

## THE PIONEERS

The technological revolution began between the 18<sup>th</sup> and 19<sup>th</sup> century. Two names are associated with this period. Those of Galvani and Volta. Two scientists, who, after years of experimenting, were able to produce continuous electric power. At last, man was in possession of the overwhelming power of electricity: The battery.

After that, the electric telegraph was also developed. Ever since 1774, a Swiss, Lesage, had already created a machine, with so many wires as the number of letters in the alphabet, which sent or received messages. The French Engineer Lomonde built an electric telegraph with a single wire, in 1787. In 1776, the Spanish doctor, Francisco Salva, successfully made a telegraph connection, over a distance of 26 miles. A few years later, an Englishman, Francis Ronalds, produced a system based on electricity, which was similar to that of Chappe's.

In 1820, while Summerring and Koch were still experimenting, Oesterd discovered electromagnetism and in the same year, Abert proposed a complex telegraph system based on electromagnetism. Unfortunately, all these inventions proved to be impracticable or unprofitable.

In 1821, the English physicist, Faraday discovered that electric power can produce movement and in 1831, he built the first transformer and the first generator. In 1831, the American physicist, Joseph Henry, assembled the first electric motor and at the same time, introduced his telegraph system. In 1832, the German, Baron von Schieling followed in his footsteps and so did the German physicists, Gauss and Weber, in 1833. Steinheil improved upon their invention. In 1835, the English physicist, Witston, and his compatriote Cook, created a "telegraph with needles" similar to that of Von Schieling's. Twenty years later, the American, Hughes, created a system in which the receiver printed messages on paper with standard letters.

However, the winner of this difficult race, and after twelve consecutive years of experiments and attempts, was the American painter, Samuel Morse. In 1844 he created his exceptionally simple electric telegraph system, as well as a simple method of communication, i.e. the Morse code. These two inventions outdated Chappe's optical telegraph and would serve the five continents from the middle of the previous century, up to the present day. It is important to mention the names of Frenchmen, Brenn and Beaudeau, as well as that of the German, Werner von Siemens, whose perfected electric telegraph comprises one of his numerous inventions.

Consequently, everyone – including the ordinary man on the street – was now able to send written messages to every part of the world. In 1851, France was telegraphically linked with England and in 1852, Scotland with Ireland. In 1854, Turkey was linked with the Crimea and France with Africa.

The telegraph, however, had to cross oceans. In order to study the currents and depth of the Atlantic Ocean, special cables were constructed and various types of ship were used. First, the Goliath, then the Niagaras, the Agamemnon and finally, the "gigantic ship" of its time – the Great Eastern. After great attempts, lasting for a period of twelve years, Europe was finally linked with America, in 1866.

In mid 1870, the telephone was invented. Human voice could now be transmitted. Apart from the Scotsman, Alexander Graham Bell, who was the first to secure his patent, there were four others who devised a similar invention: the Italian impresario, Antonio Meuci in 1849, the French telegraph operator, Charles Bourcelle, in 1854, the German teacher, Philippe Rais, in 1861, and in 1876, the American, Elisa Gray who applied for patent rights only two hours after Bell.

Thereafter, many people contributed to the technical improvements of the telephone, both to the set as well as, the system. Edison and Hughes built the carbon microphone, while Siemens created the horseshoe-shaped magnet, the metallic membrane and the automatic receiver breaker, Erickson created the dial-disc and Strowger conceived automatic telephony.

The telephone changed constantly over the last hundred years. The same applied to telecommunications, as well as to the radio, teleprinter, radar, television, optical fibre, digital

technology, satellite communications, mobile telephony, view phone and the Internet. Prior to all these, a third significant invention had appeared: The wireless transceiver. In 1888, Hertz came up with the idea of electromagnetic waves. How would these waves be traced? Through an antenna. The Russian, Poppov, and the Italian, Marconi, invented the antenna after much experimentation. In 1901, the latter, communicated with New Foundland from England by using a balloon to lift his antenna high up into the sky.

## **TELECOMMUNICATIONS IN GREECE**

### **THE FIRST STEPS**

The first submarine telegraphic cables were laid in the Mediterranean Sea in 1854. In 1858, similar cables linked the harbor town of Piraeus with the island of Syros. Greece purchased an additional submarine cable, which was laid from the island of Syros to the island of Chios, as a result of which Greece was linked with Constantinople and Alexandria. Domestically, the overhead telegraphic linking of Athens, Piraeus, Aegium and Patra provided a poor society with an overall sense of coherence. The Suez Canal started to operate in the late 1860's. Everything started to change. The route to the East became shorter. Telegraphic cables followed sea routes. In 1873, the town of Chania, on the island of Crete, was telegraphically linked with the island of Zakynthos, and Sitia (Crete) with Alexandria, while Herakleion was linked with the island of Syros, in 1878. The telephone had been introduced into Europe only a year before.

In 1892, at the time when Charilaos Tricoupes was Prime Minister, the Act concerning "telephone communications" was passed. Expansion of the new telecommunications means would prove to be a rather slow process, as was the case all over the world. The number of subscribers in Athens and Piraeus were only ninety in 1896, the year when the first Olympic games were held.

At the dawn of the new century, the number of subscribers reached 400, while the number of telegraph offices operating throughout the country was only 232. Twenty years later, in 1922, the number of subscribers was 2,000. Certain major steps were taken during the following decade. This course of action continued up to the time when the Anonymous Greek Telephone Company (AETE) was founded in 1931. Local telephony covered several more Greek cities. Thessaloniki, however, already had a switchboard in operation since 1926, serving 1,200 subscribers. In the meantime, telegraphy continued to develop. The Telegraph Service, which was State controlled, but operated by a private English Company, first merged with the Post Office services and then later in 1895 with the Telephone services and became an amalgamated service of the Ministry of Internal Affairs (called the P.T.T. Directorate).

The newly formed company AETE would undertake the automatic telephone sector within Greece, the English Company "Eastern Telegraph" would assume responsibility for the wireless and wire telegraph sector with countries abroad while the State service P.T.T., which supervised the two aforementioned companies and which was already responsible for Post Office Services, would take on two new sectors. The one sector was responsible for the manual long-distance and international telephone service and the telephone service in small cities, while the other sector was responsible for the domestic telegraph service.

This allocation and specialization of services proved to be extremely fruitful from the outset. The automatic local telephone service covered the needs of Athens and 23 other cities, within a very short period of time. The "magneto-telephone" was soon set aside. The dial telephone partially substituted the telephone operator.

During the 1930's, telecommunications nonetheless continued to develop. The first telephone directory was printed, the first coin box telephone booth was made available to the public and tariffs were reduced within reason. In 1940, the number of telephone subscribers throughout Greece reached 45,000 and there were 42 telephone exchanges and 5,500 community call offices in existence. By 1931, Greece was already linked by phone with Bulgaria and Yugoslavia and from 1932 to 1934, first Thessaloniki and then Athens, were linked with the whole of Europe.

At this point, mention should be made to two special sectors – telecommunications in the fields of mercantile marine and the army. Both these sectors depend on the corresponding state or private services, however, due to the character of these two sectors, ever since they first came into existence up to the present day, each has its own heroic history. According to radio Morse operators serving on Greek ships, communication services in the shipping sector only started in 1923, while communications in the Greek army were established, as a separate sector, in 1887 and played a significant role in the Balkan wars, the Asia Minor Campaigns and the 1940 war.

The War, the German Occupation and the Resistance. Telecommunications followed the fate of the entire country. Telephone and Telegraph cables, as well as their corresponding installations sustained considerable damage. The oppressor controlled information, both managerially and via censorship. Connections were reduced and others functioned only partially. The radio transceiver, the funnel-shaped megaphone and the Resistance took the place of what was lost. When the Occupation troops retreated, they destroyed what remained or what had not already been looted.

Liberation, Reconstruction and the Civil War. Another arduous period. In 1946, 75% of AETE (a German company) shares passed into the hands of the Greek State. It was indispensable to make up for lost time and telecommunications had to keep pace with the everchanging technological developments. All trends at the time, including the advent of the Marshall plan, led to the birth of a new telecommunications organization.

### **OTE, A NEW BEGINNING**

The Hellenic Telecommunications Organization (OTE) came into official operation on November 10, 1949. The anonymous Company, which was established in accordance with Act 1049/49, was controlled by the State, which had the sole, non-transferable share. However, the new company enjoyed economic and administrative autonomy. OTE became responsible for all telegraph and telephone communication sectors, both within the Country and between Greece and foreign countries. However, communications concerning the Army, the Electric Company (which was founded nine months later), airports, as well as communications between railway stations, were not included in OTE responsibilities. The temporary "separation" of the two basic telecommunications means terminated this way.

All AETE employees, in all 1,700 people, were transferred to OTE after the former was totally taken over by the State and subsequent to compensating its shareholders. All public telephone and telegraph services (P.T.T.) employees, amounting to 3,300 people, the staff of the small Anonymous Electric Company of Rhodes and those of the English Telegraph Company "Cable and Wireless" were likewise transferred to OTE. Cable & Wireless however, maintained the privilege on telegraph communications with foreign countries until 1957, due to the extension of the privilege granted to the company as a result of the war, which had intervened. The installations, which OTE acquired, were worth 23 million dollars, while financial aid through the Marshall Plan, amounted to another 9 million dollars.

The first few years proved to be difficult, due to the fact that demand was much greater than the Organization resources. Inhabitants from rural areas flocked into the city so the need for telephone communications increased. This problem was confronted by installing public telephones in cities and expanding community call offices in the countryside.

Despite all these problems, for the first few decades, the outcome was positive. The telephone density increased to 2,88 telephones per 100 inhabitants, which meant that Greece was ahead of all the other Balkan countries and held 10<sup>th</sup> place in Europe. Automation of local and long-distance telephony put Greece in 5<sup>th</sup> position regarding Europe. A network of 34 microwaves multiple communication stations were created during this decade. Many islands could now communicate with the rest of the country for the first time. The number of community call offices amounted to 6,547. Conventional telegraph services also experienced a new flash (for the last time). The Telex Subscriber Service was launched in 1957.

Development was stepped up during the second decade. The Greek mountains now had an imposing, everlasting companion: OTE radio stations. The Organization increased the number of its buildings and modernized its installations. Long-distance and international

telephone and telegraph services, which, apart from Europe, covered the entire American continent, Australia and many Asian and African countries, were gradually provided automatically. Simultaneously, telephone and telegraph communications with ships in the Mediterranean Sea and ocean liners were improved.

And what was even more significant, was the fact that...

The time had come for telecommunication satellites.

While OTE was achieving its first main target, i.e. reconstructing and expanding telecommunications throughout the country, as well as outside its borders, it was confronted by new challenges, as a result of constant and rapid international technological developments. Undoubtedly, these improvements offered new opportunities, but also called for greater effort. Satellite communications, which first appeared in 1962 with the launching of Telstar, the first telecommunications satellite, were expanded and were complemented by a series of other scientific and technological findings, which literally changed the map in the field of telecommunications too.

It was over a period of twenty years, 1970-1990, that inventions, which in their many specific applications – either alone or as a reciprocal effect or in combination with other inventions, introduced mankind into the 21<sup>st</sup> century: Optical fibres, Inmarsat (international maritime satellite system) the telefax, computer telephone connections, data transmission, videotext and teletext, digital telephony. Tele-conference, navigating via satellites, the use of the telephone by people with hearing or speaking problems, transmission of scientific data via outer space, telemapping of our planet, Integrated Services Digital Network (ISDN), and finally the Internet, are our generation's legacy to the generations to come.

Relying on the outcome of previous work, OTE was able to respond to current demand. Additional, impressive expansion of telephone services throughout the country and automation of the toll telephone network took place during this twenty-year period. In 1970, the Satellite Communications Centre at Thermopyles was inaugurated. Its first antenna linked Greece with Canada and America with England via satellite. Two years later, this function was transferred to a second antenna, while the first antenna supported the connection with countries of the Indian Ocean, Australia and Japan. OTE became one of the founding members of Inmarsat. At the same time, Greece became a significant telecommunications node in southeast Europe, due to its new submarine cables in the entire Mediterranean Sea and the radio electric link with its neighbouring countries.

OTE grew and grew. The Telex service improved, telephone exchanges were fitted out with electronic systems and a third antenna and a maritime earth station were put into operation at Thermopyles. Before the end of 1988, the first international fully digital telephone exchange was gradually put into operation, in accordance with the international C.C.I.T.T. communication standards.

In 1988, the imposing Headquarters Building at Maroussi, was inaugurated, becoming a symbol of the Company's accomplishments and its decisive role in the national economy and Greek society in general.

The first EWSD/Siemens fully digital telephone exchanges, with an overall capacity of 25,000 circuits, commenced operation in Athens (Koleti building), in July 1989.

The first AXE-10/Ericsson fully digital (combined trunk-nodal) telephone exchange, with a capacity of 7,500 circuits, was put into operation in Patra, on 20<sup>th</sup> November 1989.

In early 1990, the Hellaspac public network was put into commercial operation, while the Videoconference service was launched in March 1991. The first 300 public cardphones were installed in 1992.

1994 was a milestone for OTE, as the Network Management System (N.M.S.) was initially put into operation in Athens, allowing the company to effectively monitor and manage its network, thus reducing operational costs and significantly improving quality of communication.

Furthermore, the new Satellite Communications Centre was inaugurated at Nemea. In the same year, Act 2257/94 was passed in Parliament regarding OTE organization and operation. During that time, OTE proceeded to establish and operate its subsidiary companies (Hellascom Int., OTE Foreign Currency Exchange, OTEnet, COSMOTE, Hellas Sat, OTE

leasing, Maritel), while in April 1996, OTE was successfully listed on the Athens stock Exchange. A second public offering in June 1997 was crowned with similar success.

Within the year, OTE, making an unprecedented endeavour, digitized its network from 47% to an amazing 70% and installed 1,400,000 digital lines, twice the number ever installed in a year.

Finally, in October 1998, the third public offering took place with great success, while OTE was the first Greek company to enter the New York Stock Exchange. The results were impressive, proving Greek and foreign investors' trust in the company's value and prospects.

In early 1999, the Intelligent Network, FREEphone and ONEphone services started to be exploited. The Personal Telecommunication Card (OTE CARD) was to follow.

In July of the same year, the OTE fourth share offering was accomplished successfully.

The ISDN Network (voice – image – text) was provided, from then on, throughout the country.

In 2000, OTE acquired a GSM License in Bulgaria and established Globul to exploit this license.

In 2001, OTE adjusted its operation within the deregulated telecommunications market. During 2001 and 2003, OTE ranked, stock wise, among the 500 largest organizations globally and among the 10 largest telecommunications organizations in Europe. In 2003, OTE raised its stake in RomTelecom to 54%. Moreover, OTE launched ADSL services in the Greek market and on 14<sup>th</sup> May 2003, the launching of Satellite Hellas Sat2 from Cape Canaveral took place.

In 2004, OTE, COSMOTE and OTEnet were Grand National Sponsors of the Athens 2004 Olympic Games. To all us Greeks, undertaking the Olympic Games brought us against a historic challenge: to contribute to the organization of unique Games on a human scale.

OTE, in a joint venture with its subsidiaries, COSMOTE and OTEnet, took part and supported the national endeavour by providing know-how, experience, but most of all its people's vision.

The OTE sponsorship amounted to 59 million euros.

However, the actual size of the investment was far greater than the contractual obligations, as OTE provided the overall telecommunications infrastructure.

In addition, we supported the ATHENS 2004 Paralympic Games.

OTE also sponsored the world's 2nd most important sport event by providing the overall telecommunications infrastructure.

It was the first time in the history of the Paralympic Games that Paralympic athletes were not required to pay for their participation.

4,000 athletes from over 140 countries came together in Greece, to compete in a top-level sports event, the 2004 Paralympic Games.