

Yannis Antoniou

*Οι Ελληνες Μηχανικοί.
Θεσμοί και Ιδέες 1900-1940*
[*Greek Engineers.
Institutions and Ideas
1900-1940*]

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by **Nikos Pantelakis**

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This exceptionally interesting book about Greek engineers, written by Yiannis Antoniou, presents in detail the economic, social and political factors that shaped the studies and profession of Greek engineers from the early twentieth century until the Second World War. It also examines the currents of ideas they adopted during this time, as well as their influence on the development of Greek society. Greek engineers, those who studied in Greece as well as those who studied abroad, are significantly linked to the eventful course of economic growth and industrialisation in Greece.

The first part of the book provides the general framework of the conditions that prevailed during the period under consideration in the economically developed societies of North America and Western Europe, leading to the emergence of technological determinism and the technocratic movement. The writer

presents, in a concise though enlightening fashion, the ideology of the development of technological determinism and the technocratic movement in the Western world, which influenced decisively the configuration of the engineering profession in America and Europe. The author has deemed this historical presentation necessary as it is well known that the growth of Western societies inspired and shaped the economic, social and political development of Greece, undoubtedly leaving its mark also on the studies and the profession of Greek engineers during the late nineteenth and the early twentieth centuries.

The second part offers a thorough presentation of the growth of institutions of technical education in Greece, from the Sunday School of Crafts, established in 1837, up to the foundation, in 1914, of the National Technical University of Athens (NTUA), otherwise known as the Metsovion. In contrast to the University of Athens and the Hellenic Army Academy (Evelpidon), which from the start were located at the apex of the educational and social hierarchy, the Technical University developed into a high-ranking technological institution progressively, starting out as a part-time vocational school aimed at educating capable master craftsmen for public and private construction works in the Greek capital. As the author stresses, the idea that technology constitutes an application of science formed the basic theoretical tenet of positivism and had a significant effect on the professional awareness of engineers. The gradual advancement of the Technical University can be related to the interpretation of this ideology, which considered scientific and technological progress as a primary objective, either additionally or as an alternative to the official nationalistic one, to produce an 'enhanced' nationalism; an ideology which translated the Greek irredentist *Megali Idea* (Great Idea) into the terms of rationalist, scientific and technical progress for the country.

The benefactors of the Technical University, who were descended from the town of Metsovo, expressed the spirit of this idea in a pioneering fashion. Their business activity developed in Egypt and it appears that they were influenced by the theory of Saint-Simon; due to this kind of ideological kinship, they figure among those who believed in the necessity of technical and economic growth for Greece as well as the rational organisation of state and society.

The author divides the development of engineering as a discipline in Greece into four periods. The first ranges from 1837 to 1862; that is to say, until the Sunday School of Crafts was integrated into the secondary education system. According to its first director, the Bavarian noble Captain Friedrich von Zentner, it was founded to meet the need for the craftsmen necessary for the reconstruction of Athens and other cities of the newly established Greek state. During that early period the school did not issue diplomas but basic certificates. Nevertheless, while it may be characterised as a lower-level vocational school – due to the way it operated, the lack of formal admission requirements, the absence of explicit criteria regarding the formal qualifications of the faculty and the vague duration of studies – it ranked above elementary or even secondary educational institutions, according to the author.

The second period covers the period from 1863 to 1887. Initially, the school centred not so much on the introduction of new techniques or professions as on the promotion of neoclassical aesthetics. Three separate faculties were established: the Sunday School, a one-year course of study for master craftsmen; the Daily School, a three-year course for those who intended to work in the industrial sector; and the Arts School, a five-year course of the so-called beaux arts. In 1867, the Daily School was refashioned as the Handicraft School, comprising three de-

partments: Architecture, Land Surveying (four years of study) and Mechanics (five years of study). These changes, which involved the upgrading of the curriculum and the increase in the formal entry requirements for students, signalled the transformation of the institution.

The third period extended from 1887, with the foundation of the School of Industrial Arts as an institution of higher technical education, to 1914. In the explanatory report on the law establishing the school, it was stressed that the School of Arts had been superseded by events and served neither the objective of promoting the sciences nor the increased technical requirements of the day; thus, reorganisation was essential. It was also noted that the shortage of trained engineers in the country could be addressed through the qualification of personnel who could undertake public construction works, man state technical services and staff the private industrial sector. This could be achieved through the adoption of new study programs of scientific and technical content and through stricter admission requirements. These changes, in conjunction with a reduction in the number of students, justified the transition of the school from the intermediate to the higher education level. In its upgraded form, the institution was comparable to the *écoles des arts industrielles* that were founded in France at the time, which also began as secondary-level schools. The reform addressed the need for technical executives, created by the establishment of the public works department of the Ministry of the Interior as well a professional body for civil engineers in 1878. According to the author, while the school's contribution to the staffing of state services was significant, it had a limited effect on private industry. The particular pattern of education promoted the creation of a professional, meritocratic elite. Under the influence of French *grandes écoles*, this model combined sophisticated training with selfless service to state and society.

During the fourth period, beginning in 1914, the School became the National Technical University (*Ethnikon Metsovion Polytechnion*), upgraded to an academic institution equivalent to the University of Athens. The law founding the Technical University organised it into schools of Civil, Mechanical and Electrical Engineering, and Architecture. It also established technical faculties for secondary education with the foundation of schools for land surveyors, mechanics, and foremen for the chemical and metallurgical industries. High school graduates were enrolled following an admission test, as were – without prior selection – secondary school (practical lyceum) graduates. The former had to submit a high-school certificate, while the latter had to present evidence of having progressed from the second to the third year of high school. According to the same law, the National Technical University would be the sole institution in Greece offering degrees in engineering. Moreover, the law required that new professors be drawn from the membership of the Teachers' Association.

The configuration of engineering as a new social and occupational category was closely linked to the growth of Greek economy, which necessitated the undertaking of large-scale public works (in road, rail, and port building, etc.) that were essential for industrialisation.

From 1894 onwards, a number of private vocational schools began functioning, often antagonising the Technical University. The most notable of these were the Commercial and Industrial Academy and two evening schools in Piraeus, one run by the Piraeus Association and the other by the Prometheus Mechanics Society. The Commercial and Industrial Academy educated yeastmakers, winemakers, distillers, vinegar-makers, brewers, oil-industry workers, soap-makers, perfumers, cheesemakers, silkbreeders and beekeepers. In 1899, the Agricultural

School opened, followed, between 1890 and 1905, by the Railways School, the Mining–Metallurgy School and the Commercial Navy School. In November 1905, the Commercial and Industrial Academy was recognised by the state as an institution of higher technical education equivalent to the National Technical University. This decision was revoked a few days later due to the hostile reactions from the students and professors of the National Technical University and from the School of Physics and Mathematics of the University of Athens. Yet, this Academy had been founded owing to the modernising bent of a few industrialists, headed by Othon Rousopoulos. They considered that the practical education provided by the Academy constituted a necessary supplement to the theoretical thrust of the Technical University. In other cases, the industrialists themselves provided on-site practical experience in their factories, as in the case of Theodoros Retsinas. In other cities of Greece there were numerous commercial and agricultural vocational schools. Eventually, the conflict centring on the state recognition of professional studies and diplomas between the qualified engineers and graduates of the National Technical University, on the one hand, and the students of private schools and craftsmen, on the other, ended with in victory for the former.

Until 1878, the state initially assigned the monitoring and management of public works to mechanic graduates of the Hellenic Army Academy. During the Trikoupis premiership, the need to guarantee an administrative framework appropriate for the implementation and control of public works led the state to rearrange its technical services, establishing an independent public works directorate during the 1870s along with the constitution of the body of civil engineers.

The new electricity sector, booming industrial activity, the management and extension of transport infrastructure, land reclamation,

urban planning and water and sewage networks all demanded the services of specially trained personnel.

According to the author, it is obvious that during this period engineers became gradually more prominent in public works, while they remained absent from the Greek industrial enterprises. During the 1890s, the requirements of the industrial sector for specialised technical personnel were covered almost exclusively through the employment of foreign engineers and craftsmen. These persons were usually placed in management positions, assuming responsibility in the factory hierarchy so as to import industrial technology and to educate the Greek craftsmen in the workplace. Human resources in the industrial sector were significantly enriched during the late nineteenth and early twentieth centuries, with the recruitment of craftsmen trained in the private vocational schools mentioned above.

During the first two decades of the twentieth century new notions of scientific organisation of work emerged as the first generation of academically trained Greek engineers took up positions in the new industrial units. Some of them were graduates of the Technical University, while most had graduated from technical institutions abroad, mainly in Germany and Switzerland. A review of careers of some (Nikolaos Vlangalis, Alexandros Zachariou, Andreas Hatzikyriakou, Leontios Oikonomidis, Nikolaos Kanellopoulos, L. Agrapidis, Kleonymos Stylianidis, etc.) leads us to assume that they formed a distinguishable grouping, not so much as a result of fortuitous personal choices, but because a segment of the Greek bourgeoisie decided to participate in the industrial effort as entrepreneurs under the terms of Western-style capitalism. Based on existing evidence, nevertheless, it can be presumed that most factories continued to function without qualified engineers or production managers.

The third part deals with the inter-war years, when the National Technical University reinforced its position as an elite school. The elements that shaped it were the exceptionally high cognitive requirements for admission and the duration of studies, as well as its extended administrative independence. The consensus among the majority of professors to place academic independence before political preferences deterred any moves to undermine its independence.

The professoriate constituted a closed group possessing the characteristics of a social elite. As persons of eminent social prestige, they also enjoyed high earnings. The entry requirements to this group were exceptionally high. This was a body governed by self-formulated regulations. Beyond their professional and scientific qualifications, the prestige of these professors was also strengthened through their appointment to private enterprises and key government positions related to public works and utilities, as well as the chemical and military industry. Their description as a social elite is based on the statistics regarding family origins. From 1929 to 1937, 71 per cent of the students came from the middle- and upper middle class, their parents being tradesmen, freelance professionals, artisans, civil servants and persons of independent means.

In the early 1930s, the discussions concerning the direction of studies revolved around two axes: the first, centring on professionalism, viewed education as being in the service of the technical needs of the state and the construction sector, while the second believed education should be oriented towards science, technology, research and industrial applications. Notably, the dilemma of whether it should be a vocational school or technical university haunted the nature of *Polytechnion* during the interwar years.

Another important parameter determining the profession was the establishment of profes-

sional representative institutions for engineers, starting in 1899 with the foundation of the Polytechnic Association. In 1918, company executives founded the Association of Technical Executives of Private Enterprises in order to defend their own professional interests. Similar efforts continued up to 1920, when the General Union of Greek Engineers (GEEM) was established in order to offset the fragmentation of professional institutions. Then, in 1923 the Technical Chamber of Greece (TEE) was founded, which succeeded in, finally, incorporating all the relevant professional bodies. It also began, at the invitation of government authorities, a consultation process on technical subjects and technical education, gathering statistical information on the country's technical progress and the compilation of relative registers, functioning as arbiter in technical disputes among members and between members and the state, as well as making an intellectual contribution in the form of publications. The TEE promoted and defended the scientific aspirations and the professional interests of its members, while exercising disciplinary control. According to the author, this institution has been marked by the fact that it vacillated repeatedly in an effort to balance its role as technical adviser to the state and as representative of the professional interests of Greek engineers.

Throughout the interwar years, TEE policy followed aimed at guaranteeing the professional interests of its members. In order to safeguard the 'closed' nature of the profession, it sought to limit the number of students and graduates, as well as the number of foreign engineers, in Greece.

The fourth part contains an extensive list of engineers with their various specialties in their geographic distribution. It appears that Greek engineers were inspired by an ideal of progress that identified the modernisation and Westernisation of the state with scientific, technological and economic development. And

although Greece did not experience Western-style industrialisation to the full extent, it was the extensive shipping and services sector that shaped the Greek engineering profession.

In the fifth part, the author exposes the technocratic reasoning used by Greek engineers. While they initially adopted Saint-Simon's outlook on the role of technocracy, they arrived much later, in 1940, at the technocratic utopia of Nikolaos Kitsikis, who believed that engineers should be acknowledged as a hegemonic social force that would drive forward the modernisation of society.

Throughout, the author provides all the elements that are essential for an understanding of the formative years of the socio-professional group of engineers and their role in the development of Greek economy. An additional asset is the fact that he has drawn on information from the archives of the National Technical University as well as from Kitsikis' papers, located at the Heraklion Technical Vocational School. This wealth of information sheds light on multiple and interesting aspects of the book's theme. The tables presented in the appendix to each chapter that provide statistics drawn from archival sources will also prove useful to other researchers. Were such a plenitude of sources also available as regards the personnel of large industrial enterprises, our understanding of the role of engineers in the industrialisation of Greece would be greatly enriched.

Be that as it may, it is the importance of rescuing archives that emerges most strongly from this adroit presentation of information, a need still not fully grasped by Greek society, despite the efforts that have been undertaken in recent years. After all, until the not so distant past, primary sources were salvaged almost exclusively on the initiative of a few altruistic historians.