, who specialized in Rome (148). They were authors of a number of papers on syphilis and gonorrhoea (149-151). In the Croatian part of Rijeka (Sušak), Head Doctor Niko Bonetić worked at Dispensary for Venereal Diseases from 1925. Later, he became head of the Division of Dermatology at Sušak Hospital. He participated at national congresses and wrote about Škrljevo disease (152) and gonorrhoea (153,154). After his death in 1941, Dr. A. Vukas, a brilliant thinker and experimenter, was appointed head of the Hospital Division of Dermatovenereology (155). During World War II, Dr. Vukas wrote articles on syphilis (156,157), and then joined the partisan army. He was the first to write on gonorrhoea treatment with penicillin in Croatia (158). In 1947, Dr. A. Vukas returned to the Department and organized work at that hard postwar time. Later, he was the first to introduce the VDRL test for syphilis in Croatia (1953) and in 1956, together with Dr. Edina Černe, the TPI test and then TPHA. As a consequence, in a small country like Croatia two laboratories had the possibility to perform TPI test to diagnose syphilis (Zagreb and Rijeka). He was mostly interested in dermabrasion and phototherapy. Later, he was



nominated professor and published a few papers on serology (159-161).

Professor Dušan Jakac (1906-2006) studied medicine in Padua, Ljubljana and Zagreb, where he graduated in 1934. After World War II, he came to Rijeka and was appointed head of the Department of Dermatovenereology from 1946 to 1975, when he retired. He was appointed chair of Dermatovenereology at the Rijeka School of Medicine when it was opened in 1955 (Rijeka University was established later, in 1973). He also was dean of the Rijeka School of Medicine (148). He was mostly interested in professional dermatoses. Together with his assistants A. Wolf and E. Černe he organized laboratory of venereal diseases and wrote a few articles on the treatment of venereal diseases (162-166) and on syphilis in a treatise in a book Dermatovenereology in which he was Editor-in-Chief (167,168).

Professor Anđelko Wolf, the successor of Professor D. Jakac at Department of Skin and Venereal Diseases in Rijeka Hospital, wrote a few articles on the prevention of the Venereal diseases (169-171), as did Professor Nikola Mohar, who was head of the Division of Actinotherapy at the Department (172-174).

A distinguished physician was Head Doctor Tullio Nonveiller (1903-1992). He studied in Vienna and graduated in Belgrade. After the war he came to Rijeka, became head of Venereal Dispensary located near the harbor, coordinating activities against venereal diseases that had increased in incidence after World War II. He controlled prostitutes and opened a laboratory where Wasserman and VDRL reaction as well as the diagnosis of gonorrhoea, trichomoniasis, candidiasis, *ulcus molle* and *lymphogranuloma inguinale* were performed. He had particular interest in the problems of venereal diseases among seamen. He organized shows on venereal diseases for the public in Rijeka and Split using *moulages* and held lectures on the subject at the Nautical School in Rijeka. He was the author of two brochures on venereal diseases and how to treat seamen on board (175,176).

In the last decades, venereology also improved in the Croatian harbors of Pula, Zadar and Split, particularly in the diagnosis, treatment and prevention of STIs. In Pula, the Hospital built on St. Michaelis Hill in 1896 was provided with a division for venereal diseases. After World War I, Pula was under the Italian government and after World War II under Anglo-American jurisdiction (Zone A) up to 1947 (177). Stjepan Piuković, a dermatovenero-

logist, came from Zagreb (where he had written a paper on the epidemiology of venereal diseases) (178) to the Pula Hospital and gave his service for a short period. Then the Division was headed by Head Doctor Žemva (179). The general situation in the town and in the hospital was rather poor and the number of patients with venereal diseases was high (176).

In Zadar, Head Doctor Vladimir Matanić, who graduated from the Zagreb School of Medicine in 1941, headed the Hospital Division of Dermatovenereology and the Dispensary (opened in 1929 by Dr. Smirkinić at St. Nicholas Monastery) from 1952 to 1982 (180). He wrote numerous papers on syphilis, especially on its treatment with rolitetracyclin (Reverin) (181-185). After him, the Division of Dermatovenereology in Zadar was headed by Head Doctor Boris Petričić and then by Mile Gverić. They published papers on venereal diseases among seamen (186,187). At that time, Gverić also held the position of director of the Zadar Hospital.

Department of Skin and Venereal Diseases was opened at Split Hospital in 1918, and the first head was Ivo Stalio. After World War II, Radovan Vidović (1943-1995), employed at the Department, together with Vlatko Aglič (1936-1992) working at local dispensary, wrote on the epidemiology of venereal diseases, especially in seamen (188-190). Later, Dujomir Marasović was appointed head of the Department, and then director of the Hospital; also, he wrote a number of interesting case reports in the field (191-193).

In Osijek, after Head Doctor Blašković, Marijan Mrzić (1893-1921) worked at Division of Dermatovenereology for a short time because he died young. In the next years, the situation at the Division was not very good, until 1924 when Dr. Nikola Mudrovčić was appointed head of the Division. Dr. Mudrovčić studied medicine in Graz, Vienna and Prague, where he graduated from the School of Medicine in 1919 (47). After a short period of work in Zagreb at Department of Dermatology, he went to improve his knowledge at respective departments in Germany, France, Switzerland and Denmark, and then he headed Dermatological Division at Osijek Hospital and retired in 1962. He held numerous lectures and organized work in a modern fashion (47).

In Osijek, Vlatko Čorak was employed at venereal dispensary, which was closed in 2001.

In the 1970s, it became clear that in many patients with urethritis the causative agent was not



gonococcus (*urethritis non specifica* or *simplex*), but the intracellular bacterium *Chlamydia trachomatis*, which was the most common venereal disease. It was treated with tetracyclines (194,195).

Professor F. Gruber graduated from the Rijeka School of Medicine and worked for 20 years in the local dispensary for venereal diseases. From 1993, he held the Chair of Dermatovenereology at Rijeka School of Medicine and was head of the Department of Skin and Venereal Diseases. He successfully treated chlamydial infections (even one case of *lymphogranuloma inguinale*) as well as gonorrhoea, syphilis and chancroid with azithromycin, macrolide developed by Croatian pharmaceutical industry Pliva (196-199). He also conducted researches into the epidemiology and immunology of gonorrhoea (200-204).

In the 1980s, a new venereal disease appeared first in the USA, then in Europe and elsewhere. It was mostly seen in homosexuals and intravenous drug abusers. Soon it was found that the etiological agent was the retrovirus human immunodeficiency virus 1 (HIV1), while the disease was named as acquired immunodeficiency syndrome (AIDS). The disease had a fatal course, but today it is possible to cure it with HAART. In Croatia, patients with the disease were mostly cured by specialists in infectious diseases. Our dermatologists Mihael Skerlev, D. Marasović and F. Gruber have described the skin and mucosal lesions in these patients (193,205-208). Other viruses causing condylomata acuminata (HPV virus) are also of increasing interest and concern in recent years. They may lead to cervical carcinomas. Numerous articles on these agents have been published by M. Skerlev (209-211).

It is interesting that some Croatian specialists in the history of medicine have also written about STD. So, M. D. Grmek, a famous Professor of History of Medicine, in his numerous books and articles translated to many languages, also writes on the history of AIDS and syphilis (212,213).

In the 1990s, the disintegration of Yugoslavia led to the war in which the Republic of Croatia was attacked by Federal Army and Serbian paramilitary forces. The war caused destruction of towns, medical institutions, churches, and parts of the population had had to seek refuge in other regions. During the war, Croatian dermatovenereologists continued their clinical work in spite of numerous difficulties, participated in congresses, became members of the Alps-Danube-Adria STD

Group, and IUSTI; and the last but not the least, in 1993 Croatian dermatovenereologists started publishing the journal *Acta Dermatovenereologica Croatica* (ADC), where a few articles on STIs have appeared. The first ADC Editor-in-Chief was Professor Vladimir Čajkovac, now it is Professor Jasna Lipozenčić. She is the author of a few interesting articles on venereal diseases (214-219).

Today, it is well known that specialists in urology, gynecology, microbiology, infectious diseases and others are engaged in the diagnosis and management of STIs.

In conclusion, dermatovenereology as a specialty appeared later in Croatia than in other European countries. Nevertheless, during the 19<sup>th</sup> century many Croatian physicians and almost all dermatovenereologists of the past century were greatly interested in the field of venereology. In spite of the relatively late development of medical schools, wars, different governments, etc., dermatovenereologists in Croatia treated patients affected by venereal diseases with great care and ability, introduced new diagnostic technologies, acted and dealt with all aspects of STIs, even performing basic researches. A significant progress has been achieved especially in large centers where medical schools have been opened. The Croatian venereologists have also organized a few international congresses on STD and have become members of prominent international societies. Among the physicians engaged in the field of venereology (or genitourinary medicine) in the last years, particular merits go to Professors M. Skerlev, J. Lipozenčić and F. Gruber. In the 19<sup>th</sup> century and the first half of the 20<sup>th</sup> century, the majority of patients with syphilis and gonorrhoea were treated at departments of skin and venereal diseases, whereas today they are managed by general practitioners at outpatient clinics. Nowadays, the interest of dermatovenereologists is shifting towards other STIs such as chlamydial infections, genital herpes, HPV genital infection and HIV, and their presence among homosexuals. These diseases and problems remain a challenge for the future venereologists and other specialists.

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