Hygiene was taught from the establishment of the University of Athens in 1837 by professors belonging to various specializations, including I. Nikolaidis-Leivadefs, G. Prinaris, S. Balanos, P. Kiriakos and I. Pirlas, who taught it in concert with other subjects. But the professor who laid the foundations of the University of Athens Hygiene and Microbiology Laboratory was Constantine Savas, who acted as Director of this Laboratory and was appointed Professor of Microbiology and Hygiene in 1900. Savas remained there until 1929, when the two chairs were separated. The year 1900 was a milestone in Hygiene studies and the improvement of public health for the Greek people. That is why C. Savas was an ingenious and industrious scientist. At the same time, he was an excellent academic teacher and a man of the highest morals. His scientific knowledge was gained by his studies in Athens, Vienna, Berlin and London. So he studied medicine at the University of Athens, graduated in 1877 and received his PhD in 1881. In 1882, upon examination, he enlisted as a cadet military doctor, and was later promoted to the positions of second lieutenant doctor and medical lieutenant in 1884 and 1888 respectively. He then quit the army and visited Vienna, when he specialized in Pathology and Microbiology near Professor Weichselbaum, from 1888 to 1890. Then, from 1893 to 1894, he went to the Berlin Health Institute, to study under Professor Rubner (Robert Koch’s successor). In 1898 in London, he studied Public Health Organization, while, visiting various cities in Germany, Austria and Italy, he worked on Legislation and Health Provisions, Public Health and Medical Prevention projects. Because of his knowledge he was aware of the importance of teaching Hygiene and Microbiology at the University.

Before becoming an academic teacher at the University of Athens he was awarded various titles for his important, extensive sociomedical research work. Of special interest in his rich authorial work are some studies, which were delivered at Medical Societies and Congresses. In 1893, his treatise «On the cerebrospinal meningitis in Greece», consisting of 128 pages.
was awarded with the «Symvoulidio prize». As part of the numerous significant papers on meningitis in 1866, 1869, 1870, 1871 and 1881, Savas’ monograph «On cerebrospinal meningitis in Greece» provided a comprehensive image of the disease’s epidemiology in Greece\(^1\). This study characterizes Savas’ scientific way of thinking during his first scientific steps and at the same time the implementation of Hygiene, Microbiology and Epidemiology in Greece.

Professor Savas elaborated upon the importance of the teaching of Hygiene in his welcoming speech at the University of Athens and through his Manual of Microbiology and Manual of Hygiene.

In his welcoming speech on Hygiene and Microbiology, delivered on 15 November 1900 in the Great Hall of the Law School, Savas observed that Hygiene attracts more attention and interest than any other medical specialty. He briefly delineated the development of Hygiene from Antiquity to his own time, and the influence Microbiology had exerted on Hygiene. He mentioned the social improvements arising from the collaboration of these two sciences and the value of the modern science of Hygiene. Savas concluded his speech with an examination of the sanitary conditions in Greece, suggesting at the same time the necessity for taking measures for their improvement. He stressed the importance of scientific training in Hygiene for young doctors and underlined that he would make every possible effort to achieve this goal. Savas also stated his belief that Hygiene should be popularized in every possible way, and taught at Universities, at Polytechnics, and at other academic institutions where possible. He believed that the teaching of Hygiene at the University would contribute to the best possible management of public health issues, through the teaching of statistics and the organization of an efficient statistical unit which would elucidate population mobility (births, weddings, and deaths throughout the entire country) in order to meticulously study the sanitation conditions of the population and manage problems when these arose.

Savas also emphasized that the teaching of Hygiene would enlighten medical staff as regarding vaccinations and revaccinations, which required implementa-

dation in accordance with the example set by Prussia, in order to eradicate pox, the presence of which was a stigma in all civilized nations\(^12\).

In 1906, Savas published the first edition of his Manual of Microbiology.

He believed that the thorough education of students should not be based only on classroom, laboratory, and clinical courses, since there was limited time to develop the subject and the human mind was not always able to remember all the information it had received. He believed that a book like the Manual was necessary not only during university studies, but also as a valuable aid during the practice of medicine. His aim was for it to become an indispensable source of information, guiding and supporting doctors throughout their careers. For this reason, as he himself noted, the compilation of a Microbiology manual aimed not only to train medical students, but also to act as an aid for doctors, veterinarians and zymurgists. He writes: «The awareness of this need urged me to write the present Manual of Microbiology, aiming not only to train Medical students, but also, I hope, to guide doctors and veterinarians, and even zymurgists, in their work... Much has happened through the progress of Microbiology. For this reason, I have divided the material of this book so as to have separate chapters of interest to doctors and veterinarians and separate parts dedicated to the needs of zymurgists...»\(^10\). As he states in the Prologue, the book was based on the most up-to-date information, taken from the best papers of the time, mainly German, English, and Italian medical literature. His experience teaching the course at the University of Athens and the Academy of Industry, and the latest medical publications formed the primary sources for the Manual of Microbiology. In March 1906, in the Preface to the first edition, he writes of the teaching of Microbiology: «Microbiology is being taught for the first time at the University of Athens. As I am the first official teacher of this new science in Greece, I had to apply a theoretical and practical teaching method, and find names for things that did not exist before. Each of these targets met with a series of problems. In order to be able to teach systematically, a laboratory had to be established; Savas laboratory was the first of its kind established in Greece. In it, Hygiene and Microbiol-

\(^1\) The monograph was submitted to the «Symvoulidio Prize», during the official session at the aula of the University December 27, 1892 and was awarded the prize of 1000 drachmas.
ogy were taught not only to medical students, but also to many doctors. Fully trained, these individuals could contribute in the future to the dissemination of knowledge concerning Hygiene, and support the competent authorities in their efforts to reform public health...»\(^{10}\).

He also stressed that the naming of concepts related to the science was a difficult problem, as new scientific terms, previously unknown, had to be both clear and accurate as well as in accordance with the rules of Greek word production. «Perhaps in no other branch of Medicine it is so difficult to translate foreign terms into Greek as it is in Microbiology, since many of these (terms) have been formed by people who are not familiar with the Greek and Latin languages, and have created altogether monstrous words»\(^{10}\).

From this Prologue, it is evident that Professor Savas was profoundly aware of both the relationship between Microbiology and Hygiene and the importance of scientific research, which aimed to explain various environmental factors that could affect human health.

In 1907, the Manual of Hygiene was published together with 158 images.

Savas was then Professor of Hygiene and Microbiology at the University of Athens and physician to HM the King, as is noted on the book’s cover. In fact his influence in formulating a health policy was big, since from 1900 he was also one of the physicians of the kings George I, Constantine, Alexander and George II. C. Savas’ name is also related to the sudden and premature death of King Alexander, as witnessed by his letter to the personal doctor of the exiled king Constantine, Andreas Anastasopoulos. The letter concerns king Alexander’s injury and cause of death. This letter, written on 16/29 October 1920, testifies Savas’ medical ethos and the scientific trends of his era\(^{16,17}\).

In the Prologue, he states that it was written in the most comprehensive manner possible, with the aim assisting not only doctors and students, but also parents teachers, and the general public in an era when Greece was plagued by numerous infectious diseases, when the country’s health conditions and sanitary services had become very degraded, and when the teaching of Hygiene had been completely neglected.

«I hope», Savas writes in this first edition\(^{11}\), that «Hygiene will be received as... closely linked to man’s most precious asset... For this reason, even though it is aimed mainly at doctors and medical students, I have tried to render this book as comprehensible as possible, so that non-doctors can easily understand it». «For a long time now, doctors and the general public alike have felt the need for such a book, incorporating the newest discoveries of this beneficial science. It is a regrettable fact that in Greece, the country where Hygiene first flourished, the indispensable attention was not paid...». He also stresses that Hygiene (or Dietetics, as it was then called) was one of the first courses to be taught at the University upon its establishment, but that it was later largely neglected. Sometimes this was because its teaching was interrupted for long periods; at others, it was because it was because the course was taught by Professors with no experience, even though it «required special studies and was an exclusive and independent occupation»\(^{11,15}\). As a result, doctors, graduated from the University «without any knowledge on hygiene», while the public, lacking the motivation of specialists and with no interest in reading relevant publications, remained completely ignorant. Thus, people had forgotten its existence, rejected any relevant thinking on the subject, and did not comply with its guidelines\(^3\). Worst of all, this general indifference led to the complete disorganization of the Public Hygiene Service, which had been very efficiently organized by the Bavarians upon their arrival in Greece. In this way it had gradually deteriorated, and the institution of prefecture medical officers, established by a Special Decree in 1836, was abolished. The law concerning vaccinations was no longer being implemented, and Greece was the only country in Europe that not only lacked health legislation, but also the relevant public health services. Its health services had not operated since the years 1833-1845, and despite the fact that public health had now been radically reformed, these services had not undergone any modification. On the contrary, despite the fact that other nations were continually instituting and refining new laws and setting an excellent example, health staff in Greece was confined to the Medical Council, a purely advisory committee without any vested power to take or implement initiatives, to a handful of city doctors, and to two or three port health officers. Indeed, the above occurred, Savas stresses, in an era when the countries of Aimos (i.e., Romania, Serbia, and Bulgaria), had excellent laws and health services. «For this reason», Savas adds in his Prologue, «I believe that it is my pressing duty, arising from my position...».
at the University and my specialization in Hygiene, to act to the best of my abilities against this situation, the harmful effects of which have been witnessed for many years both through our country’s high mortality rates and through the extensive spread of variola, consumption, malaria and many other infectious diseases. Through my lectures at the University, I have tried to impart the necessary Knowledge of public health to future doctors, so as to help them practice their humanitarian profession. Through the publication of the present manual, I aim at the widest possible dissemination of these ideas, not only to doctors, but to all other educated social classes).

Savas’ belief about the importance of teaching Hygiene was practically shown when malaria and cholera plagued Greece. In fact his contribution to the salvation of the Greek people from lethal infectious diseases, such as malaria, which ravaged the country, was estimable. The whole antimalarial effort was tirelessly led by Professor Savas. He significantly contributed to the establishment, organisation and activities of the Society for the control of malarial diseases, a Society which used all the available means to fight plague and malaria in Greece. The Society was founded in 1905, modelled on the equivalent Italian organisation, established by Savas’ friend and colleague, a Professor of Hygiene in Rome, called Angelo Celli. The year 1905 is regarded as a milestone for Greece, as it marked the first real manifestation of private care and the first steps to relieve the country from malaria. To achieve the Society’s goals, such as the rapid popularisation of knowledge concerning malaria, the improvement of the conditions of country’s marshes, the free provision of quinine to the poor and in general the taking of measures to manage the disease, Professor Savas established various committees in order to assist the Society’s work. At the same time in the Laboratory of Microbiology and Hygiene various microscopic samples from various parts of the country were studied. The teaching of Hygiene was taking place at the University’s amphitheatre by the display of transparencies on relevant matters. Doctors were sent to various small local marshes to study the environment and the larvae of anopheles mosquitoes.

For many years, Savas acted as the president of the Society for the control of malarial diseases. He also proposed various legislative measures, such as On the sale of State quinine (1908). From 1907 to 1928, as a Professor of the University of Athens and Vice-President of the Society for the control of malarial diseases, together with Dr. I.P. Kardamatis, Health Inspector and Secretary General of the same Society, they published the 6-volume work entitled *Malaria in Greece and the work of the Society*. The book was set under the auspices of the King and the Society. The six volumes based on official statistics from 1899 depicted the severity of the problem of malaria in Greece.

Additionally, Savas due to the joint efforts of the Army and the civilian authorities, led by him and Colonel MD Pan. Manousos, he took a leading role concerning the fight against cholera with the formulation of an anticholeral serum, with which the army and the population of Macedonia were inoculated during the Balkan war malaria epidemic (1913), which in spite of the adverse circumstances of the war, was successfully controlled. «Thus, it should not seem boastful to view this work as a triumph of the Greek Medicine, which, based on its own powers and without the least foreign help, under adverse circumstances, achieved a favorable accomplishments». These are the concluding words in the Manousos’ and Savas’ report after the control of the cholera epidemic during the summer of 1913. A total of about 500,000 people were vaccinated. The vaccine was prepared in the Laboratory of Microbiology and Hygiene of the University of Athens and this was the first large-scale vaccination against cholera recorded in the world medical literature till then.

All these activities show that Savas has been the main introducer and the leader of Hygiene and Microbiology and a tireless administrator of public health in Greece.

**CONCLUSION**

The teaching of the subject of Hygiene by Constantin Savas at the University of Athens had as its purpose to enlighten medical staff and the public, in an age when the Public Hygiene (Health) Service was completely disorganized, and to highlight the social improvements arising from the collaboration of the two sciences of Hygiene and Microbiology, as becomes clear from the welcoming speech Savas delivered at the University of Athens and in the Prologues to his Manual of Microbiology and Manual of Hygiene.
Η σημασία της διδασκαλίας της επιστήμης της Υγείας στο Πανεπιστήμιο των Αθηνών σύμφωνα με τις απόψεις του καθηγητή Κωνσταντίνου Σάββα.

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ΠΕΡΙΛΗΨΗ: Η επιστήμη της Υγείας διδάχτηκε στο Πανεπιστήμιο Αθηνών από την εγκατάστασή του από καθηγητές διαφό- ρων ειδικοτήτων. Ο Κωνσταντίνος Σάββας υπήρξε ο διευθυντής του Εργαστηρίου Υγείας και Επιδημιολογίας από το 1900-1929. Η σημασία της διδασκαλίας της Υγείας στο Πανεπιστήμιο φαίνεται από τον εναρκτήριο λόγο του στο Πανεπιστήμιο Αθηνών και από τα συγγράμματα του «Εγχειρίδιο Μικροβιολογίας» και «Εγχειρίδιο Υγείας». Στον εναρκτήριο λόγο του με θέμα την Υγεία δίνει μεγάλη έμφαση στη σπουδαϊότητα της διδασκαλίας της Υγείας για τη διαφύτευση των γιατρών και του κοινού, ενώ αναφέρει τα κοινωνικά οφέλη που προκύπτουν από τη συνεργασία ανθρώπων που ασχολούνται με την επιστήμη της Υγείας και της Μικροβιολογίας. Στον πρόλογο του "Εγχειρίδιο Μικροβιολογίας" και του "Εγχειρίδιο Της Υγείας", τα οποία ιδιαίτερα συνέβαλαν στην διδασκαλία της επιστήμης της Υγείας, είναι φανερό ότι ο καθηγητής Σάββας ήταν γνώστης της σχέσης αυτών των δύο επιστημών και της σπουδαιότητας της διδασκαλίας και της επιστημονικής έρευνας στον τομέα της Υγείας.

Λέξεις Κλειδιά: Κωνσταντίνος Σάββας, Υγεία στην Ελλάδα, Πανεπιστήμιο Αθηνών, Εργαστήριο Υγείας, Μικροβιολογία, Στατιστική στην Ιατρική, ελονοσία στην Ελλάδα, χολέρα στην Ελλάδα.

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