

150 YEARS SINCE THE BIRTH OF ERNEST JUVARA (1870-1933)

A. G. Mohan^{1,2}, M. V. Săceleanu^{3,4*}, A. A. Marinescu⁵, Dana Mihaela Turliuc^{6,7}, A. V. Ciurea^{5,8}

University of Oradea, Romania, Faculty of Medicine and Pharmacy

1. Department of Neurosurgery

2. Bihor County Emergency Hospital, Oradea, Romania / Department of Neurosurgery
“Lucian Blaga” University, Sibiu, Romania “Victor Papilian” Faculty of Medicine

3. Department of Neurosurgery

4. Emergency County Hospital, Sibiu, Romania / Department of Neurosurgery
“Carol Davila” University of Medicine and Pharmacy, Bucharest

5. Department of Neurosurgery

“Grigore T. Popa” University of Medicine and Pharmacy, Iasi
Faculty of Medicine

6. Department of Surgery (II)

7. “Professor Dr. N. Oblu” Clinical Emergency Hospital Iasi / Department of Neurosurgery (II)
“Sanador” Clinical Hospital, Bucharest

8. Department of Neurosurgery

*Corresponding author. E-mail: vicentiu.saceleanu@gmail.com

150 YEARS SINCE THE BIRTH OF ERNEST JUVARA (1870-1933) (Abstract): Ernest Juvara was born in 1870, in Bârlad, Romania in a wealthy farmer family. He displayed some remarkable aptitudes and skills from early childhood. He finished his primary and high school studies at some of the most famous education institutions in Romania. In 1888 he is accepted at the Paris Medical School. There, Prof. Paul Poirier was an exceptional mentor for Juvara. From him, he learned the art of anatomic drawing. In 1895, Juvara defends his doctoral thesis in medicine and surgery and is awarded “*extrêmement bien*” by the Paris Medical School. In the same year he returns to Romania with Prof. Thoma Ionescu and begins his surgical and university career. During his stay in Paris, he managed to publish a successful anatomy book, personally decorated with multiple original anatomical drawings, and drew over 100 anatomy illustrations for demonstrations and anatomy treatise published by his mentor. His extraordinary surgical and scientific activity, organizer and inventor talent advanced him to the position of tenure professor at only 29 years of age. He is regarded as the founder of the Department of clinical surgery at Iași Faculty of Medicine and one of the orthopedics pioneers in Romania. Throughout his career he drew over 3,000 original anatomy illustrations and published over 230 articles and books. We pay tribute to one of the pillars of Romanian medicine, Ernest Juvara, a skillful surgeon, a talented professor, artist, and inventor, and especially a truly remarkable personality. **Keywords:** ERNEST JUVARA, HISTORY OF MEDICINE, ORTHOPEDICS, ROMANIAN MEDICINE.

Childhood and education

Ernest Juvara (fig. 1) was born on May 14th, 1870, in Bârlad, Romania. His father,

Iorgu Juvara, was a wealthy farmer. During his childhood he was very shy, but this personality trait eventually worked in his

favor. His isolation from other children pushed him towards some remarkable activities for his age. One of his teachers, Professor Socrate Lalu, told the story of how Juvara completely disassembled and reassembled the first mechanical watch he received from his parents. The watch worked without an issue.

Aware of the remarkable aptitudes and skills he developed from early childhood, his parents sent him to the Romanian capital, Bucharest. Here he finished his primary

school studies at “Urechia” Institute. He graduated from high-school at “Saint Sava” College – one of the most famous high-schools in Romania (fig. 2). According to the only 1880-1888 class book to survive the German bombardment of Bucharest in 1944, Juvara was not at the top of his class. Still, his physics and chemistry professor acknowledged his interest in applied sciences. In 1886, while still in high-school, Ernest Juvara was named laboratory preparer.

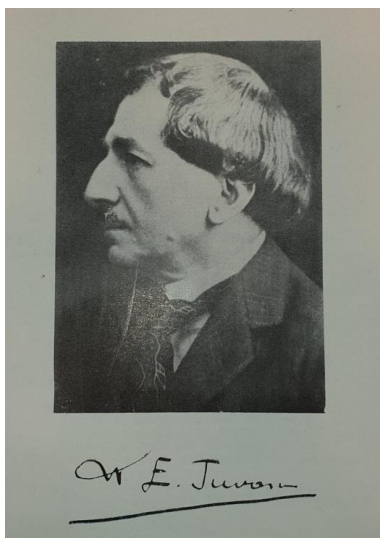


Fig. 1. Prof. Ernest Juvara and his signature
Image source: Fagarasanu I,
Ernest Juvara omul si opera, Romanian
Academy Publishing House, Bucharest, 1986
(1)



Fig. 2. “Saint Sava” National College, Bucharest (left) – founded in 1694 by Wallachian Prince and martyr, Constantin Brancoveanu (1654-1714) (right)

Student at the Paris Medical School

In 1888 he received his baccalaureate diploma in literature and sciences. In the same year, he is accepted at the Medical School in Paris. In that period, anatomy was taught by Prof. Louis Hubert Farabeuf (1841 – 1910). He often used drawings and chalkboard sketches, which inspired young Ernest Juvara to make use of his natural talent for drawing. At first, he tried to imitate his mentor and later even surpassed him. While the drawings were Prof. Farabeuf specialty, the practical demonstrations were Prof. Paul Poirier's responsibility.

Even though, Juvara was learning from some of the best professors at the Paris Medical School, his appetite for scientific knowledge was not satisfied. He arranged a laboratory in his own home, where he continued his studies of anatomy, chemistry, and botany. At the same time, his chemistry professor, Armand Gauthier (1837-1920) offered him the position of laboratory preparer for three years (1890-1892).

Still, anatomy was his utmost passion. He was the favorite student of Prof. Paul Poirier (1853-1907) (fig. 3) who noticed his earnestness, dexterity in dissections and especially talent for anatomical drawing.

Prof. Poirier was a remarkable teacher who maintained an atmosphere of friendship in his laboratory. He often invited his students to bicycle and automobile races. This was the catalyst for Juvara who in later years was one of the first automobile owners in Romania. He remained for 5 years in Prof. Poirier's laboratory where he met some of the greatest minds of the last century. This was a crucial decision for Juvara, who managed to meet here some of the most prominent Romanian doctors such as Thoma Ionescu (fig. 4) and Ion Cantacuzino (fig. 5).

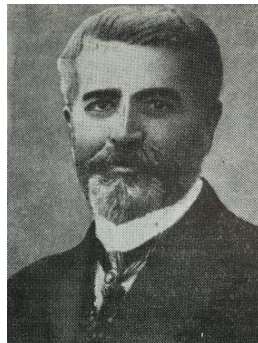


Fig. 3. Paul Poirier c. 1893

Image source: Fagarasanu I, *Ernest Juvara omul si opera*, Romanian Academy Publishing House, Bucharest, 1986 (1)



Fig. 4. Thoma Ionescu (1860-1926)

Image is in the public domain



Fig. 5. Ion Cantacuzino (1863-1934)

Image is in the public domain

Passionate about the study and teaching of anatomy, in 1892, Juvara decided to write together with H. Friteau “*Quinze leçons d'anatomie pratique*” (Eng. *Fifty lessons of practical anatomy*). This book contained 84 original drawings and sketches handcrafted by Ernest Juvara. The book was a great success. The two authors published five editions of this book. Later, it was even translated in German and Romanian.

In 1894, Prof. Poirier decided to publish a treatise of human anatomy. In this endeavor, he assigned the digestive tract chapter to Thoma Ionescu and the coordination of the manufacturing of all anatomical drawings to Ernest Juvara. Of his experience in Prof. Poirier's laboratory, Juvara will later write in his memoir:

“In Paris, under the influence of Farabeuf and Poirier and advised by artists such as Cuyer, Leuba, Devy and others, I caught the taste for scientific drawing. As chief of Prof. Poirier's laboratory, I drew over 100 scientific drawings which still serve today for anatomy demonstrations at the Paris University. Later, I coordinated the manufacturing of the drawings for Poirier's anatomy treaty.”

In 1895, Juvara defends his doctoral thesis in medicine and surgery “*Anatomie de la région ptérygo-maxillaire*” who was awarded “*extêmement bien*” by the Paris Medical School. Even before he finished the thesis, he was appointed assistant professor in the surgical clinic of Colțea Hospital in Bucharest and chief of the topographic anatomy laboratory, which was led by Thoma Ionescu. The two doctors were recalled in Romania through a special law in 1895.

Juvara left Paris after 8 years of studies, where he left a lasting impression on all his professors and collaborators. Prof. Poirier

often said about him that he never had a more talented student than Juvara.

Return to Romania with Thoma Ionescu

He returns to Romania, together with his mentor, Thoma Ionescu in 1895. Here, Juvara began a double and tireless medical career. One was clinical surgery at Colțea Hospital in Bucharest, where he operated side by side with his mentor and the other as assistant professor at the Institute for Topographic Anatomy and Experimental Surgery where he worked every day from 2 P.M. until the evening.

As subdirector of the institute, Juvara firstly took care of its organization. He chose a new and courageous style for that time. In addition to the surgical clinic, the institute also contained a dedicated unit for research and experimentation, which was also divided in multiple departments: topographic anatomy, comparative anatomy, microscopic anatomy (physiological and pathological), physiology and experimental surgery. While he was occupied with organizing this structure, Thoma Ionescu succeeded in mustering some of the best and enthusiastic Romanian doctors for this new and exciting institute.

In 1897, Juvara publishes “*Lecțiuni de anatomie practică*” (Eng. *Lessons of practical anatomy*). It was a follow-up to the successful French version he published in 1892. This book was again a great success in Romania. This motivated him to publish in 1899 a German version which now contained 183 drawings (fig. 6).

Ernest Juvara was always striving for better details in his drawings. In this endeavor, he decided to make use of photography - a new, emerging technology at the time. The first Romanian photo was shot only 50 years before in 1848. His technique

150 years since the birth of Ernest Juvara (1870-1933)

involved the hardening of the tissues using formaldehyde, sectioning, photography, and later drawing. This positioned him in

the hall of Romanian pioneers of medical photography art alongside Gheorghe Marinescu (1863-1938).

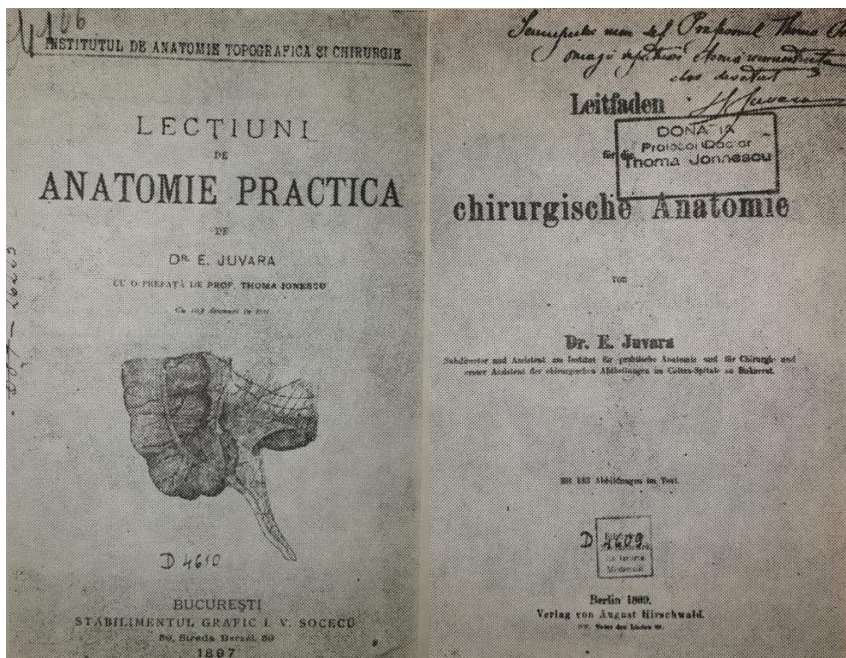


Fig. 6. First page of “*Lecțiuni de anatomie practică*” (Left) and “*Leitfaden für die chirurgische Anatomie*” (Right)

Image source: Fagarasanu I, *Ernest Juvara omul si opera*, Romanian Academy Publishing House, Bucharest, 1986 (1)

Juvara was an exceptionally talented surgeon, who created numerous procedures. Some of them were considered classic in the international scientific community. In 1897 he published “*Procedeele operatorii contra prolapsului complet al rectului si in particular despre un nou procedeu (Eng. Operative procedures against complete rectal prolapse and in particular a new procedure)*” in “*Revista de Chirurgie*”. Later, this became internationally known as the Juvara or Delorme-Juvara procedure.

He was also a prolific inventor. While under the tutelage of Thoma Ionescu, he invented multiple surgical instruments and

sterilizing devices with Collin House and Adnet House in Paris and Lautenschläger House in Berlin (2).

Professor of topographic anatomy and clinical surgery at Iași

At Thoma Ionescu’s initiative, Juvara applied to the position of associate professor of topographic anatomy in Iași. After passing the afferent contest, on November 1st, 1899 under Decree nr. 4414 of the Minister of Health, Juvara is named associate professor of topographic anatomy in Iași. His mentor continued to promote him in all university and academic circles. After just

5 years, on November 26th, 1904, Ernest Juvara became tenure professor of topographic anatomy and clinical surgery at Iasi Faculty of Medicine.

Under these circumstances, Juvara became tenure professor at just 29 years and founder of department of clinical surgery at Iași Faculty of Medicine. This was a well-deserved distinction for a man who had a thorough education in those two fields. After all, he was the pupil of Farabeuf and Poirier for 6 years and Thoma Ionescu for another 5 years.

As always, new beginnings are difficult.

The new university department did not have an associated surgical department or even a basic laboratory. Even more so, there were no resources for course demonstrations, except cadavers who also were not stored properly.

After a short struggle, two years later, in 1906 a brand-new surgical department was established at “Saint Spyridon” Hospital in Iasi (fig. 7). Initially, only 20 beds were assigned, but it slowly grew in both size and renown. By 1910, the department had over 80 beds and Prof. Juvara performed over 5,800 surgeries.



Fig. 7. Saint Spyridon Hospital, 1845 Drawing by I. Rey
“Album de douze vues de la ville de Iassy” Image in public domain

In those two years, he was not idle. He took upon himself the task of adorning the new university department with anatomical drawings, each piece individually hand-crafted by himself. In 1900 he wrote about those drawings: *“they require a lot of my time, because I have to check them alone side by side with a cadaver and take notes that afterwards need to be scaled to larger dimensions on special paper and color them in order to highlight the most interesting part.”*

His strenuous work was admired in

1906 at the National General Exhibition. Later, in 1912, when visiting the Iasi Faculty of Medicine together with King Carol the 1st of Romania, the famous German anatomist, Heinrich von Waldeyer (1836-1921), requested to be left alone to freely admire Juvara’s work. This newly founded museum of surgical anatomy also contained numerous photographs of patients before the surgery, as he requested this to be standard procedure with every patient.

As a pupil of Thoma Ionescu, Juvara was the first to introduce rachianesthesia in

Iasi, without excluding the other types of anesthesia. One of his students, Ion Fagarasanu, writes: *“Personally, I have seen no complications or sequelae on the several thousand rachianesthesia performed in ten years, while I was an assistant to Juvara”*.

His results were so impressive that one of his assistants, Dr. Alexandru Tzaicu (1883-1958) (fig. 8), decided to self-operate his inguinal hernia using this anesthesia method in 1909. This was the first self-operation in the world. Prof. Juvara assisted him with the rachianesthesia, while Dr. Tzaicu self-operated alone.

The experience was later published in 1911 in *“La presse medicale”* in 1911. He reported no incident, no unpleasant phenomena, or complications. As he personally writes, his motivation was to show that this kind of anesthesia is so *“[...] inoffensive that it can be performed with the patient in a sitting position, while with the cocaine anesthesia, even administered locally, is indicated that the patient must be laying horizontally. I had the conviction that the consciousness, intelligence, and the hand will not be affected by inferior injections. [...] I arranged the operating table in such a fashion that I could remain in a sitting position and have the certainty that I will remain this way no matter how anesthetized I will be”*.

Ernest Juvara was the first to impose asepsis methods in Iasi and to highlight the importance of this practice to all his students. His intense clinical, surgical, didactic, and scientific activity catches the attention of the *Society of Physicians and Naturalists from Iasi* who elects him to be president in 1910. His work is recognized even by his French colleagues who appoint him corresponding member of the Paris Society of Surgeons (1911) and the Nation-

al French Society of Surgery (1928).



Fig. 8. Dr. Alexandru Tzaicu self-operating his inguinal hernia, assisted by Prof. Ernest Juvara, 1909, Iasi, Romania

We list only some of his published work, while he was a professor at Iasi: *“Opération de la hernie inguinale par le procédé de Bassini”* based on a personal experience of 800 cases, *“De la création d’un vagin dans le cas de l’absence congénitale, par dédoublement de l’espace inter-vésicie-rectum, suivi soit d’autoplastie par manchon cutané”*, *“Emasculation totale”*, *“Pleurotomia cu rezectie de coastă sub lambou”*, *“Evident du plancher buccal”*, etc. *“Lucrari de terapeutică si clinică chirurgicală (Eng. Works of Clinical Surgery and Therapeutics)”* is his last book published while in Iasi. Grigore T. Popa, his successor, says about the deep admiration both staff and students had for Prof. Juvara *“Juvara made a cult out of being a professor and his students made a cult out of him”*. Today, he is considered the founder of the modern school of anatomy and surgery in Iasi (3).

Return to Bucharest and the start of the Great War

In 1912, Ernest Juvara is transferred to Bucharest, at Filantropia Hospital as chief of the Department of Clinical Surgery. This transfer was just in time for the start of the Balkan Wars (October 8th, 1912 - July 18th, 1913). In 1913, he is mobilized by the Romanian Armed Forces in Bulgaria (fig. 9), where he offers his entire experience as organizer in the fight against a ferocious enemy: cholera. For the first time in Romanian history a large scale vaccination campaign is executed. In this endeavor, Juvara was responsible of organizing the hospitals

where cholera patients were isolated.

Returned from this campaign, he continues his surgical and scientific activity at Filantropia Hospital. Aware of the imminence of the Great War, he is preoccupied with perfecting the rachianesthesia technique and with developing new surgical treatments of fractures. This motivates him to invent several exceptionally useful orthopedic devices described in his outstanding paper "*Tratamentul operator al fracturilor diafizelor prin metoda fixatorului extern (Eng. Surgical Treatment of Diaphyseal Fractures by External Fixator Method)*".



Fig. 9. Maj. Prof. Dr. Ernest Juvara in the Bulgarian Campaign (1913)

Image source: Fagarasanu I, *Ernest Juvara omul si opera*, Romanian Academy Publishing House, Bucharest, 1986 (1)

The Great War begins in 1914 and Romania joins the forces of Antanta in 1916. The same year, Juvara is mobilized by the Romanian Army under the rank of Major. He is attached to the 4th Evacuation Hospital, which was under the command of the 4th Romanian Army. During the war he was dedicated body and soul to the wounded

soldiers. He was later promoted to the rank of colonel (fig. 10).

Col. Dr. C. Giurea recalled "*I saw him during the war... both at Hangu and at Brosteni and Bicaz subsections, which he supervised. Many wounded owed their lives only to the tireless day and night work, peerless abilities, and devotion of Prof. Juvara. I*

150 years since the birth of Ernest Juvara (1870-1933)

often saw him, when his surgical work gave him respite, offering advice and helping with the repair of medical trucks' engines, in or-

der to transport the wounded as soon as possible, inspiring the admiration of the mechanics and the respect of surgeons."



Fig. 10. Col. Prof. Dr. Ernest Juvara (red arrow) at the Red Cross Hospital in Botosani (1917). Image source: Fagarasanu I, *Ernest Juvara omul si opera*, Romanian Academy Publishing House, Bucharest, 1986 (1)

At the end of the war, he returns to "Filantropia" Hospital, where he works until 1923 when he is transferred to "Brâncovenesc" Hospital in Bucharest. At the time, this hospital still existed and was considered the best hospital in Romania.

Here he organized the largest and most modern surgical department in Romania (fig. 11). It included over 120 beds. This clinic was later visited by the famous Prof. A. Hartmann (Paris), Prof. Fred H. Albee (New York).



Fig. 11. Prof. Ernest Juvara (red arrow) and his collaborators in the operating room at "Brâncovenesc" Hospital (1928) Image source: Fagarasanu I, *Ernest Juvara omul si opera*, Romanian Academy Publishing House, Bucharest, 1986 (1)

Published work and distinctions

He continues his work in the laboratory as well. He edited a treatise of surgical anatomy meant to have 4 volumes, but in the end only 2 were published: Volume 1 - "Head and neck" (1924) and Volume 2 - "The limbs" (1925). For this project he created over 250 original color drawings, all individually handcrafted by himself. His work was so impressive, that in 1923 when Prof. Jean Louis Faure visited his clinic proposed to Prof. Juvara to donate all his drawings to the Paris Medical Academy.

After the war, his passion remained the orthopedics, especially osteosynthesis. Of his over 230 published works, more than a third are dedicated to osteoarticular pathology.

His student, Ion Fagarasanu, estimates that Prof. Juvara made over 3,000 anatomical drawings throughout his life, surpassing some of the most renowned anatomists. This demonstrates how much time and effort he was prepared to invest in his art.

He was decorated with the Order of the Star of Romania, in the rank of Knight by

King Ferdinand I of Romania and was elected President of the Romanian Society of Surgery between 1929-1930.

It is known that he had no love for distinctions and honorary functions. He avoided any initiative for promotions to any high-ranking positions. Even when proposals were spontaneously made from outside, he rejected them vigorously. This explains why he was never a Member of Parliament, dean, or rector of the University. Even the title of President of the Romanian Society of Surgery, of which he was a founding member and its first secretary, was awarded to him contrary to his wishes.

At only 63 years, in full health he suffered a tragic death. On May 5th, 1933, following an accident, he was electrocuted in the bath by the lamp he used to read with.

His work was never forgotten. He left behind a renowned Romanian medical school.

One year after his death, his colleagues created a memorial medal in his honor (fig. 12).



Fig. 12. Prof. Dr. Ernest Juvara memorial medal
Image used with the written agreement of the owner

150 years since the birth of Ernest Juvara (1870-1933)

In 1970, UNESCO celebrated a century since the birth of one of the most brilliant medical minds Romania had to offer. Also, today his bust can be seen in bronze in the main hall of “Foişor” Clinical Orthopedic Hospital in Bucharest (fig. 13).

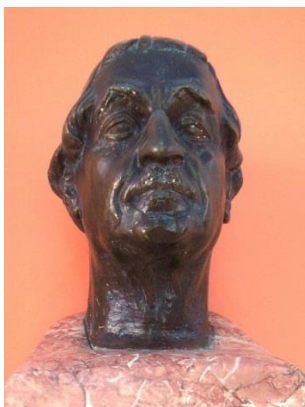


Fig. 13. Bust of Prof. Dr. Ernest Juvara

Image source: Cristian-Mihail Miehs;
20.11.2015

Image with CC-BY-NC 3.0 license

Non-medical interests and hobbies

Ernest Juvara was a founding member

of the Romanian Automobile Club (1904). His great memories with Prof. Paul Poirier automobile racing in Paris grew into a real passion for automobiles and mechanical work. He was the first man from Iasi to ever have an automobile. It is even more impressive the fact that he ordered from abroad only the chassis and the engine. Everything else, he handcrafted himself (fig. 14).

He published numerous articles in the Romanian Journal “*Automobilul*” regarding different types of carburetors, often drawing related schematics (fig. 15). His passion for mechanics guided him to be a member of the technical commission of the Romanian Automobile Club.

He was in love with nature. He would often go on hikes or casual drives in the country. This, in combination with his passion for automobiles came in very handy during the Great War. Often, he would recommend shorter, less known routes for the ambulance drivers. Juvara was also a passionate hunter and owned an impressive firearms collection.



Fig. 14. Ernest Juvara with his own automobile (1906)

Image source: Fagarasanu I, *Ernest Juvara omul si opera*,
Romanian Academy Publishing House, Bucharest, 1986 (1)

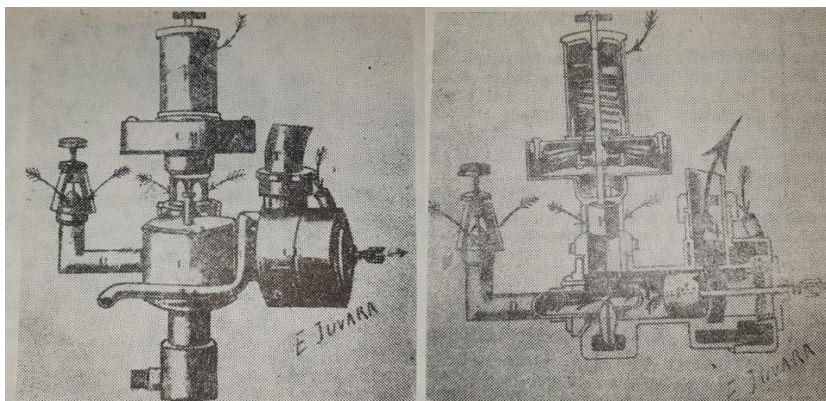


Fig. 15. A modified carburetor schematic by Ernest Juvara
Image source: Fagarasanu I, *Ernest Juvara omul si opera*,
Romanian Academy Publishing House, Bucharest, 1986 (1)

REFERENCES

1. Fagarasanu I. *Ernest Juvara omul si opera*, Romanian Academy Publishing House, Bucharest, 1986
2. Palade R. Ernest Juvara (1870-1933), *Chirurgia* 2005; 100(3): 209-211.
3. Tarcoveanu E, Vasilescu A. Ernest Juvara (1870-1933) - Founder of the Surgical Anatomy School of Iasi. *Chirurgia* 2015; 110(1): 7-8.

NEWS

MACHINE LEARNING IN FETAL CARDIOLOGY: WHAT TO EXPECT

Fetal echocardiography is used for the evaluation of the fetal heart. Due to increased bias, new technologies have emerged. Machine Learning (ML) is a computer science discipline focused on teaching a computer to perform tasks with a specific goal, without explicitly programming on how to perform it. In a recent review, Garcia-Canadilla *et al.* focus on the usefulness of ML in fetal cardiology. They cited a systematic review on the interobserver reliability between human and ML interpretation of fetal heart rate tracings, with no improve of the outcomes when ML was used. However, in another cited study, ML was successfully used in predicting fetal growth abnormalities in a cohort of more than 30,000 patients. An intelligent navigation method, FINE, developed by Yeo *et al.*, can automatically obtain different sonographic views of the fetal heart and identify cardiac abnormalities. Concluding, ML for the assessment of the fetal heart can be successfully used for the identification of individuals with similar features, leading to a better standardization of fetal cardiac data, thus providing support for the clinical interpretation and taking a correct treatment decision. (Garcia-Canadilla P, Sanchez-Martinez S, Crispi F, Bijmens B. Machine Learning in Fetal Cardiology: What to Expect. *Fetal Diagn Ther* 2020; 47(5): 363-372)