

**MIRYUSIF MIRBABAYEV**

**CONCISE  
HISTORY OF  
AZERBAIJANI OIL**





*The presence in Azerbaijan the rich oil and gas resources is the happiness of our people and the main principal factor of our country's development, the good living of our people at the present and in the future.*

*Heydar Aliyev*



*Doctor of Chemical Sciences, professor of the Azerbaijan Technical University Mir-Babayev Mir-Yusif Fazil oğly is well-known and experienced specialist in the area of oil chemistry and ecology. He was born in 1953, in Baku. He graduated from Chemical technology faculty of the Azerbaijan Oil and Chemistry Institute named after M. Azizbekov in 1975. In 1986 he defended his PhD's thesis on the speciality of "Oil chemistry". In 1994 he defended his doctoral thesis. He is the author of more than 90 scientific works published in Azerbaijan and abroad (in Russia, Iran, Turkey, USA). He began to study the history of Azerbaijan oil business from 1992. His articles are published in magazines of "Azerbaijan oil industry", "Chemistry and technology of fuels and oils", "Oil chemistry", "Territory of Neftegas", "Oil Gas Chemistry", "Azerbaijan International", "Horizon", "Caspian" and others.*

*At the moment he is the expert of an oil history in the group of Oil museum's creation in Baku.*

MIRYUSIF MIRBABAYEV

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**CONCISE HISTORY  
OF AZERBAIJANI  
OIL**

M.F.Axundov adına  
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Kitabxanası

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*The proposed book is brief, independent, various on volume essays on the history of Azerbaijan's oil business, written on the basis of documentary data. It is devoted to origin, formation and the beginning of the industrial development of the oil business in the Absheron and in Azerbaijan as a whole. Peculiarity of the book is: wide use of an archival, pre-revolutionary material, and also presented at the end of the book is the brief chronology of the history of Azerbaijan's oil business, in which an attempt is made to give the complete picture of the development of an oil industry in the region starting from ancient times up to now.*

*The book is intended for a wide range of readers: employees of the oil-gas industry, the faculty and scientific employees of the Oil Institutes of Higher Education and Technical Schools, students, post-graduate students; and also - for anyone interested in the rich oil history of the country of eternal fires.*

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*I devote this book, to the blessed memory of my grandfather, the known scientist-linguist, the winner of the Stalin Prize Miryusif Mirbabayev and my mother - Shafiga Mirbabayeva.*

### COMMENT-REVIEW

for the book "Concise History of Azerbaijani Oil" of Doctor of Chemical Sciences, Professor of Azerbaijan Technical University Mirbabayev Miryusif Fazil oglu

The book consists of separate independent essays, various on volume and made up on the basis of documentary data.

The author is a well known expert in the field of oil-chemistry, and has published around 90 scientific works, within the republic and abroad. The author has been engaged in studying the history of Azerbaijan's oil business since 1992. The result of this laborious work became the work proposed to the reader. Addressed to oil workers, students and post-graduate students of Oil Institutes of Higher Education. It can in my opinion, also attract the interest of the mass reader.

For example, the essay on the Baku Branch of the Imperial Russian Technical Society (the BB of the IRTS), which was the scientific center of Baku up to 1920, and promoted the establishment of the Russian Nobel Prize in Baku in 1904, is very captivating. That is, Baku by being the kernel of Russian oil extraction and refining in the XIX century became the center for testing the results of scientific and engineering researches.

The essay on D.I. Mendeleyev (who has repeatedly visited the Absheron), who was a friend of H.Z. Taghiyev and effectively cooperated with him in the area of the oil business, also deserves special attention. The research of D.I. Mendeleyev, V.V. Markovnikov, V.G. Shukhov and others on the studying of Absheron oils are precisely specified and at the same time the role of the scientists in search of rational processing of oils and oil residues are shown.

Indicated in the appendix is "Brief Chronology of Azerbaijani Oil", the representation of chronicle arid historical facts are original. However it is read, it is vivid and fascinating, which is credited to the close work of the author, the quantity of the documents and the editions of books included, such as "Works of the BB of the IRTS" from 1886 to 1918 and "Oil Business" from 1899 to 1917, etc.

The list of used and recommended literature presented at the end of book can also be added to the merits of the author: it is impressive and shows a depth of scientific study of a researched theme.

Generally, the book of "Concise History of Azerbaijani Oil" written by Mirbabayev M.F. is actual in present time - the time of an industrial development of an independent country which has an abundance of oil contracts, which facilitates its prosperity. Within its content the given book emphasizes a historical and logical unification of the oil business, which Dmitry Mendeleyev specified having created at this time the uniform scientific program of the development of the oil business on the basis of studying the history of chemistry. The scientist-chemist emphasized: "Regardless of the way you argue or criticise the history, particulars are few to the human mind; systematic generalizations at first are necessary.... If there is lack of these generalizations, knowledge is not yet a science and force, but slavery before studied".

*E.B. Muradaliyeva*  
*Doctor of Historical Sciences,*  
*Professor of Baku State University*

Any idea, expressed by words, is a force, which's action is boundless.

Lev **TOLSTOY**

If oil is - Queen, then Baku is her throne.

Winston **CHURCHILL**

*Baku has been my native city for a long time.*

Ivan **GUBKIN**

## INTRODUCTION

The speedy development of modern civilization would be impossible without a major fuel and energy resources such as oil and gas. Azerbaijan is an oil-rich country possessing resources of hydrocarbon raw materials and has the richest history of its development and utilization.

Currently research of the history of Azerbaijan's oil business is especially a critical issue, as it has deep roots and is saturated, with extraordinary events. In our opinion, in order to correctly employ oil facilities, we should be well aware of the legacy of the oil industry passed on to us. Particularly at that time, there was a deep understanding of the oil business as a branch, which laid the basis for speedy development of technical, chemical and oil-chemical sciences in Baku. Outstanding people of that time

who headed this process, were - Haji Zeynalabdin Taghiyev, the Nobel brothers, Dmitry Mendeleev,

Konon Lisenko, Musa Naghiyev, Shamsi Asadullayev, Murtuza Mukhtarov, Isabey Hajinsky, Movsumbey Khan-

larov, Fatullabey Rustambekov, Konstantin Harichkov, Victor Herr, Lev Gurvich, Vladimir Shukhov, Semyon Kvitko, Konstantin Krasussky and many others. It is worth noting, that the Russian oil industry up to 1910 was represented, basically, by the Azerbaijan (Baku) oil industry. Balakhany, Sabunchi, Romany, Bibiheybat and Surakhani were among the major oil fields of the Baku oil region.

In antique times, it was known that oil existed and had been used, first of all, for lighting purposes, and also as a fuel. Places of oil extraction had been sacred and called naphtha (nephtoi), whence the name oil followed. Greek thinkers Herodotes (485 - 425 up to B.C.), Plutarch (50 a.c.) and Roman Dioskorid (I century of a.c.) in their writings described the oil fields and their applications.

The first data on oil extractions from the Absheron can be found written in old Albanian sources of VII century a.c. Numerous, authentic data about early oil well extractions during VIII-XIII centuries on the Absheron peninsula were found in Arabian sources - in the works of scientists - Baladzori, Masudi, Istakhri-Abu, Abu-Dulaf, Mohammed Bekran. In such a way, Masudi in his writing "Book of the middle" (first half of the X century) points out, that "... In Baku there were two main sources: yellow and white, - and black and dark blue oil, which were extracted. Incomes from each source made 1000 dirham's, that is, about 250 rubles a year".

The largest oil wells in the Absheron were situated near the settlements of Balakhani, Surakhani, Bibi-Heybat, Sabunchi, Romani, Shubani and Binagadi. The known geologist, professor Melchior Neumayer in his book "History of the Earth" (S.-Petersburg, 1898) emphasized, that "... the curious satellite of Baku oil is the gases coming from under the ground; during the former times at Surakhani they gave

the rise to sacred fires around which huge crowds of Indian worshippers gathered".

Indeed, in VI century B.C. there were temples of fire-worshipper in Absheron (in the settlements of Shubani, Surakhani, on Pirallahi island), in which inextinguishable sacred fires coming to the surface were burning. In XVIII and in the beginning of XIX centuries a.c. fires were supported by priests of old Iranian sects "parses" from which there was (until now) a well kept temple "Ateshgah" in Surakhani. (Parses, gebrs- a nationality of the Iranian tribe, followers of Zoroastr religion. Those, pursued in Persia for their religion, Zoroastrians, started to move to India following the collapse of the empire of Sasani in VII century a.c. In Bombay, parses made a significant class of the population for their wealth and social status. According to a census in 1921, their number was about 102 thousand in India and about 10 thousand in Persia).

Surakhani's white oil was considered the best medical treatment, and it hit the shelves of markets in Persia, Bukhara, India and Moscow. This was testified in notes of the known Venetian traveler, the first European who visited the Caucasus, Marko Polo (1254 - 1324) which would be published after centuries in France (" Le livre de Marco Polo ", Paris, 1865).

The history is saturated with examples of the use of oil in military work - this was approved by: Carthaginian commander Gannibal (246 - 183 b.c), ancient Roman scientist Pliny the Elder (23 - 79 a.c.), and others. Oil was a part of a so-called "Greek fire" (a mix of saltpeter, sulfur and oil), which was successfully used during wars in ancient and Middle Ages: "fire" was burning on the water's surface setting fire to the enemy vessels...

After 1870 the universal industry of oil extraction started

in the Russian empire and abroad with simultaneous developments of research in oil chemistry and oil technology. A huge role in extensive research of oil and oil products played by brilliant works and inventions of chemists and technologists of different countries such as - D. Mendeleev, A. Butlerov, F. Beylshteyn, K. Rayhenbah, K. Shorlemmer, K. Engler, V. Markovnikov, V. Ogloblin, Yu. Lermontova, K. Lisenko, A. Letny, A. Nikiforov, V. Shukhov, S. Kvitko, W. Barton, L. Gurvich and others.

However, the beginning for the industrial use of oil was after the invention of the cracking-process.

First developed by Vladimir Shukhov (1891) and later, by William Barton (1913) the bases of thermal cracking-process, enabled the transformation of high-molecular hydrocarbons into low-molecular hydrocarbons; after detailed studies of the features of the cracking-process about half of the extracted oil was processed into petrol fractions. Later, the cracking process was used by the creation of a method of catalytic hydrogenising of saturated hydrocarbons formed by splitting oil.

Here it worth to note, that though research on the development of thermal decomposition of oil was carried out at earlier times, in the 1890's (in Russia by Alekseyev, and others and in England by Dyuar, etc.), in particular Bakuvian Semyon Kvitko in 1912 developed a new way of thermal decomposition of the oil residue. He patented this invention a year before the American Barton, whose industrial realization was carried out only in 1925. Even before World War I, the naval ministry, was assuming to use S. Kvitko's invention, however the war prevented the implementation of the envisaged plan.

It's worth emphasizing, that the essential contribution to the technology of high-temperature processing of Baku oil



has been by N. Zelinsky, S. Vishetravsky, S. Lebedev, A. Dobryansky, F. Inchik, K. Harichkov, R. Vishin, and others, whose works at the same time promoted a new direction in the chemistry of oil - petrochemical synthesis. The Baku branch of the Imperial Russian Technical Society (founded on 24th of March, 1879), which became the center of scientific research of oil on the Caucasus.

The main feature of the proposed book is that the text of essays on the history of the Azerbaijan's oil business is substantially based on the use of pre-revolutionary documentary material, which gives the rather more complete chronology of the history of the Azerbaijan's oil business from ancient times up to now.

In the texts of proposed essays the additional data about the individuals who have contributed to the history of scientific and public thinking of the period are mentioned in italics.

## ESSAY I

### THE FIRST RECOLLECTIONS ON THE AZERBAIJAN'S OIL

**As the longest times will elapse  
Their descendants will notice shadows  
of those whose spirit was manly.**

*Gavrila DERJAVIN*

Oil is known throughout the centuries: pagan deities in ancient Persia (Iran) were extracting it from wells for the sacred fire. Meanwhile, the building material used for the construction of Babylon and Nineveh was asphalt (rocky or mineral) tar formed in residue as the oil extracted in the Ise River, the inflow of the Euphrates had evaporated.

At the beginning of the XIII century, Mohammed Bekran, the Arabian historian who visited the Absheron wrote in his book about the extraction procedure of oil from the wells in Balakhany; e.g. the wells represented by themselves the first oil sources (reserves) of the Absheron.

Oil sources on the Absheron peninsula which have inflammable gases served the followers of Zoroaster (Zaratushra) as a tool of religious worshipping. In VI B.C. fire worshipper's temples were functioning on the Absheron peninsula where the sacred inextinguishable flames came out from the ground. In the XVIII century and early XIX century, fires were scrupulously maintained by pagans of the ancient Iranian sect of "Pars" who left the Fire Worshipping Temple in Surakhani as the legacy for present times. In accordance with the notes of Plutarch, the ancient Greek historian who



*Fire Worshipping Temple, Surakhani (1930-1940)*

described the campaigns of Alexander the Great, his troops used oil from the Absheron peninsula for lighting in the IV century B.C. by transporting it in water-skins or clay vessels.

In the X century, Masoudi, the Arabian geographer in his writings described the white Surakhani oil and the Surakhani "eternal fire". The Surakhani Fire Worshipping Temple "Ateshgah" and other similar temples were built in oil and gas surge places (in Shubani district on Pirallahi island) they were destroyed during the military campaign of Alexander the Great to Azerbaijan (356 - 323 years B.C.) and the campaign of Byzantine Emperor Irakly in the year of 624 B.C. In 636, this temple was restored by local and exiled fire worshippers from Persia.

This Temple was knocked to the ground for the third time

and sank into oblivion during the Arabian invasion in Azerbaijan in the year 643. Only after a decade was, (e.g. in the XVII century) the Temple restored once again using funds from Indian merchants who lived in Surakhani. This fact can be confirmed by the writing done in the ancient Hindi found on the stone flag of the Temple and deciphered by the Indian scientists.

"The Cameral Description of settlements in the Baku province for the year of 1832" contains the writing on Surakhani: "There is a fire-spitting place in this settlement where Indians come to worship and live for several years... - there are also white oil wells all around".

Interesting data on the Surakhani Temple was left by Mr. Gmelin Samuel Gotlieb, a Russian scientist who visited Baku in 1770 by the instruction of the Saint-Petersburg Academy of Sciences: "Local fire worshippers - they are the descendants of ancient grebes (followers of the Zoroaster religion), who survived in Persia after Islam was established there. They worship their inextinguishable fire as something very sacred and the deity... Those devout people from India are visiting this fire in Baku for salvation... One of these Temples is still standing near the Surakhani settlement".

*The name of "Surakhani" takes its roots from the Sanskrit word "Surkashani" which means "a relic", "a worshipping place". Currently, the Temple of Fire Worshippers which is situated in Surakhani village is a historical monument of architecture and one of the tourist places of the Baku region.*

Starting from the VIII century, the famous travelers and scientists who visited the Caucasus (Absheron) are the following: Arabians - Istakhri Iskhak (VIII century). Ahmet Baladzori or Al Belazouri (mid IX century), Masoudi Abdul Hossein (first half of X the century), Abu Doulaf (year of 942), Amin Ahmet ar-Razi (1601); Venetian traveler - Marco

Polo (first half of the XIV century); German scientist - Adam Olearius (1636); Turkish Evliya Chelebi (1647); Swedish - Engelbert Kaempfer (1683) and others. They have demonstrated that the political and economic life in this region was linked to the oil from the very beginning.

In this regard, "Conquest of Countries" of A. Baladzori, which was partly published in English ("The origins of the Islamic state", by P. Hitti and F. Murgotten, N.Y., 1916, v.1-2.), contains very important data about the economy, public relations and the culture of the people of the Arabian Caliphate.

Masoudi has stated in written form about the existence of two main sources of black and white oils on the Absheron. Marco Polo used to describe the use of oil on the Absheron for medical purposes and for lighting. He also confirmed the export of oil from Baku to the countries of the Middle East. In conformity with data of Amin Ahmet ar-Razi, at the beginning of the XVII century, there were almost 500 wells on the Absheron where black and white oils were extracted.

It should be noted that in the XV - XVII centuries, oil in many European and North American countries was extracted by the primitive method: a tissue was lowered inside superficial wells and lakes, and then, it was squeezed to get oil to leak into vessels. The Absheron residents in that period already knew how to dig oil wells and mines to a depth of 10 sazhen (1 sazhen is equal to 2.13 meters) and extract oil using horse traction.

These facts are also described by other prominent travelers of late periods who visited the Absheron (Baku): the English traveler - Johnes Hanway (1741); and the Russians - Ioann Lerkh (1733), Samuel Gmelin (1770), A.Yartsev (1812); Edward Eichwald (1825) and others who left overall description of the oil quality, oil wells and the eternal fires.

After having seen the wells in 1636, Adam Olschleger (known in literature as Olearius), a German diplomat and traveler described the Baku oil wells in the following manner: "Those different wells numbering up to 30 are located at a distance of one rifle shot; a strong oil fountain goes out from these wells. Among them, were 3 main wells with the obligatory access of two sazhen in depth. For this purpose, several cross-beams were installed which could be barely used as stairs... Here, it was possible to dredge either black or white oil out of the well, but the first was more abundant than the latter".

We should also note that Masoudi (X century) and later, Olearius (XVII century) stated the existence of white oil on the Absheron which was considered important goods and exported to the markets of Persia, Turkey, Iraq and India.

This is also confirmed by J. Hanvey, one of the directors of the English-Russian trading company, who visited Baku 100 years later after Olearius. In his book entitled "The Historical Survey of the English Trade on the Caspian Sea" (1754), he noted that Baku residents have been using gas for cooking food, boiling water and lime burning; and the Surakhani white oil was considered as a very rare discovery and exported to various countries: it was used as a remedy from stone disease, pains in the breasts, and convulsions etc.

It is significant to see the statements of Evliya Chelebi, the Turkish traveler about Baku oil: "... People extracting the oil are descending inside the wells: they extract oil day and night by accumulating it into cylinder-shaped vessels made from goatskin. Then, it is purchased by merchants and exported to various countries. Oil is found in eight colours, but the best oil is yellow colored oil. Black oil is owned by the Shah... It is transported to the fortresses neighboring Uzbekistan, Persia, Kurdistan, Georgia and Dagestan... and is used in

those places for lighting. The lighting is necessary for the military warning to protect cities and fortresses...".

We can also find an interesting description of the Baku oil wells in the writing of E. Kempfer, the secretary of the Swedish Embassy in Persia, who was in Baku on January 6th-8th, 1683 and wrote the following in his book named "Seven Miracles of the Baku peninsula":

"Another splendid location is situated one thousand steps to the North-West. There is a source of white oil situated in a very bizarre place where nobody would ever imagine oil could exist ... As you move towards the West, you can find a spectacular source of black oil extracted two hours of riding from where the white oil is located. It is dirty... almost black in colour... A countless number of tight vertical wells are dug for oil extraction. Oil is flowing inside these wells in abundance and permanency... The solid clay soil allows for deep digging to the desired layers without installing any walls and posing no danger to the life of diggers. Extraction of oil from the wells is done using skin buckets manually or by means of small traction ... Lifting is ensured via the special mechanism which is put in motion by two horses running in a circle with traction means. Here, work never stops except for several hours during the night... Oil transportation is done in skin cylinders put on four wheeled carts to the cities of Shemakha and Baku; from the first point, it goes on camels within the country's boundaries, but the second point serves as transport via the sea to Girkania, Uzbek and Cherkask oblast and Dagestan..." (Bakinskiye Izvestiya, 1883, #5)

E. Kempfer described the Surakhani "eternal fire" in the following manner: "Fire billowed out of many wells near the Sarghani (Surakhani) settlement. Village residents have been burning stones to get lime...".

In 1733, when the Absheron was still part of Russia

(Russia gave back Peter I's conquered lands during his campaign of 1722 - 1723 to Persia only on March 10th, 1735 at the basis of the Ganja Treaty), Dr. I. Lerkh, the employee of the Russian Embassy in Persia took the following notes after his visit to the Baku oil region: "I have passed five versts (= 3500ft.) from inextinguishable fire to Balakhani up to the black oil springs... During the Persian Shah, there were 52 such wells... Wells with depths of 20 sazhen were known as strong oil fountains. It yields 500 batmans of oil every day... Oil from these wells flows into big deep holes and then, transported in big skin bags put on carts to Baku. The rest of the oil is poured out to 3 holes or cellars, and then, it is sold in Gilan, Shemakha and other places. Some remaining parts of the oil is used in the city" (1 batman was equal to 8.2 kg).

The first writing "About oil" by the academician I.V. Weitbrecht, which was published in "Primechaniia na vedomosti" and contains the maximum data on the Absheron oil, appeared in 1739. This treatise entitled "About oil" was based on true materials of F.I. Soymonov, a famous hydrograph and later, a renowned statesman, who had sent results of his research work to the Russian Academy of Sciences back in 1728.

He had been to Azerbaijan (Absheron) several times, describing the oil wells in detail and presenting the plant of oil gas fields. The first atlas of the Caspian Sea with text came in to light in 1731 under the patronage of F.I. Soymonov who studied the Caspian Sea from 1719 to 1727.

Authentic data on the oil resources of the Absheron can also be found in the writings of S.G. Gmelin, the academician who visited Baku in 1770.

In his report (of 1771), the scientist wrote the following: "... wells are closed with stones separated by pieces of clay where you can see the carved name of the Khan of Baku. It

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shows that nobody can take any oil from this well until the guard of the Khan opens the wells for use. It was reported by local residents, that the revenues of the Baku Khan from salt and oil sales were equal in revenue to 35 to 40 thousand rubles. One pood (=16.38 kg) of salt costs 7 or 8 kopecks while one batman of black oil which is equal to 15 pounds when used for burning, costs 5 kopecks" (Gmelin S.G. "Reise durch Russland zur Untersuchung d. drei Naturreiche" (SPb., part 4, years of 1770-1784)

Gmelin's data is confirmed also by A.Yartsev, a famous traveler who had been to Baku before it became a part of Russia. In particular, Yartsev wrote in 1812: "... One Baku Prince has the right to sell all mountainous oil from this country. While it is in strong in abundance in Balakhani, the number of buyers is less that one can imagine. In this case, the rest of the oil is transported to the city of Baku. In that city, there are no special warehouses for sales operations; but, there are 15 wells outside the city dug up to the very solid gypsum stone and made from stones inside. The reserve oil is poured out into these wells and stored for a while till it is sold out by merchants". (Yartsev A. "Rossiyskaya Gornaya Istoriya (the Manuscript)", part 7, book 1, #43) Excerpts from the book of K.A. "Essays on the history of the Baku oil extracting industry". (M.-L., 1940, page 11)

The description given by Marschall von Bieberstein, who visited Baku in 1796, is also interesting: "The Absheron peninsula is rich with inexhaustible volumes of oil... The main market of oil is Gilan because those who cultivate silkworms in this province believe in their experience or conviction commonly known for everyone that the oil is the only thing which can be burnt without causing any harm to insects in lighting of the houses."

*Frederick Marshal von Bibershtein (Fyodor Kondratyev-*

*vich), 1768-1826, the famous Russian botanist and traveller (on ethnic nationality he was German). He was born and studied in Stuttgart (Germany); in 1793 moved in Russia on military service; from 1796 he, as the scientist, accompanied the Persian expedition of general Zubov. He traveled mainly on the Caucasus and the Crimea. As a result of travel across the Caucasus (1798-1799), he has collected large botanical collections. His main transactions on natural science were "Flora Taurico-Caucasica" (Kharkov, 3 volumes, 1808-1819) and "Centuria plantarum Rossiae Meridionalis" (edition was finished after author's death). These works were the first report about flora of the Caucasus and the Crimea, and long time served as the basic sources of data on plants of these regions. He has published 2 releases of an album of colour images of plants; at the moment his rich herbarium is stored in Botanical Institute of the Russian academy of sciences.*

These documents prove that the most ancient oil wells (they are in total 120 at a depth from 2 to 20 sazhen) were situated in the following settlements of the Absheron: Balakhani, Surakhani, Bibi-Heybat, Binagadi, Sabunchi, Romani and Shubani, where a large part of the oil was concentrated in Balakhani. The characteristic detail: old wells after long lasting use were idle and renovated only after some parts of oil were emerging and accumulating there.

Currently, the first oil source on the Absheron is deemed the well at a depth of 35 m, installed by Master Allahyar Mamedali Nur Ogli in Balakhani in 1594. In 1803, the Baku resident Kasumbek Mansurbekov started the offshore extraction from two wells for the first time which were situated 18 and 30 m from the shoreline of the Bibi-Heybat bay.

It is worth to point out the following: Baku residents such as Kerbala Yusuf Amirbek Ogli and Haji Nabi Safi Ogli were awarded the Silver medals in accordance with Tsar's decree

signed in 1833 "For their labour and zeal demonstrated in oil tapping and well construction" in Kuban (Ekaterinodar) where they were invited by the commanders of the Black Sea Cossack Troupes.

In Balakhani, local residents found the writing on the stones in 1823 which says that the Khalafi well had been renovated 200 years before. The other ancient wells: Chambu, Haji Zurabi, Dostakov, Salakhi, Urusi, Kazy, Shakh-Safi, Aghai, Ali-Beyi, Hasan-Ali, Khanali, Irzagouli and others which had been constructed in the XVIII century, were put under renovation long before Azerbaijan's entry into Russia.

An authentic description of wells in Surakhani is given by E. Eichwald who visited Baku in 1825. In particular, Eichwald describes wells with the valued white oil in his writing named "Reise auf dem Caspischen Meer und Caucasus": "Wells with white oil are situated in the North-West almost 1.5 versts from the village of Surakhani (Sarrachani). 16 wells made inside from stones are constructed duly for its extraction. Their inner walls in the upper levels are made from large stones and tightly placed stones which do not exceed one foot in diameter in the lower levels to enable oil and water to be accumulated. They are hermetically covered by lids to avoid any oil evaporation... Slow flowing oil indicates that there is black oil sublimation which is precipitating in a new place. White oil is accumulated in many wells together with water. Every well is yielding unknown quantities. It comes in abundance during summer, but goes down in volume in winter. It is greater in good weather and less in bad weather. For example, the well called Mustafa at a depth of 3 sazhen 6 feet yields up to 3 poods of oil every 10 days, while in cold weather; it is equal to 1 pood 10 pounds. ... White oil dredged out in small skin-bags is sent to Baku for storing at the warehouses. But its colour is not absolutely white. Often it has a

yellowish hue. The longer it is exposed to open air, the more yellow and dark it becomes."

As Russia conquered Northern Azerbaijan in 1813 and 1828, oil wells became the property of the State Treasury; the lease-out system was officially enacted in that epoch. In accordance with this system, oil wells were put under a lease-out procedure by the government or were administrated directly by the Treasury.

In this regard, it is typical to see the report of general N.F.Rtischev, Commander-in-Chief in the Caucasus dated July 30th, 1813. It describes not only the Treasury's revenues coming from oil wells and various duties, but indicates also that "during four years of the lease-out system, this sector including other non-important sectors has brought 450 thousand rubles from procedures without taking any additional care or making any fees by the Treasury".

Here, it is worth to note that besides the Absheron, oil in small quantities was extracted in Guba and

Shirvan uezds (districts) where oil wells were also included in the properties of the Treasury and were put under the lease-out system as soon as those uezds became part of Russia. For instance, Guba Town Major who used to give these wells to the lease-out system had to watch that "oil extraction did not rise arbitrarily at the expense of excessive additional wells. Otherwise, it could damage the business of the most important Baku oil fields which were more useful for the Treasury than the oil in Guba".

The Absheron oil wells starting from the end of 1806 up to 1824 - from 1826 to 1834 - from 1850 to 1872 belonged to various lease-out holders, but during these periods of time, they were directly owned by the Treasury. Starting from 1806, the first main lease-out holder of Baku oil wells for 18 years was M.M. Tarumov, the secretary of the province; the

last holder had been I.M. Mirzoyev from 1860 up to the abolishing of the lease-out system in 1872. Strictly controlling the actions of the lease-out holders, the Tsars Treasury was strongly advocating the monopoly rights and interests by forbidding anyone other than the lease-out holder to sell oil.

For example, Item 6 of the Contract concluded between the Treasury and Tarumov in 1821 stipulates: "Anyone caught breaking this rule, such illegal merchant will be fined one thousand rubles for the first time in the form of State banknotes in favour of the Treasury and all quantities of oil put on sale by him will be transferred in favour of the lease-out holder as the owner of oil, but once the second or the third illegal sale of oil occurs afterwards, besides all penalties in favour of the Treasury and lease-out holder, the illegal merchant will be prosecuted in accordance with the laws. (Central State Historical Archives of the Azerbaijani SSR. (Currently, named as the State Historical Archives of the Republic of Azerbaijan, f.24, op.24, d.109, page 24)

This Contract gave guarantees to the lease-out holder for almost everything: manpower for digging and repairing wells; dredging oil out of wells and its transportation to the city warehouses; as well as the right to dig and search new sources of oil. In his turn, the lease-out holder had to pay large sums for the extraction of Baku oil in conformity with the concluded Contract.

It should be pointed out that different viewpoints on the oil policy had ruled the governmental and public circles of Russia: there were advocates and protesters of the lease-out system as a whole.

One of the most ardent advocates of the lease-out system was general N.F. Rtischev, who wrote in his report dated July 30th, 1813: "A true revenue for the Treasury from this sector may be ensured only if such wealth in abundance will

be continuously leased out by honest people... But once such fields will be the permanent property of the Treasury, it will mean that there should be a special number of personnel with relevant salaries, as well as fees for workers and their visits. All of this requires significant expenditures from the Treasury".

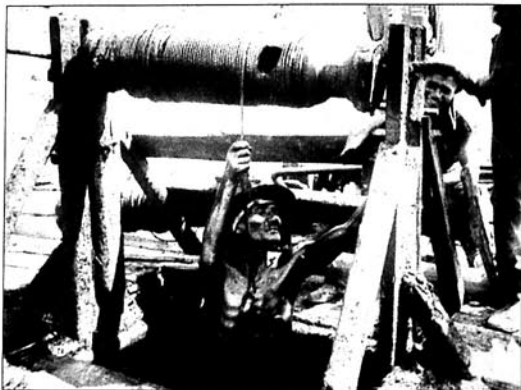
He was fully supported by P.P. Gagarin, Tsar's senator.

Opponents of this system (such as Reut - superintendent of the Baku oil fields, E. Eichwald - head of Mining expedition, M.P. Vronchenko - stats-secretary, V.I. Ragozin - famous oilman, D.I. Mendelejev and others) had anyhow insisted to abolish the lease-out system and enact the direct State administration in Baku's oil fields.

For example: M.P. Vronchenko, state-secretary in his letter dated the 12th of October 1844 written to general A.I. Neidhardt, Commander-in-Chief of the region of Trans-Caucasus, brought the argument against the lease-out system: "Oil export to Persia was not less if we compare the first eight years from 1828 to 1836 with the second eight years from 1836 to 1844... on the contrary, it had an increase of 9139 poods... Net revenues of the Treasury for the three full years of 1840, 1841 and 1842 were running up to 109 thousands rubles. The last lease-out sum in total was equal to 91 thousands rubles".

It should be noted that from January 1st, 1825 for the first time, Baku fields had started to be administrated directly by the Tsar Treasury at the same time, N.I. Voskoboynikov (1801-1860) talented mountain engineer was seconded together with his mission-mate praporshik Talalayev to be sent to Baku Town in accordance with the Mountain expedition in order "to check and accept; Baku town's major wells and warehouses with white and black oils as the public property located in Balakhani, Binagadi, Surakhani and Bake

from Tarumov, lease-out holders had to present the detailed registration book signed commonly about the number of wells and warehouses, their status and quantities of unsold oil still stored at warehouses; which buildings and assets belonging to the lease-out holder had to be handed over to the Treasury; how much unsold and stored oil in Masazyr and Zykh was in Baku; are the warehouses comfortable in use" (The State Historical Archives of the Republic of Azerbaijan, f.24, op.24, d.390, page 2)



*First oilfields of Azerbaijan (wells)*

After having successfully accomplished the mission, Voskoboynikov sent the extensive report to the Mining expedition about the status of the oil and salt resources of the Absheron. It is interesting that his materials remain currently the only source where one can find a comprehensive



*First Absheron's (Baku) well*

description of the status of the public and private oil wells of the Absheron under the lease-out system and on the eve of its transition to the direct State administration.

In this context, in accordance with the data of Voskoboynikov, there were 17 wells near Bibi-Heybat on January 1st, 1825 leased out by Tarumov, 1 private well; 82 public wells with black oil in Balakhany. Voskoboynikov underlined that there were 16 stone warehouses constructed alongside the northern ramparts of Baku city which were full with oil which was transported on carts from almost all of the oil wells of the Absheron. (Currently, these places of warehousing are taken for the building of the Presidium of the National Academy of Sciences called "Ismailliya" and M.A.Sabir's square).

He notes the following in the "Mining Journal" (1827):



"The peninsula of the Absheron represents by itself woodless and almost fruitless piece of lands... But nature has filled the gaps of this country by forming in its terrestrial bowels abundant sources of oil and salt which meet not only the needs of the local residents, but also serve as a prerequisite of their wealth... But what is black oil - black tar? It is mainstream in entrails of the earth, but it sorts out to the surface of this ancient land in various altitudes and even on the seabed".

Furthermore, N.I. Voskoboynikov worked several times as the director of the Baku oil and salt fields in 1825 and 1834-1838, which positively impacted the development of the Azerbaijani oil history. His main achievements are the following: elaboration of the extensive action plans in the fields of extraction, exploration, storage and sales of oil.

Having faced in his pathway significant obstacles put by the power of the rich elite, which had absolutely been against cessation of wells to the Treasury (such as E.F. Kankrin, minister of finances; general E.A. Golovin, Commander-in-Chief in the Caucasus who had replaced general A.P. Yermolov and others), Voskoboynikov undertook full-scale measures in the Absheron, which definitely favored the creation and development of the oil industry in Azerbaijan: concreting of pavement at oil warehouses; equipment to get the lighting kerosene by refining of the Surakahni oil; introduction of registering by making threads in oil storage places; use of white and black oil instead of turpentine, tar and cod-liver oil for lighting the houses, street lamps and lighthouses; as well as "impregnate timber with oil, which is used for the construction of the top sides of ships".

In 1837, the Trans-Caucasus Society for the Promotion of Industry and Trade created by the initiative of Voskoboynikov, which ensured data collection on oil consumption in all Caucasus. Activities of this Society favoured oil sales in

Azerbaijan and Trans-Caucasus as a whole.

The oil refining plant of Voskoboynikov became the first such plant in the Absheron which started its activities in Balakhany in 1837 and mastered "special refining facility and steel bulks for transportation" (Acts collected by the Caucasian Archaeographic Commission (ACAC, chapter 9, page 651). But he did not succeed in completing the process of refining oil into kerosene; Voskoboynikov resigned in 1846 and left the Absheron for good.

In accordance with data of the Caspian Chamber of the State of Properties of the Ministry for Public Properties in 1842, there were 136 functioning wells in the Absheron, which annually yielded up to 3.8 thousand tons of oil; in fact, the oil extracted in large quantities was exported to Persia. The deepest point of the wells was up to 14 sazhen.

In 1846, Vasilii Semyonov, a member of the Caucasus Main Administrative Council proposed to drill an oil well at a depth of 21 m for oil exploration being the first deepest well in the world. Drilling works were led by major Alekseyev, director of Mining Engineer Corps of the Baku oil fields. (ACAC, chapter 10, page 137) Azerbaijan overtook America by 13 years: the first drilled American oil well is dated 1859. However, it is indeed in 1859, after tapping huge artesian sources in Venango, Pennsylvania, the commercial oil field started to be used.

In his address to M.P. Vronchenko, stats-secretary dated 8th -14th of July, 1847, Grand Duke Mikhail Vorontsov, Governor-General on the Caucasus (1782-1856), officially confirmed the completion of drilling the first ever oil well in Bibi-Heybat: "I authorized the Shemakha Public Chamber to conduct oil exploration works in Baku uyezd, on the shore of the Caspian, in Beybad tract using earth augers at the basis of required fees to the amount of 1000 rubles allocated by

you in 1845 for this purpose. With this result, acting Director of Baku and Shirvan mineral fields reported that they had tapped .... oil in Beybad..." (ACAC, chapter 10, page 145)



Grand Duke Mikhail Vorontsov

*Vorontsov Michael Semyonovich (1782-1856) - the Russian commander and the statesman. Besides high home awards, in January 1819, he became the honourable knight of the order of Bath - the higher military award of Great Britain (Grand Cross Breast Star). The Grand Duke (in 1852). In 1844, he was the commander-in-chief of Russian forces on the Caucasus and the Caucasian governor. In May, 1845 he has acted with forces in the well-known Dargin's campaign which in two months of difficult fights has been finished with a capture of village of*

*Dargo - the base station of Shamil. For this campaign Vorontsov has been erected in princely advantage and he has been appointed a chief of Kura's chasseur's regiment. In 1847, Vorontsov personally headed the forces operating in Dagestan; he supervised over storm of Gergebil and a capture of Salta. In 1853, before the Crimean war he has been occupied by strengthening of border with Turkey and protection of the Black Sea coastal line. Later, because of age and health's deterioration, Vorontsov has resigned and has for ever left the Caucasus. He died in Odessa in 1856.*

However, even in 1844, V.N.Semyonov in his presentation letter to the Governor General of Caucasus noted that annu-

al revenues from black oil sales were ranking from 80 to 85 thousand rubles in silver, but these sums could be raised to 100 thousand, if it is possible to do the following:

- 1) To rebuild two main wells.
- 2) To drill deeper wells using auger.
- 3) To dig up new wells using the method proposed by Voskoboynikov.
- 4) To create a precipitation tank for the separation of oil from water.
- 5) To ensure conditions for oil refining

(The Archives of Department for Mining and Salts Affairs; section 4, table 2, file #2465). In 1848, a new well which had yielded 110 poods of oil per day was constructed in that epoch. As time showed no serious attempts were made to realize Semyonov's recommendations because the Grand Duke M. Vorontsov had supported the lease-out holders.



Edwin Drake

Before going ahead with the story, we should underline that in 1911 on the 52nd anniversary of the American oil well in the memory of Edwin Drake (1819-1880), the founder of the American oil business, the drilling of the first well in Pennsylvania in 1859 initiated the establishment of the Oil Museum (Drake Memorial Museum). Newspaper-journal "Oil Business" (1911) wrote that "... the history of the oil industry will be presented at this museum in line with desire of its founders, and samples of sand, oil, tools and

objects related to that period of time, as well as the library dedicated exclusively to the theory and history of the oil industry will be collected for this purpose. Founders of the museum had the goal to make it a kind of Mecca for all those who had any interest in the oil industry". Time is right to create the analogical museum also in Baku (in Bibi-Heybat) where the first oil rig was drilled long before the American one.

Drilling of oil wells was officially forbidden in Russia up to 1869, the government heeded the recommendations of foreign specialists who used to substantiate uselessness and lack of prospects in drilling for oil extraction. For example, the Trans-Caucasian Trade Society refused to get the authorization to start drilling works when it had solicited the government in 1866.

It is indeed the success of the oil business in the United States that prompted attention to the European (Galicia) and later to the Caucasian (Absheron) oil fields.

In 1869, I.M. Mirzoyev, the lease-out holder drilled his first well at a depth of 64 m in Balakhani, but it was not successful. In 1871, he decided to drill the second well at a depth of 45 m in the same place, which proved very successful by yielding upon average up to 2 thousands poods of oil per day.

The intensive construction of oil wells in depths of 45-50 m started in 1872 which halts completely the construction of new wells.

Production rates of the Absheron and American wells were given in comparison in the article entitled

"Oil in the United States and Russia" written by P.A. Chikhachev (1809-1890), a prominent geographer and orientalist, who had visited European, and Near and Middle East countries for almost 30 years: the Absheron wells yielded 3 times more oil than the Americans; the height of oil fountains

in the Baku oil region reached 84 m, while it was just 19 m in The USA.

The first powerful fountain, known as "Vermishevskiy", in the Absheron started inside a well located on the site of "Khalafi" Trading Society on June 13th, 1873: more than 90 million poods of oil were collected during three months. On the 14th of October 1875, a new second strong fountain at a depth of 96 m was initiated in the oil field of "Souchastniki" Company; during one month, this well yielded up to 200 poods per day.

In accordance with data of S.M. Lisichkin, the overall number of functioning wells in 1873 was equal to 158 and the drilled oil wells were just 9, but in 1876, the number of functioning wells and drilled oil wells was the same - 62.

This means that digging up new wells for dredging out the surface oil using the obsolete manual method stopped; the steep rise in the number of drilled oil wells started by using new techniques in oil extraction and refining in that epoch: The first steam machines were emerging in the market; large capacity spoons in length relevant to the wells' deep or long steel buckets with an opening bottom were used for oil extraction and its pouring into trough leading to warehouses.

In 1873, an engineer V. Neruchev, visited Baku, and noted the oil extraction from drilled wells in the following manner: "... the spoon is lifting almost 5-8 poods of oil which takes from 3/4 up to 3 minutes depending on the movement inertia and the well depth. If lifting and lowering of the spoon is done using steam power and the well depth does not exceed 30 sazhen, then one lifting and lowering of the spoon needs not to be more than 45 seconds; but if the steam power is replaced by horse power, it takes almost 1 minute; the manpower takes approximately 2-3 minutes. This method of oil extraction is in Baku is called oil-bailing" (Priroda, 1876, 1st

book) K.I. Lisenko, a famous oil chemistry specialist and professor of the Saint-Petersburg Mining Institute noted in 1878 that starting from 1874, the number of drilled oil wells had intensively increased, while dug up wells were getting fewer; e.g. main oil extraction was ensured by drilled oil wells and dug up wells were playing the auxiliary role. In 1878, there were 301 drilled oil wells in the Absheron, 251 were located in Balakhani, Sabunchi, Romani and Zabrat.



*Lisenko Konon*

*Lisenko Konon Ivanovich (1836 - 1903) - Professor of chemistry, mine engineer. He graduated from the Mining Cadets Corps in 1856. Later on, he worked in Heidelberg Laboratory of professors - Robert Bunsen and Emil Erlenmeyer. In 1861, Lisenko became the teacher of organic chemistry at the Mining Institute of Saint-Petersburg and remained there until the end of his service career. During this period of time, he was a junior scientific assistant and professor of the institute and an inspector in*

*the last decade. From 1877 to 1888, he worked as the editor of the oldest scientific-technical journal of Russia called "Gorny (Mining) Journal" which was published for the first time in 1825 in Saint-Petersburg. He visited Baku on several occasions to study the oil processes. The scientific writings of Lisenko are numerous; its main directions are the following:*

- 1) Proves in hydrocarbons' differences found in American and Baku oils,*
- 2) Theoretical substantiation of the practical method of*

*cleansing the oil distillates.*

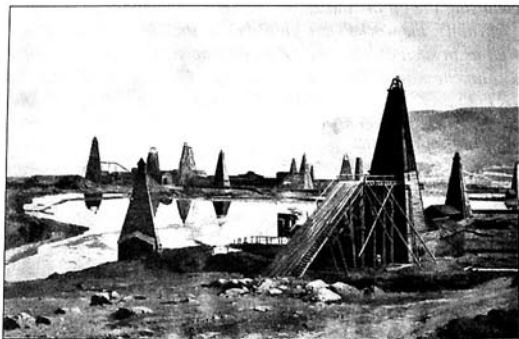
*Mainly, his works were published in the "Gorny Journal", as well as in such outlets like "Zapiski Imperatorskogo Russkogo Tekhnicheskogo Obschestva (IRTO)", "Baku Branch (BB) of IRTO" and "Neftyanoye Delo" (Oil business). K.I. Lisenko was the first to announce the idea of the creation of "the oil station" in Baku to store there all journals of drilling works (which enabled the draft the geological map of the Absheron), as well as to research oil in various depth.*

In the end of the present essay, we shall present the notes of I.A. Shteyman, an engineer and

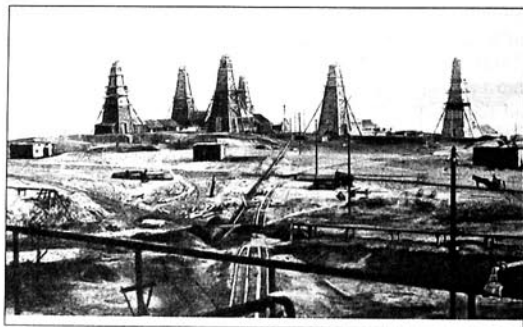
administrator of the Mining Mines on the Caucasus which contains, in our opinion, the necessary and important proposal for that epoch about the organizing of the oil business in the Absheron by using

private capital: "In spite of the huge development of the American oil business, the Caucasian oil could compete with the American... The abolishing of the lease-out system will become an important step towards the development of the industry. Once the government repeals the lease-out system, it will open up useful possibilities for the private sector. The most principal of its obligations should be the elimination of all economic obstacles put on development of any oil field. The rest will depend on the skills of private people to get involved in the business and their entrepreneurial knowledge. In this respect, it is not possible not to envy the skills of our transatlantic friends" (Notes of the Caucasian Branch RTO, 1899, document #10).

*Shteyman Ivan Alexandrovich (1820 - 1894) - a famous coordinator of the Russian Mining Business, secret counselor. In 1866 - 1885, he headed The Mining Department on the Caucasus; he contributed significantly to the establishment and the development of the Russian oil industry. Shteyman is the*



*Bibi-Heybat's oilfield of Nobel brothers*



*Romani's oilfield of Nobel brothers*

*initiator of drafting the geological maps of the Caucasus and the Absheron peninsula.*

In February 1872, Emperor Alexander the Second approved the project "On Rules in the Oil Business and Excise from the photogenic production" in Saint-Petersburg by writing the following resolution on the document presented to him - "To be so!" (Gorny Journal, 1872, #3, page 20). This switched the green light for Russian, local and foreign capitals to the Azerbaijani oil.

Having concluded all mentioned above, we shall note that the beginning of intensive introduction of drilling in oil extraction since 1869-1870, as well as the abolishing of the lease-out system in 1872 and granting rights for private people to rent oil-rich lands favoured the drastic rise of the oil industry in Azerbaijan and Russia in general. It impacted the creation of many oil firms and trading societies: "H.Z. Taghiyev" (1872), "Baku Oil Society" (1874), "Nobel Brothers Co." (1879), "The Caspian - Black Sea Society" of the Rothschilds (1883), "Oil" (1883), "S.M. Shibayev" (1884), "The Caspian Company" (1887), "Naghiyev Musa" (1887), "A.I. Mantashev" (1889), "Asadullayev Shamsi" (1893), "Caucasus" (1896), "I.A. Akhverdov" (1896), "The Russian Oil" (1898), "Souchastniki" (Co-participants)" (1899), "The Absheron Oil Society" (1899), "Alexander Benkendorf" (1900), "Bibi-Heibat Petroleum Co. Ltd." (1900), "Balakhani Syndicate Ltd." (1900), "The Moscow - Caucasus Oil Society" (1902), "The Saint-Petersburg and Caucasus Oil Industrial and Trading Society" (1911), "Mukhtarov Murtuza" (1913) and many others. It meant that a new stage of development for the oil business in the Absheron and in the Russian Empire as a whole.

## ESSAY II

### THE PERSIAN CAMPAIGN OF PETER THE GREAT

Person should be judged not based on his talents  
but based on the application which he gives them

*Rene DECART*

After the end of the Northern war, having led successful military actions in the West, Peter I (1672-1725) (last Moscow tsar and the first All-Russian emperor), thought of moving toward the East, in a direction of Persia (Iran), India, China and further, with one main purpose, the further enlargement and enrichment of imperial treasure...



*Peter the Great*

He considered it possible, first of all, due to oil resources, which were available in the territory of Azerbaijan, which were already bringing a huge income to the treasury of the Persian king. According to Berg-Board's reports to the emperor, due to an oil extraction in the Absheron, "the local nation receives a huge income". According to documents, the Persian king had an annual income of on average up to 7 thousand tumans (about 50

thousand rubles) from the trading of oil with the countries of the Near and Middle East.

Oil resources and those riches about which Peter I knew about not by hearsay, and also a strong reason - ("protection of the king's lawful authorities") accelerated his military invasion into Persia.

*Peter I (1672-1725) - Russian tsar since 1682 (ruled independently since 1689); the first Russian emperor (1721). Russia's outstanding political and military figure. He carried out a number of major transformations: the organization of manufactories, weapon and mountain factories, development of trade; establishment of the Senate, collegiums; introduction of recruitment duties, creation of a regular army, construction of fleet; division of the country into provinces; construction of Petersburg, fortresses, channels; opening of educational institutions, Academy of Sciences; sending of young nobleman for studying abroad. Having put the bases of the Russian school of military art, he showed diplomatic and military abilities during Northern war. He successfully supervised armies at the capture of Notebourg (1702), in battles at Lesnoy (1708) and near Poltava (1709). He skillfully selected assistants in different fields of activity. Decisively suppressed attempts of reactions for preventing the realization of the reforms conceived by him...*

In 1465, Hasanbek - The Ambassador of the Shirvan's shah made a friendship visit to Moscow's grand prince Ivan III. And in 1466, with a reciprocal visit, The Moscow Embassy delegation led by ambassador Vasily Papen came to Shamakhi (capital of the most ancient state of Shirvanshahs').

The composition of delegates included Moscow merchants among who were known travelers in the Caucasus, Persia and India, tversk. Merchant Aphanasy Nikitin, who visited Baku, told the tsar's court about the valuable eastern goods (shirvanshah's silk, mugan's cotton, the Karabakh carpets,

Baku oil and salt). Nikitin left a diary (traveling notes) "Walking beyond three seas", in which he comprehensively described the four-year-period he travelled across Persia and India (Sreznevsky I.I. "Scientific notes of the Academy of Sciences", S.-Petersburg, 1856).

Information on Baku's available oil resources were already mentioned in old Albanian written sources of the VII century and were in the Arabian documents of the VIII century. And later in the XIII century, it was noted by the Venetian traveler and merchant Marko Polo and an Arabian scientist Mohammed Bekran, that life on the Absheron had been long connected with oil. Marko Polo - the first European - researcher of internal and eastern parts of Asia, traveled across Central Asia from eastern coasts of the Black sea up to China, based on the information that the oil was taken out of Baku on camels to neighbouring lands and used as lighting fuel and for medical material.

In 1637 it was emphasized in both the documents of the Moscow state (on the "list of cannon stocks")", and also in the military materials of 1640, that Baku oil in a burning form was a terrible weapon.

The pretext for Peter I's military campaign to come to the Caspian lands was also his decision "to punish" rebels for the damage caused to Russian merchants, trading in Shemakha. In this city there were numerous merchant colonies of different states, including Russia. Russian merchants traded on The Caspian Sea and in cities along the Volga region (Astrakhan, Tsaritsyn, Yaroslavl, and Nizhny Novgorod). Trading communication among Astrakhan, Moscow and Vologda, and through Arkhangelsk, enabled the ships with the Russian goods to sail through to Central Europe and further.

In August 1721 one of the feudal lords of North Eastern

Azerbaijan, the chairman of the Sunni religious branch Haji Davud Mushkursky (Gubinsky) together with the Dagestani people and mercenaries, headed the anti-Persian movement; they besieged Shemakha and took the city. Robberies, especially by mercenaries began in the city: all merchants in the city (including Russians) were plundered and severely beaten, which caused extreme discontent with Russia.

There was the main purpose (replenishment and enrichment of tsar's treasury with the further capture of near-Caspian areas) and there was a pretext. Knowing not only the character of the first emperor and his uncontrollable temper, the military invasion did not keep itself waiting long. In the 1722-1723 campaign, Peter I assumed to carry out campaigns in Baku, Tebriz and other areas of Azerbaijan. For this purpose it was necessary not only to capture a narrow coastal strip, but also to go further, into the inlands of the Southern Caucasus.

Here it's very pertinent to note the strictly-scientific characteristics of Peter I, given by professor H.A. Leer, the chief of the Academy of the General Staff in S.-Petersburg: "...he possessed an unusually over developed creative mind, and had an ability to meet critical deadlines calmly. He was also a deep psychologist; capable of acting on the soul of the soldier... he belongs to a number of few commanders who were able to do everything, could do everything, and wished to do everything... Peter is a commander, of the highest level to whom "beaten roads did not exist at all". He organized the Russian army based on foreign standards, applying and re-creating techniques of Russian military art and imitating and borrowing foreign practices, Russian military work much more outstripped the European states at this time..."

Under the edition of professor H.A. Leer (1829-1904), who was a talented military writer, extensive scientific com-

positions, "Encyclopedia of military and naval sciences" and "Review of wars from Peter I up to current times", were published.

*Leer Henry Antonovich (1829-1904) - the professor; the chief of Academy of the General Staff in S.-Petersburg; a member of the Swedish Academy of military arts. Leer laid the basis for scientific research strategy in Russia. In a literary area first acted at the end of 1850 in "Military collection" immediately attracted the attention of experts. The most significant works, except above mentioned, were "Public lectures on the Franco-German war of 1870-71" and "Experience of short-historical research of laws of art of conducting war".*

Another well-known historian, M.V. Nechkina, reported that "as a person Peter I balanced, being a talented organizer with rich initiative, with an extreme mental unbalance, cruel behaviour, habitual drunkenness and unrestrained debauch". Nechkina considered that "a number of western historians-researchers idealised Peter I as a representative of "statehood", covering his dark parts and incorrectly considering his reign as a sharp turning-point, while he only distinctly developed previously outlined traditions".

*Nechkina Milicha Vasiliyevna (1901-1985) - the known Soviet historian; the winner of the State premium of the USSR (1948); since 1958 - the academician of the Academy of Sciences of the USSR; the author of numerous works on history of public and revolutionary movement in Russia in the XIX century.*

Peter's administration developed an extensive program covering political and economic actions concerning Transcaucasia, as the growing Russian industry needed raw materials which were available in this region. However, Russia was anxious of the attempts of Osmanli Turkey to grasp Transcaucasia and to become stronger on the coasts of

the Caspian Sea.

It is characteristic, that prior to the beginning of the military campaign, Peter I on the 15th June, 1722

proclaimed in "Manifest" the purpose of the future invasion. (History of Azerbaijan, Baku. Publishing house Elm, 1979, p.83) In "Manifest" he marked that Russian merchants "based on ancient customs

came" to the place for trade (trading relations of Russian merchants in Shemakha had been known since the XII century). Peter I's manifest was the first printed document in the Azerbaijani language, published and widespread in Azerbaijan, the manifest was sent to the main cities of Shirvan (Baku, Derbent and Shemakha) and the near-Caspian areas.

Certainly, the true purposes of the campaign was concealed in the manifest: where Peter I convinced the local shia population that he was a friend to the king and the purpose of its mission was to establish order in the region; at the same time it was explained to the Christian population of Transcaucasia, that the purpose of the invasion was their liberation from the oppression of Muslims. That is, how the emperor masterfully used the religious factor.

Documents testify that Peter I was seriously preparing for a campaign to attack Persia: the information on the country, on its possessions, and also detailed information on the oil and all its resources were gathered. Long before the military campaign in 1716, the Russian ambassador in Persia A.P.Volynsky had been given a confidential assignment the basic purpose of which was; to study caravan routes, conditions of defense structures of local armies, learn the presence of pastures along roads (for cavalry), establish relations with local Christians, and also to study prospects of the development of the Russian trade in Persia (particularly, in



Azerbaijan).

It is worth noting, that Volynsky, brilliantly executed Peter's I assignment and returned to Russia in 1718 after the conclusion of favorable trading contract with a court of the Persian king (shah) Hussein. Later, in 1722, Volynsky would participate in the Persian campaign together with the emperor.



*Artemy Volynsky*

*Volynsky Artemy Petrovich (1689-1740) - the statesman of the XVIII century, the representative of class and interests of nobility. At Peter I - the diplomat and the governor of the Astrakhan province. In 1715, Peter I appointed Volynsky to Persia "as an envoy" for opening a convenient trading way to India through Persia. During Empress Anna Ioanovna I's rule, Volynsky was appointed cabinet-minister. He is the author of the project about restriction of autocratic authority in favor of nobility. Accused of high treason Volynsky was executed.*

*was executed.*

In 1720, Peter I sent his associate, captain A.P. Baskakov as a spy to Persia, with the purpose of adjusting trading relations with Persia, and then with India. Baskakov was entrusted to "look over and observe carefully a state of local inhabitants and other circumstances and to carry out all these in maximum secrecy".

*Baskakov Alexey Petrovich a prominent figure of the XVIII century. - Was mentioned in history for the first time in 1720 in*

*connection with Peter I's activity. In 1723, Baskakov was appointed a member of the highest court to analyse cases and court over the vice-chancellor baron Shafirov; a year later Baskakov-became manager for the monastic incomes, and then - the Synod's chief prosecutor. After the death of the emperor, in 1740, Baskakov was appointed the President of the auditing board, and a year later time - the Smolensk governor.*

Peter I's aspiration to become stronger on the Western shores of the Caspian Sea and to construct a large city with a military-naval base was connected with his desire to establish a strong Russian influence in Transcaucasia and Persia. Considering Baku as the main point in trade relations among the countries of the East and Russia, Peter I wrote: "There will be an extreme need for us (Russians) to capture shores along the Caspian Sea, as; we can't let the Turks here". With this purpose the hydrograph specialist F.I. Soymonov was ordered "to explore, measure and describe the Caspian Sea" in 1719 (Essays of history of the USSR, of the XVIII century, 1954, p.606).

Starting from 1719 to 1727 Soymonov investigated the Caspian Sea (he visited the Caspian Sea four times: 1719, 1722, 1723, and 1726). In 1731, under his supervision the first complete atlas of the Caspian Sea which was named "Description of The Caspian Sea from the mouth of the river Astarabad, western and eastern coasts, depths and soils and views of notable mountains" was published.

Later, already being the statesman, Soymonov wrote the historical composition "History of Peter I" (SE, 1980, p.1248).

On June 18th, 1722, a Russian flotilla with a composition of 274 ships under Peter I's command and general-aide-de-camp F.M. Apraksin took a course from Astrakhan to the south. The Russian army moved in two directions - by sea

and by land. The importance of the Persian campaign for Peter I (in which the role of "oil" stimulus was not the last), in our opinion, is defined also by the fact that he took his wife - Catherine with him, having left the prince A.D. Meshikov in S.-Petersburg as head of the government.



*Fyodor Apraksin*

*Apraksin Fyodor Matveyevich (1661-1728) - the prominent military leader, a general-admiral, the nearest associate of Peter I. He was the commander of Russian fleet in Northern war and in the Persian campaign; he was noted in the battles for Vyborg, Helsingfors, and Borgo; and also at cape Gangut. From 1718, he was a president of the Admiralty-staff; in 1722 he accompanied Peter in the Persian campaign, being permanently near the emperor in a rank of the commander-in-chief. In 1723 he*

*returned to Petersburg where he has accepted the head over fleet in which the Russian emperor last time put to sea. After Peter's death, he was appointed a member of the founded Supreme council (on February, 8th 1726). Some times he has headed a flotilla in the sea and once to Revel for its defence against England. It was last exit of count F.M. Apraksin in the sea; then having handed over the post, he has gone to Moscow where on December, 10th 1728 he died on 67-year of a life.*

On August 15th, 1722, an army of 50-thousand settled down north of Derbent. A foundation was laid where Peter I settled down, the port of Petrovsk's (nowadays Makhachkala). Under personal supervision of the Emperor Soon

Tarki, whose owner had earlier accepted Russian citizenship was captured; then without a fight Derbent was occupied.

A reasonably interesting fact from the life of the emperor on the Caucasus: Peter I's presence at Derbent on the 23rd of August coincided with an earthquake. Unabashed, he told to his spouse and to surrounding retinue: "Before my power even nature shudders...".

During Peter I's stay in the Caucasus in August, 1722, he was visited by representatives of all states of Derbent, Baku, Salyan, Resht and other cities. Peter I sent a letter to the senate where he wrote, that "he was intimately met by population". But it was an incomplete truth. Baku's sultan Mohammed-Hussein bey, relying on his own forces and the help of Haji Davud, was ready to protect the city and for this reason he did not accept the person armed with the letter from Peter.



*Catherine the First*

Soon, in the light of some circumstances (there was a new threat of war from Sweden) on September 7th, 1722 Peter I went back to S.-Petersburg, however almost all Western and Southwest coasts of the Caspian Sea were occupied by Russian armies until August 1723. This was the merit of Major General M.A. Matyushkin, who was entrusted to supervise over the military operations. Prior to the sailing of flotilla Matyushkin received the following order from the emperor: "go to Baku and conquer the city with the help of god, as it is the key to all our business....and protection of

this place is the most important, as we are doing everything for this purpose" (I. Golikov, Acts of Peter the Great., Stepanova publishing house, 1797).

*Matyushkin Michael Afanasevich (1676-1737) - the general, associate of Peter I. He was sent to Italy to study their naval works in 1697; he participated in fights near Poltava and in the Persian campaign (in the capture of Baku), where after the departure of the emperor he commanded over all armies.*

It is worth to note, that the occupation of Baku (July 28th, 1723) very much pleased Peter I, and magnificent celebrations were arranged in the streets of S.-Petersburg. The colonel - Prince I.F. Baryatinsky was appointed as the commandant of Baku. Later, up to 1920, one of streets of the city was called Baryatinskaya; then this street was renamed to Fioletova, and after 1991 to Alizade.

After Baku's occupation Salyan was taken.

Peter I considered that only by possessing Baku oil, Russia could strengthen external trading relations with the East and then Europe. Therefore in 1723, he wrote to general-mayor M.A. Matyushkin, the commander of all troops in the Caucasus and the Caspian Sea: "Order to take some poods of white oil from Baku and send or bring it yourself to us .....". Later followed another order: "Send thousands of poods or as much as possible of white oil and look for the master" (History of Azerbaijan, v.1. Baku

Publishing house AN. Azerb. SSR, 1958, p.314)

Of course, the orders of the emperor were carried out, and both M.A. Matyushkin and F.I. Soymonov made the detailed inventory of all Baku oil fields, which subsequently were accepted as a part of the property of the imperial treasury.

In his work "Materials to modern history of the Caucasus from 1722 till 1803" the known public figure of Russian, history P.G. Butkov notes that, after the conquer of Baku "...

the property or incomes of the treasury were taken to the Russian administration. These consisted of two main, selling clauses: salt and oil, and as much it is known, they brought in 50 thousand rubles yearly to the Russian treasure".

*Butkov Peter Grigorevich (1775-1857) - an actual member of the Russian Academy, the senator; he served with the military department up to 1820, after he was appointed as director of the schools of the Voronezh province. In 1823 he was defined as an official of special assignments under the Finnish general-governor Zakrevsko. In 1841 he was elected as an academician in the branch of Russian language and literature, and in 1849 he was appointed as senator. Butkov is known for numerous scientific researches; his first scientific works in the form of "Materials....." were devoted to the service in the Caucasus. Fundamentality they attracted the special attention of the commission appointed by the Academy for analysing the manuscripts of Butkov: " Materials ... " were the first experience in the Russian historical literature, which provided the consecutive description of the history of the Russians on the Caucasus and in Crimea in the XVIII century and at the beginning of the XIX century. Butkov's main works were printed in the magazines of the "Northern Archive" and the "Magazine of the Ministry of Internal Affairs".*

As a result of Peter I's Persian "local" campaign, Russia received the Western coasts of the Caspian Sea together with the cities of Derbent and Baku, and also Southern coasts with the city of Astarabad (according to the Petersburg treaty on September the 12th, 1723). Russia, in its turn, undertook to assist Persia in the war with the Afghans.

The successes of Russia in the near-Caspian areas made Osman's Turkey active and in the autumn of 1723, it directed the armies to Transcaucasia... Later, in Istanbul on July 12th, 1724, the agreement between Russia and Turkey was

concluded according to which, Transcaucasia was divided between these two powers. Turkey recognized the rights of Russia to the near-Caspian areas (including Derbent, Baku, Salyan, Lenkoran, Resht and Enzeli), and Russia, in its turn, undertook no action to counteract the influence of Turkey in other parts of Transcaucasia.

Thus, if in the Middle Ages Baku's "oil extraction" was a "monopoly" of Persian shahs, in Peter I's times the oil sources of Baku passed into the hands of Russia. Finally, it can be concluded that the beginning of the long conquest of the Caucasus was laid with the acquisition of Derbent, and especially Baku together with the coastal areas adjoining it.

However, during the Persia-Turkish wars Russia, according to the terms of the Resht (21st January, 1732) and Ganja (10th March, 1735) agreements, gave up the near-Caspian areas in favor of Persia (E. Eyhvald. Description of the Caspian Sea and the Caucasus "The son of country", 1850, N 12).

After Peter I's death on the 28th of January, 1725, England, France and Turkey started to act against the Eastern policy of Russia and at the same time in Persia Nadir Guli khan Afshar (future Nadir-shah) was at war successfully for the restoration of the former borders of the Persian state. All these four countries by all means impeded the strengthening of Russia's influence on the Caucasus...

In conclusion we shall note, that Peter I's plans to open the way to the East through Transcaucasia, the transformation of the Caspian Sea into internal seas of Russia, possession of oil sources, conducting trade with the countries of East through the Volga-Caspian route, started to be carried out 88 years after his death, when the final annexation of Baku oil to Russia took place based on the Gulustan agreement (12th October, 1813) according to which Persia recognized the annexation of Northern Azerbaijani khanates to Russia.

### ESSAY III

#### AZERBAIJAN'S OIL BUSINESS UNTILL 1920

**A scientist must be the knight of truth.**

*Vissarion BELINSKY*

The outset of oil industrial refining began in the mid XIX century when Baku became the largest oil region of the Russian Empire. The speedy development of the oil business took place in 1872 by abolishing the lease-out system of oil which became fast-paced from September 1877 when the excise tax had also been repealed (till 1888) on all oil products. The abolishing of the excise tax favoured the drastic rise of oil extraction in Azerbaijan. During the next forty years until 1917 more than 3 thousands wells were drilled in the Absheron, and almost 2 thousands of them yielded oil. However, serious attempts had already been made to develop the oil business long before the abolishment of the lease-out system.

In 1858-1859, the German baron N.E. Tornow, V.A. Kokorev and P.I. Gubonin were constructing an oil refinery in accordance with the German plants for kir (asphalt) processing in the Baku settlement of Surakhany, near the Fire Worshipping Temple. The purpose was to get lighting oils from resinous shale, but the results were poor. They had been obliged to replace kir by oil which yielded good lighting oils. Justus von Liebig, a famous German chemist actively participated in drafting the project of this plant and sent his assistant E.Moldenhauer to Baku to fulfill the necessary work. With the help of Liebig the "Trans-Caucasian Trade Asso-

ciation" in Baku purchased from Germany all the necessary equipment for construction of above-mentioned plant: ball-shaped boilers with capacity of 100 poods for rerunning of distillate and cast-iron retorts for destructive distillation.

The interesting fact: a talented Russian oilman Vasily Kokorev was involved in oil business by baron Nicolay Tornow (1812-1882). By the way baron was famous in Russia as a perfect orientalist having had several serious works in Islamic legislation's field, including his monograph "Mohammedian law".



Liebig Justus

*Liebig Justus (1803 - 1873) a German chemist and founder of modern Agronomic and Physiological Chemistry. He studied at Darmstadt grammar school and then, at the Universities of Bonn and Erlangen. In 1822, he moved to Paris where he attracted the attention of Alexander von Humboldt. In 1824, he was named Professor of Chemistry in Hesse and moved to the University of Munich in 1852. In 1860, he was appointed the post of President of the Academy of Sciences and the main custodian of the scientific museums of Germany.*

*The activities of Liebig were very fruitful, he contributed significantly to analytical, organic and technical chemistries. He became the first scientist to introduce the practical studying of chemistry for students in the laboratory. Almost all the next generations of professors of the German high schools as well as many foreign scientists studied in the laboratory of Liebig. Among his graduates, there are also*

*many Russian scientists: N. Zinin, P. Ilyenkov, N. Sokolov, A. Voskresensky, N. Lyaskovsky and others. We shall mention the following names out of his numerous scientific works: "Die organische Chemie in ihrer Anwendung auf Agricultur und Physiologie" (1840, in 1876 - 9th edition), had been translated into Russian in 1864 by Professor P.A. Ilyenkov and "Chemische Briefe" (1844, in 1877 - 6th edition), published in Russian in 1855 as "the Letters about the Chemistry").*

In December 1863, Javad Melikov constructed a kerosene plant in the city of Baku and used cooling stations in the refining process for the first time in the history of the world's oil refining. V.I. Rogozin, a prominent Russian oilman characterised J. Melikov as follows: "As it goes with everyone who has such an idea, he saw only the means for the realization of the idea in any beginning enterprise. He was seen as a strange and eccentric man to the residents of Baku. Of course, they thought this because he was not seeking financial gain and gave all he had down to the last kopeck he was driven purely by his ideas to attain his goal. In the history of development of the technical enterprises, we often face at times awkward people who are the impetus for our production by driving it ahead, but remain themselves without any business dying in poverty and oblivion. But the crowd who did not believe in such persons and mocked them became the owner of wealth gained at the basis of their achievement".

*Ragozin Viktor Ivanovich (1833 - 1901), a famous entrepreneur, was one of first organisers of the Russian oil business and was a mathematician by education. He got into the oil business at the beginning of 1870. He was the director of the Shipping Society called "Drujina" and then, the administrator of the Nijgorod Trading Bank and "Volga" Insurance Society. Rogozin created the laboratory to study the chemical contents of oil and generates the mineral lubricant named by him as*

"oleonaft" for the first time in the world. In 1876, the Balakhnin plant was established in 30 versts from Nijniy Novgorod for the production of oleonafts. The second Constantine plant had been constructed in 1879 near Yaroslavl. The product generated by Rogozin replaced the expensive wooden oil and entered into wider use not only in Russian, but also abroad in a short period of time. In his own plants, Rogozin tried to realize the idea of D.I. Mendeleev related to the full use of the Caucasian and Absheron oils. Besides three types of lubricants, Rogozin also generated solid products from the resolution process: sebonafta and the first samples of tar. Rogozin is also known as the author of a countless number of articles, scientific reports and monographs on oil topics.

J. Melikov the founder of kerosene and paraffin production in Baku and Grozny did not survive the tough competition with the larger industrial plants for oil refining and died in poverty and deep oblivion.

In 1846, the first well in the world at a depth of 21 m was drilled for oil exploration in the Baku settlement of Bibi-Heybat by the proposal of V.N. Semyonov, stats-secretary and member of the Main Department for the Trans-Caucasus region. For example for the first time in the world, oil drilling proved to be successful. This work was carried out under the supervision of engineer Alekseyev.

It meant that the beginning of drilling deep oil wells was registered here, on the shores of The Caspian Sea in the Bibi-Heybat settlement. Several years later in 1859, deep drilling was initiated in the state of Pennsylvania (USA) following the first initiative of the Baku residents.

After having obtained official authorization to drill oil wells in 1868, a second oil well at a depth of 64 m was drilled using the mechanic method in Balakhany, Absheron in 1871. Starting from that date, intensive drilling began which made

the price of oil fall. If one pood of oil in 1873 was 45 kopecks, after tapping of the famous "Vermishev" fountain in Balakhany on June 13th, 1873 which covered shortly all surrounding areas and formed several oil lakes, the price for one pood had fallen down to 2 kopeck.

Wells belonging to I.A. Vermishev, an oilman had been yielding a strong fountain of oil during the 13 days at a height of 61 m and poured out more than 90 million poods of oil in three months. This indicator exceeded many oil inflows discovered in Pennsylvania.

The Baku Branch of the Imperial Russian Technical Society was established on March 24th, 1879 and favored the intensive development of the oil business in Azerbaijan.

After having visited Russia, the Caucasus, and the Absheron in 1882-1883, Charles Marvin, the renowned British traveler, writer and journalist (1854-1890) was surprised with the wide scale of the oil business in these regions and described it in his books: "Region of eternal fire: Petroleum region of The Caspian " (1884) and "Baku is the petroleum of Europe" (1886).

Recollections about his visit to Russia, and in particular to Baku, were also described by Knut Hamsen (Pedersen), a famous Norwegian writer in his book entitled "About Fairyland" (PSS, chapter 3, edition of Marx Society, 1910). In Baku, he met with the establishment of the city and visited the "Nobel Brothers" company. In 1920, K. Hamsen was awarded the Nobel Prize for literature.

*Knut Hamsen (his real name is Pedersen) (1859-1952,) the famous Norwegian writer, attracted attention for his novel "Hunger" (1890). In the writings of Hamsen, naturalism is specifically interrelated with the neo-romanticism. Being a typical representative of literary modernism, Hamsen correlated the world of logic and expediency with the world of capricious*

*fantasies in his works.*

In 1885, Carl Engler, the German chemist arrived in Baku to study the nature and origins of Absheron oil. Later on, in 1888, he published his theory on the organic origins of oil which became the basis for all subsequent analogical theories in counterbalance with the theories of mineral origins of oil (D.I. Mendeleyev and others).



Carl Engler

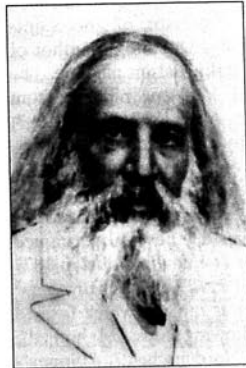
*Carl Oswald Victor Engler (1842-1925) a renowned scientist and chemist-experimenter. He worked as the head of the pure chemistry chair and the director of the Chemistry Institute in Karlsruhe in 1887. He left a great literature legacy of up to 300 published scientific works. It worth to note the following writings out of his principal creations: edition "Nandbuch der Technischen Chemie", F. Stohmann und C. Engler, 1872-1874; "Neues Handuch der chemischen Technologie", C. Engler, 1912 and in particular, his 5 chaptered writing on oil written in collaboration with H.*

*von Hoffer, the geologist and others. In this context, it should be underlined that this fundamental writing includes the article about the geology of the oil fields of the Absheron peninsula written by Dmitry Golubyatnikov at the request of C. Engler and H. von Hoffer. The name of Engler came to worldwide attention due to his works in the field of oil analysis (oil refining by Engler method, defining of its viscosity by viscosity*

*gauge etc.) and his theory on organic origins of oil. His experiments on generating the artificially prepared oil by refining of oils under pressure are classical ones. Engler was a member of many scientific institutions and societies, including the Russian Academy of Sciences as well as the honorary chairman of the International Commission for unification of the oil products and analysis methods.*

The Russian Emperor Alexander III (1845-1894) came to Baku for two days with his family on October 8th -9th, 1888. He visited the Cherny Gorod, was at the oil plant owned by "The Nobel Brothers"; and the oil fields of "The Caspian and Black Sea Society" of the Rothschild's and Shamsi Asadullayev in the settlements of Balakhany and Sabunchi. It is interesting to note that the Tsar's government had been actively supporting the establishment and the development of large firms because they could represent industrial interest at

best once they were more organized from an industrial point of view.



Dmitry Mendeleyev

Soon, lamps destined to be used with Russian kerosene were emerging in Russia and differing from the American models. In this regard, it is worth to mention the role played by D.I. Mendeleyev who was the first to propose using the oil residues which remained after separation of the kerosene for generating lubricants. The scientist scrupulously studied the oil processes in Russia, and he had been to Baku several

times in 1863, 1880, 1884 and 1886 (twice) to study economics and the status of the technical capabilities in the oil fields.

The most debated issues in the years of 80-90 had been the construction of oil transporting lines between oil fields and plants located in the Black city of Baku. The most important companies like "The Nobel Brothers", "H.Z. Taghiyev" and "the Baku Oil Society" made a lot of efforts to solve these problems. In 1877, the construction of the first pipeline in Russia was completed between the fields in Sabunchi and the plants located in the Cherny gorod (Black city). 25 oil transporting lines in length of almost 286 km were used to pump up to 1.5 million poods of oil per day from the fields to the plants that had been constructed in the Baku oil region in 1890.

It is necessary to recall such talented engineers like A.V. Bari and V.G. Shukhov who were the main team-leaders in the construction of the oil pipeline in Baku. Besides them, there was also N.L. Schukin, Professor of the Saint-Petersburg Technical Institute (1848-1924) and an author of the project of the Transcaucasus Baku-Batum pipeline. The construction of the unique trunk kerosene pipeline from Baku to Batum took 10 years from April, 1897 till July, 1907. Its importance was long debated by interested parties.

The creation of tankers for oil and oil products for transportation seriously impacted the development of The Caspian fleet by opening up a new era in the oil business.

For the first time in the world, the tanker named "Zoroaster" was built by the order of Ludwig Nobel in 1877 in the Swedish city of Motala. Later, "The Nobel Brothers" company ordered to build numerous tankers which formed the whole fleet and covered the following ships: "Mahomed", "Moses", "Spinosa", "Darwin", "Nordenschild", "Linney", "Bhudda", "Koran", "Talmud", "Savior" etc.

Having at their disposal a powerful tanker fleet and more than 2 thousands oil tank cars, "The Nobel Brothers" company transported oil and oil products to countless reservoirs built by themselves in many cities of Russia - Nijny Novgorod, Saratov, Tsaritsyn, Astrakhan, Yaroslavl and others.

Afterwards, ships belonging to other firms were also navigating in the river channels of Russia. For example, the trading and transportation society called "Mazut" founded by Alphonse Rothschild in 1898 owned 13 tankers in The Caspian: "Bibi-Heybat", "Alexander Kolesnikov", "Nikolay" and others, as well as such steamships as "Venture", "Cheleken" and so on.

Starting from 1880, tankers from the Batum port with the kerosene of Baku were heading for many worldwide countries. In the 1880's and the 1890's the Russian (Baku) oil was openly competing with American oil and even starting to conquer its position in the European and Asian markets. Kerosene exported from Baku was fully meeting the needs of Russia and since 1883 the import of the American kerosene into the Empire was halted.

Data relating to the oil extraction in the US and Russia has shown that in 1859, this indicator in the USA (Pennsylvania) was equal to 82 thousand barrels. In 1889 this was 14 million barrels. Meanwhile, the same indicator for the year of 1889 in Russia (Baku) was at the level of 16.7 million oil barrels. In this case, it is worth to present the excerpts from the article of Peter Chikhayev named "Oil in the United States and Russia" (1885) which debates the status of oil extraction in The US and Russia as well as in other oil extracting countries of the world. It is underlined that more than a half of the world's oil extraction volumes are ensured by The US and Russia. Chikhayev notes that "in 1881, the



daily average production rate of wells in Baku was equal to 40 tons while in The US, it was 11.5 tons" and makes reference to the words of Charles Marvin, who compared the "Absheron with a sponge immersed into water". Then, Chikhachev underlines that solid heavy residues forming in oil refining and containing 60% of mineral oils (called by local population as mazut) were being processed in large quantities in the plants of Black city and in Surakhany in accordance with the method invented by engineer O.K. Lentz with its subsequent use for heating steamships. Before this method, people had used haloxylon and the expensive British coal. The author thinks that the richness of the Absheron is confirmed either by the high production rate of the wells (they had yielded 3 times more oil than in the USA) or the height of the oil fountains (in the Baku region, this was equal to 84m, while in the USA 19m).

*Peter Alexandrovich Chikhachev (1808-1890), a prominent geographer, orientalist and geologist is known for his trips to Atlay, Asia Minor, Europe and Africa. He spent a major part of his lifetime in Paris. He bequeathed a large part of his assets after his demise to the Paris Academy of Sciences to encourage scientific research in Middle Asia.*

In 1901, the oil region of Baku ensured 95% of all Imperial oil extraction; during that year, oil extraction in Russia was distributed in the following order: 667.1 million poods in the Baku province and almost 34.7 million poods in Terskaya region.

The number of employees working in the oil fields of the Russian Empire increased from 7 thousands in 1894 to 27 thousands in 1904 (24.5 thousand of these were working in the oil region of Baku,

Azerbaijan. In 1904, there were 150 oil refineries across Russia and 72 plants among them were situated in the

Absheron.

It should be noted that the Russian oil industry up to 1910 had been mainly composed of the Azerbaijani oil industry. The main fields of Baku were the following: Balakhany, Sabunchi, Romany, Bibi-Heybat and Surakhany ("Survey of Baku oil industry for 1915.", Baku, 1916, chapter 2, page 235).

In 1899-1910, after having secured more than half of worldwide oil extraction, Baku helped Russia to get first place by leaving behind such countries like the USA, Argentina, Peru and others. Already, in 1885, the Asian countries had started to buy kerosene from Baku Batumi instead of America. During that period of time, up to 37 million gallons of the national fuel was exported to those countries.

M. Neimayer, the famous geologist underlined the following in his book entitle "The Earth History" (Saint-Petersburg, 1898, page 643): "In 1873, Russia had paid more than 10.5 million rubles for imported oil products, while in 1890, it had gained more than 27.5 million rubles for exported oil and oil products". Meanwhile, the author notes that the Absheron oil had found wider use in England, Germany, Austro-Hungary, Turkey and other European countries.

*Neimayer Melchior (1845-1890) is a renowned geologist. He studied in Munich and Heidelberg. Starting from 1873, he was the paleontology Professor at the University of Vienna. He is known for countless geological expeditions within Austro-Hungary, and the Balkans, Italy and the islands in Asia Minor. He founded the complete school of young paleontologists, including some among the Russian scientists. The most clear panorama of Neimayer's vision is presented in his writing named "Die Stamme des Tierreichs" (Vienna, 1890); meanwhile, his fundamental creation called "Erdgeschichte"*

(Leipzig, 1885-1887, in 2 chapters) had great success. In this writing, he had explained in general, but scientific language the modern geology in the spirit of evolutionism and gave important conclusions and descriptions of the landscape of the modern "face of the Earth". It soon became a real bestseller and was reprinted in 1895 by his follower, professor V. Ulig. Three years later, this book was translated into Russian entitled "The Earth's History" (Saint-Petersburg, 1898).

The rise of the oil industry in Baku at the end of the XIX century brought Russia to the level of the leading capitalist country of the world. After 1901, it kept second place behind The USA for a long time when finally Mexico conquered its place.

The Congresses of Baku oilmen established in 1884 served to organize and coordinate the activities of the Russian businessmen. The main purpose of such Congresses was "the possibility for oil industrialists to talk about their needs, aspirations and wishes in front of the government".

The Congress represented by itself the union of capitals of the oil firms in which each firm had its own share of votes. For example, during the 38th Congress of oil industrialists held in 1814, the largest firms had 111 votes: "Nobel Brothers" - 18, Shell - 34 and "Oil" General Corporation - 59 (Transactions of the 35th extraordinary Congress of Oil Industrialists held in Baku on June 10th, 1916, Baku, 1916).

Representatives of oil barons used the Council of the Congress to interact with various governmental institutions and to get into close contact with public agents, and to take part in intercompany meetings, commissions, e.g. to protect the interests of their relevant firms in front of the government. There was also the special statistical bureau attached to the Council of the Oil Industrial Congress, which had to collect process and promulgate all data related to the oil business.

ness. Since January 10th, 1899, the Congress

Council started to print "Neftyanoe Delo" (Oil business) newspaper-journal in Baku once every two weeks, which is still being published. In May 1920, it was renamed as "Azerbaijanskoye Neftyanoye Khozyastvo" (Azerbaijan Oil Industry).

One of the indicators of the successes of the Azerbaijani oil business in the second half of the XIX century was the participation of Baku oilmen in various Russian and international exhibitions. For instance, the plant of V. Kokorev and P. Gubonin was named during all Russian manufacturing Exhibitions of 1870 in Saint-Petersburg "for the preparation of lighting oils of very high quality from the Caucasian oil and its wider production in this plant" (Notes of the Caucasian Society of Agriculture, 1870, #5, page 15).

Год первый 15 Апрель 1899 г. № 7

# Нефтяное Дело

582

Издание Съезда съезда нефтепромышленниковъ въ Баку.

ВЫХОДИТЬ ДВА РАЗА ВЪ МЯСЯЦЪ.

<p><small>Учредители и издатели: Баку, недалеко Собора, утварь въ 1886 году, на 1500 руб. Баку, недалеко Собора, утварь въ 1887 году, на 200 руб. Для доставки объявлен особый адресъ на свободномъ извѣщеніи, по № 25, въ Баку.</small></p> <p><small>Содержание: 1. Извѣстія о работѣ Баку на апрѣль, съ таблицей, о работѣ въ Баку. 2. Извѣстія о работѣ Баку на апрѣль, съ таблицей, о работѣ въ Баку. 3. Извѣстія о работѣ Баку на апрѣль, съ таблицей, о работѣ въ Баку. 4. Извѣстія о работѣ Баку на апрѣль, съ таблицей, о работѣ въ Баку.</small></p> <p><small>Каждое число 2 раза въ кварталъ.</small></p> <p><small>Подписная цена съ доставкой на годъ 10 руб., на 6 мѣсяцевъ 6 руб., на 3 мѣсяца 4 руб., безъ доставки на 10, 6 и 4 руб. въ разсчетѣ, въ вѣдѣніи Слѣдств. съезда нефтепромышленниковъ.</small></p>	<p><small>Возможна ли доставка въ Баку, на 1000 руб. 2000 руб. 3000 руб. 4000 руб. 5000 руб. 6000 руб. 7000 руб. 8000 руб. 9000 руб. 10000 руб. 11000 руб. 12000 руб. 13000 руб. 14000 руб. 15000 руб. 16000 руб. 17000 руб. 18000 руб. 19000 руб. 20000 руб. 21000 руб. 22000 руб. 23000 руб. 24000 руб. 25000 руб. 26000 руб. 27000 руб. 28000 руб. 29000 руб. 30000 руб. 31000 руб. 32000 руб. 33000 руб. 34000 руб. 35000 руб. 36000 руб. 37000 руб. 38000 руб. 39000 руб. 40000 руб. 41000 руб. 42000 руб. 43000 руб. 44000 руб. 45000 руб. 46000 руб. 47000 руб. 48000 руб. 49000 руб. 50000 руб. 51000 руб. 52000 руб. 53000 руб. 54000 руб. 55000 руб. 56000 руб. 57000 руб. 58000 руб. 59000 руб. 60000 руб. 61000 руб. 62000 руб. 63000 руб. 64000 руб. 65000 руб. 66000 руб. 67000 руб. 68000 руб. 69000 руб. 70000 руб. 71000 руб. 72000 руб. 73000 руб. 74000 руб. 75000 руб. 76000 руб. 77000 руб. 78000 руб. 79000 руб. 80000 руб. 81000 руб. 82000 руб. 83000 руб. 84000 руб. 85000 руб. 86000 руб. 87000 руб. 88000 руб. 89000 руб. 90000 руб. 91000 руб. 92000 руб. 93000 руб. 94000 руб. 95000 руб. 96000 руб. 97000 руб. 98000 руб. 99000 руб. 100000 руб.</small></p>
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Furthermore, products and objects of the oil industry of Azerbaijan became the biggest success story in "the Caucasian Exhibition of Agriculture and Industry" held in Tiflis, in 1889. In particular, gold medals from this exhibition had been awarded to the following Baku oil firms: "Nobel Brothers" for their achievements in oil industry and putting the regeneration of alkali liquor into practice; "S.M. Shibayev" - for diversity and high quality of oil processing products and right configuration of the business in the plant (The Caucasian Calendar, 1890, page 71).

Large oil industrials seeking new worldwide markets for sale operations had been actively participating in world exhibitions. Ludwig Novel and Victor Rogozin had been especially successful in this venture. Their samples of oil products from Baku plants demonstrated in world exhibitions held in Paris (1878), Brussels (1880) and London (1881) had gained the highest assessments of experts.

In 1882, Ludwig Nobel in one of his speeches had underlined the following: "The Russian market becomes smaller for Baku kerosene it should somehow seek access to foreign markets". Meanwhile, Victor Rogozin said the following in the 1st Congress of Baku oil industrials held in 1884: "The European market obtained in rational, insistent and systematic manner will open for us.... more room for selling from 12 up to 15 million poods taking it as a minor figure... Only by getting an access to Europe, the Baku industry will become bigger and not only national, but also international. Without getting this oil into Europe, it will never become the serious industrial field" (Minutes of I Congress of Oil Industrials in Baku city, Baku, 1885, pages 25-26).

At the end of XIX and beginning of XX centuries the Nobel Prizes named after Ludwig Nobel (in 1889, in Saint-Petersburg) and his son - Emmanuel Nobel (in 1904, in Baku)

will be approved in Russia.

In 1875, the first time in the history of the world oil industry, V.I. Ragozin had studied lubricants and built for this purpose the first ever plants in Balakhni (Nijnegorodskaya Province) and in Konstantinov (near Yaroslavl). In 1878, lubricants made from Baku oil and exported by him abroad had gained the worldwide markets.

In this way, Azerbaijani oil as a raw material for lubricant production had played significant role in the Russian economy. Oil plants of Ragozin on Volga; plants of Nobel, Taghiyev, Shibayev, Naghiyev, Rothschild, Asadullayev, Ashurbekov and others in Baku; plants of Frolov, Roys and Petukhov in Saint-Petersburg had been receiving lubricants made from Baku oil which had successfully replaced the American lubricants in England, France, Belgium, the Netherlands, Norway, Denmark and other countries in Europe.

In this case it worth noting that the most famous brand among Russian oils had been "Bakouin". In fact, the firms selling lubricants in Great-Britain from Russia had been just two: "Nobel Brothers" and "Kerosene-oil production society".

Already, in the early 21st century, the capacity of oil plants in Russia had fully met the needs of the Empire in lubricants of high quality ("Survey of Baku Oil Industry for 1892, Baku, 1893, page 105). Oil products generated at the Baku plants and the large part of crude unrefined crude oil had been exported from Baku four ways: The Caspian, the Trans-Caucasus and Vladikavkaz (Baku - Petrovsk) railways and very few volumes had been transported by carting. So, in 1904, all export of oil and oil products was equal to almost 492.1 million poods.

Already in 1897, out of the overall volume of oil extracted in Russia had been at the level of 487 million of poods. 458

million poods had been extracted in the Baku oil region. But, the largest consumers of Baku kerosene had been England, Turkey and Greece after Russia.

It is due to the fact that in the 1890's, Baku oil had already become the main goods to be transported by the Volga fleet which gets more speedy development: in 1881, the first river-floating paddle tankers named "Kalmyk" and "Tatarin" with the capacities of 40 and 50 thousands poods as well as two metallic barges "Nadezhda" and "Vera" had been constructed in Sweden by the order of "The Nobel Brothers". All of them had been used exclusively for the transportation of kerosene. Metallic barges of large sizes (150 meters in length and 20 meters in width) had practically avoided any kerosene leakage and had been twice as durable as the wooden ones, but the cost was very high. For this reason, at the end of XIX century, they were owned only by large firms - "Nobel Brothers", "Caucasus and Mercury", "The Caspian and Black Seas Society", "S.M. Shibayev", "M. Naghiyev", "S. Asadullayev" and others.

The formation and development of the Caspian and Volga fleets at the end of XIX century had paid the great importance for delivery of oil fuel from Baku to large Russian cities, and favoured the rise of shipyards and ship repairing industries of Povoljye. The creation of the Caspian and Volga's fleet during the years of the 1880 - 1990 allowed the export of large quantities of Baku oil to various industrial centers of Russia. During that period of time, the oil fuel from Baku had to pass the itinerary of 2900 versts by Volga-Caspian maritime lines and it had been the main important cargo in internal maritime lines of Russia.

In 1914, the oil transportation operations by Volga had been dominating the structure of goods flow which meant that the formation of the powerful oil-loading fleet in Volga.

"Nobmazut" cartel (merging of "Nobel Brothers" firm with Rothschild Trading and Transportation Enterprise "Mazut") had fully dominated the markets of the Russian Empire: in 1913, 72 of metallic tank barges out of 160 in Volga had been owned by "Nobmazut" (46 owned by "Nobel Brothers" firm and 26 - by "Mazut" enterprise).

The speedy development of the Azerbaijani oil business had mainly impacted on the significant influx of foreign capital (Nobel, Rothschild, Vishau and others) which had been drastically entered into the oil industry of Russia. In fact, this access of capital had been accompanied by the parallel ousting of the Russian and Baku entrepreneurs not only from oil extracting industry, but also the oil products trading. Suffice it to say that at the end of XIX century, "Nobel Brothers" and "The Caspian and Black Society" of Rothschild had to 70% of all oil trade in Russia.

The foreign capital had been favoring the steep rise of oil extraction and the booming development of fields servicing oil fields and oil refining plants (in that time, additional port berth and power plants had been under construction). Baku is conquering the third place after Saint-Petersburg and Moscow by the capacities of its power plants. Large joint-stock societies had been established to service oil fields: "The Caspian Machinery and Boiler's Plant", the mechanical workshops of "Nobel Brothers", "S.M. Shibayev", "Caucasus and Mercury", , the workshops of "Nadezhda", "Eastern Society of Warehouses", the mechanical and cast-ironing plant of G. Bartdorf, docking for ship repairing of A. Dadashev and others. In this case, more than a half of emerging mechanical production plants had been mainly used to repair ships, because the maritime transportation had dominated the transportation of the extracted oil.

The richness of the oil reserves, cheap manpower and of

course, large profits which had been brought to the oil industries by oil business, speeded up the influx of foreign currency into Russian (Azerbaijani) oil industry. This enabled the decision of the Special Conference taken on May 1, 1880 about the inadmissibility of foreigners to the oil fields within the Baku region.

Later, in 6 July 1898, the Russian government had issued the Special decree which had allowed foreigners to conduct freely oil exploration works on public lands together with the Russian nationals, get allotments for its subsequent extraction as well as participate in forthcoming sales in leasing oil-rich areas.

Staunch defenders attracting foreign capital to the Russian oil business were the following: the Grand Duke M. Golytsin, Chief Administrator of Civil Affairs in the Caucasus and S.Yu.Vitte and V.N. Kokovtsev - finance ministers of Russia.

For example, the Grand Duke M. Golytsin wrote: "The Caucasus is a different situation and it is still hard to go without foreign capital. In particular, the entrepreneurial skills of Russian capitalists are not enough. Absence of free capital, premature status of manufacturing and productive industries, and low level of agriculture, lack of technical knowledge and weak entrepreneurial initiatives of local population will stagnate for the economic growth of this area. In such conditions, it becomes impossible to reject the participation of foreigners in the economic life of the Caucasus, the strict prohibition for them to buy immovable's will result in the halting of influx of fresh foreign capital to this land and damage economic interests. ... Overall and incontestable limitation of activities of foreign enterprises in the Caucasus will be equal to the stalling of this prosperous industry of the country".

The Earl S.Yu.Vitte (finance minister for 1892-1906) used to mention always in a special meetings for oil business: "...Competitiveness of our oil products in worldwide market is absolutely unthinkable without attracting foreign and in particular, British entrepreneurs and their capital".

The Earl V.N. Kokovtsov (minister of finance from 1906 to 1914 and starting from 1911 - the chairman of the Council of Ministers) in his conversation with an employee of "Times" declared that "... he thinks it necessary to support the British capitalists who invested money into Russian oil enterprises because the Russian capitals are not enough for these affairs. The issue of legalization of joint-stock societies will be solved in the Council of Ministers due to various opinions of some members of the Cabinet and he will vote in favor of the British".

From 1901, the foreign capital strived to monopolize fully the oil economy. The British companies had been very active in this venture: from 1898 to 1903, the British entrepreneurs had invested 60 million rubles into oil extraction and expansion of their oil fields. But, their interest the Baku oil business had emerged long before.

Already in 18th century, the director of British-Russian Trading Company I. Hanway (1741) and the traveler G. Foster (1784) went in Baku and noted that Baku residents had been using gas for boiling water, cooking and lime burning for a long time. They had used oil to protect their roofs from atmospheric precipitations. In 1754, J. Hanway published in London a book entitled "The Historical Survey about the British Trade in The Caspian Sea where he had broadly described not only the problems in trade, but also the status of the oil business in Baku.

In 1884, Boverton Redwood, the secretary of the London Oil Association visited the Absheron and later, presented his

extensive report at a meeting of the Society of Chemical Industry about the status of oil business in Russia and concluded that "...the Baku oil sources are so rich in oil that the Russians are able to supply kerosene and lubricate all the world" (Gorniy Jurnal, 1885, chapter 1, page 349).

The British scientific journal "Engineering" (1885) published an extensive article about the success of the Baku oil business which had analyzed its status since 1864 and had even suggested that in 2-3 years, Russia will be able to install its control over markets of the Northern Europe and in nearest future, will become a strong competitor for Americans in countries neighboring the Black and Mediterranean Seas not mentioning the Far East and India (Torgovy Listok, 1886, 22 February).

The analogical conclusion of the competition of both superpowers was also made by Charles Marvin, the journalist already known to us. In his brochure called "Forthcoming inflow of the Russian oil" in 1886 he wrote: "Sooner or later, America must give up first place in favour of Russia". Later, he said that "...the Russian oil business had been too attractive to be avoided by England" and for having better access to Baku oil business, Charles. Marvin was set to profit from the construction of Baku - Batum (as it is already known that the construction of the pipeline had started in 1897 and was completed exactly after 10 years later).

As the patriot of his own country, Marvin had hoped that "...the Russian oil pipeline together with all its accessories, machines, pumps, reservoirs and other staff will not cede to the Germans or Belgians" (The Gorniy Jurnal, 1887, chapter 1).

In 1886, a British company called "John Russell & Co." sent representatives twice to the Caucasus; Stuart, the representative of the London Trade Chamber and Peacock, the

British Vice Consul in Batum had been present at the III Congress of Baku Oil Industrials (March - April 1886). In his report, Stuart expressed his opinion against the purchasing of kerosene plants to the British by explaining that Great Britain's main interest should be the sales of oil products.

In 1897, the British had purchased fields from H.Z. Taghiyev for 5 million rubles and generated more than 7.5 million rubles (net profits) in these oil fields after two and a half years. It is necessary to note that Taghiyev had sold his oil enterprises to get an access into other fields the Azerbaijani economy. In this case, he had retained his shares for the amount of 1.6 million rubles of "Oleum" society created at the expense of these enterprises which had enabled him as a large shareholder to continue accumulating assets at the expense of the oil industry. It is exactly in that period Taghiyev invested significant capital into textile, food processing, civil engineering industries, shipyard and fishing. For example, in 1890, Taghiyev purchased "Kaspi" (Caspian) shipping society for 1 million 136 thousand rubles by establishing the company with 10 ships. "The Caucasian Joint-Stock society for processing fibrous materials" with the main capital of 2 million rubles founded in 1897 had been the largest enterprise in textile industry located near external boundaries of the Empire.

"H.Z. Taghiyev" (1872-1897) in the 1880's-1990's owned multifaceted assets and large enterprises in the oil industry. He kept fourth place (following the "The Nobel Brothers", "The Caspian and Black Seas Society" and "The Caspian Company"). In 1885, the company had extracted 7 million poods and produced 2 million poods of kerosene.

The largest joint-stock society ranking behind the "Nobel Brothers" had been the society called "A.I. Mantashev" founded in 1889. Its oil extraction containers had been esti-

mated from 25 to 49 million poods, while the overall capital in 1909 reached 27 million rubles. In 1907, the plant of Mantashev had produced 5.6 million poods kerosene.

In that period, the company of the Baku oil industrialists like Musa Naghiyev and Shamsi Asadullayev had been ranked as the large ones (they had been subsequently founded in 1887 and 1893). The annual oil extraction obtained by these firms had been between the levels of 7 - 12 million poods. They had at their disposal oil fields, oil refineries and oil-loading tankers. Main capital of the firm "Naghiyev Musa" in 1907 had been equal to 10 million rubles; in 1904-1910, they had held 6-7 places among oil firms of Russia. In order to perceive the importance of the firm "Naghiyev Musa" in 1907, we should note that it had had 10 votes in the Council of the Baku Oil Industrialists Congress (the largest oil firm in Russia "Nobel Brothers" had had 18 votes in the Council of the Congress).

The oil fields owned "S.M. Shibayev" was bought by a British man (James Vishau and others in 1890) it had already yielded 1 million rubles net profits after one year. "The Nobel Brothers" in Saint-Petersburg had purchased from the oil industrial I. Hajinsky the oil fields in Romany on April 10, 1902; then, in 17 October 1905, the same firm is purchasing oil fields from the industrial A. Adamov at the basis of consent given by the Committee of Ministers.

In 1904, Great-Britain had need for 47% of Baku kerosene and this figure was 71% in France. However, an unfair treaty concluded between Baku oil industrialists and the American syndicate "Standard Oil" of John Rockefeller had had the negative consequences for the export of Baku kerosene.

*John Rockefeller Davison (1839- 1937) is the largest industrialist. One of the most outstanding personalities of the American financial business. Thanks to his knowledge, his way*



*John Rockefeller*

*of reasoning and using several successful combinations with railroad tariffs, he became not only the largest oil king in the world, but subordinated to a whole range of banks, railroads and countless number of various enterprises of the extracting and refining industries. When he was just 26 years old, he decided to buy a small oil refinery in Cleveland (the State of Ohio). Starting this way, J. Rockefeller controlled almost 10% of oil business in USA at the end of the 60's.*

*Creating his own company called Standard Oil (1870) in that period (together with his brother William), he had propelled his business ahead in such manner that this firm became fully integrated in 1879. In 1882 he reorganized Standard Oil Company into Standard Oil Trust. According to the decision of Supreme Court Justice, in 1911 Rockefeller's Standard Oil Trust was divided into several oil companies: Standard Oil New-Jersey (now - Exxon), Standard Oil New-York (Mobil), Standard Oil California (Chevron), Standard Oil Indiana (Amoco) and Standard Oil Ohio (BP America). In 1913, assets controlled by Rockefeller reached 17.5 billion US.*

*At the beginning of the First World War (1914), 4 large entities had dominated the Baku oil industry: "Nobel Brothers", the British-Dutch Transnational Trust "Royal Dutch Shell", the Russian General Oil Corporation "Oil" and the financial oil company called "Neft" ("Surveys of the Baku oil industry for 1915", Baku, 1916, chapter 2, pages 235-331).*

*The Russian General Oil Corporation which "Oil" was*

founded in London (1912) by the largest Russian and Foreign banks had united almost 20 firms ("Mantashev A.I.", "Sons of Lianozov G.M.", "The Moscow-Caucasus Trading Society", "The Caspian Company", "the Russian Oil Industrial Society", "the Absheron Oil Society" and others) the. Main capital of "Oil" in 1914 was equal to 23 million rubles. While assets of merged firms in 1917 had reached 125 million rubles and had been controlled by the Russian-Asian Bank.

62% of oil extracted in the Empire as well as 2/3 of kerosene and mazut production had been met in 1914 by the following companies: Oil, Shell and the Nobel Brothers.

The largest British oil firm in Baku was a company called Shell. It was founded in 1892 (headed by Marcus Samuel-Junior) and owned more than 340 oil terminals from Baku to Shanghai and 30 cruise ships. All these assets enabled this to supply permanently the large areas from Aden to Vladivostok with Baku oil. In total, at the beginning of the XX Century, the British industrials had controlled 11% of Baku oil fields. And if in the Russian oil industry, the main competitors of Shell had been Nobel Brothers, but at an international level, the American syndicate Standard Oil remained as their main competitor being as the subject of a sheer and uncompromising battle by Shell to be the full monopoly in world market.

*Marcus Samuel-Junior (1853-1927) was born in London to an emigrating Jewish family. During a relatively short period of time, he had gained success in oil business and founded the powerful transportation-trading company called "Shell Transport and Trading Co.", which had been administrated jointly by his brother Samuel and Freud Lane. The company had been named in the memory of enterprise of Marcus Samuel-Senior who used to trade goods made from the ordi-*



*Marcus Samuel-Junior*

*nary shell. Starting from that time by the symbol of Shell became this ordinary marine shell. Among goods sold by this company the oil products produced and processed in Baku had the dominating place.*

Marcus Samuel-Junior had visited Baku for the first time in 1890; during that period of time, Azerbaijan used to extract already more than 60 thousand barrels (8000 tons) of oil per day mainly due to the efforts of such entrepreneurs like Nobel

Brothers and the Rothschild's. The first tanker of Shell had traversed the Suez Canal on August 23, 1892 by laying the foundation for future development of Shell and later, known as Royal Dutch Shell.

Starting from 1907, the merging of two large firms - the British Shell and the Dutch Royal Dutch into the integrated transnational Trust called "Royal Dutch Shell" under the leadership of Henri Deterding had taken place to mobilize efforts in competing with the American syndicate. 60% of the Trust's shares had been owned by Royal Dutch and 40% by Shell. In Baku (1917), the Trust had united the following firms: "The Caspian - Black Seas Society", "Caucasus", "Shibayev S.M.", "Souchastniki", "Mazut", "Petro-Baku" and "the Russian Oil Society". The oil production plants of the Trust in 1914 had secured the fifth part of oil extraction in Russia; oil extraction by Royal Dutch Shell only in Baku oil fields had been 57 million poods in 1914. While in 1915, the share of the Trust within Baku oil region had been 13.4%



of overall extraction (Survey of Baku Oil Industry for the year of 1915, chapter 1, pages 57-60 and chapter 2, pages 2-19).

*In 1890, Royal Dutch was established in The Hague. Its director was August Kessler, a talented entrepreneur who started to explore the oil reserves of Sumatra. After the death of A. Kessler in 1900, the position of director-administrator and later, chairman of board of the directors of Henri Deterding (1866 - 1939), prominent Dutch businessman. He had been the prolific of making the co-operation with Shell to compete against Standard Oil. "Royal Dutch Shell" (headed by H. Deterding from 1907 to 1937) had had in its disposal own oil pipelines, the large number of oil refineries, oil-loading fleet with overall capacity of 1.6 million tons and the sophisticated trading network. The share capital of the Trust had been equal to more than 2.5 billion rubles in their exchange value. H. Deterding had been named as "the Oil Napoleon" by his contemporaries.*

John Rockefeller did not miss a chance to get access into the Baku oil industry. The Syndicate "Standard Oil" had seconded geologists and oil specialists already in the summer of 1898 to Shemakha uyezd. Having explored this region; specialists had concluded that there are industrial oil reserves in the lands of this area. Later on, in 1902, Rockefeller was ready to refuse credit proposed in Japan to be used by him the to



Henri Deterding

get the authorisation to purchase oil fields in the Caucasus.

In this way, Standard Oil tried by any means to conquer positions which were taken by the entrepreneurs of the Absheron in the Russian oil markets. However, the Entrepreneurial Union of Baku Oil headed mainly by The Nobels and the Rothschild's had literally erased all Rockefeller's efforts.

In order to compete against the syndicate "Standard Oil" in the European markets, the European Kerosene Union was established in 1906 in Berlin ("Europäische Petroleum Uniongesellschaft") with the initial capital of 20 million marks. This Union had been spearheaded by the German Bank, the firm "Nobel Brothers" and the Paris Banker's House Rothschild's; they relied upon the solid oil resources of Russia, Romania and Austria. Later, in 1907-1908, the British-Dutch Trust "Royal Dutch Shell" who had also joined this European Union. Launching wider activities in England, the Netherlands, Switzerland and other countries, the Union had become the real menace for Rockefeller. In 1913, the Union's capital had reached 37 million marks, 20 millions of which belonged to the German bank and 17 million marks to the "Nobel Brothers" and the Paris Bank Rothschild's. ("Trading and Industrial Newspaper", 1913, #61).

All companies mentioned above, which made up part of the Trust "Royal Dutch Shell", the main exporter of oil products, had been "The Caspian -Black Seas Oil Society" (founded by Alphonse Rothschild in 1883) realizing 36% of all export operations and being the second oil extracting C.O after "Nobel Brothers". The Society of Rothschild's had possessed 264 wells; their fields and plants had been serviced by almost 1400 workers. It is interesting to say that one of the administrators of the Rothschild's brothers in Baku had been

Adolph Guhmann, famous engineer-technologist and follower of L.G. Gurvich; meanwhile, oil fields administrator had been David Landau (father of Nobel Prize winner for physics in 1962 - Lev Landau).

The following list of foreign customers of kerosene and lubricants supplied by "The Caspian - Black Seas Oil Society" reflected in "The Survey of Plants and Facilities of Trans-Caucasus": Great Britain, France, Austria, Belgium, Turkey, Greece, Germany, Italy, the Netherlands, Portugal, Malta, Transdunay counties, Japan, China, Algeria, Indochina, and the Philippines. In general, the Rothschild's had exported from Baku via Batum 27 million of 600 thousand poods of kerosene. During three years prior to the First World War, Rothschild's sold a large part of their oil shares to the main competitor - Standard Oil - "Royal Dutch Shell".

The financial oil corporation called "Nefit" which was the creation of P.I. Gubonin, used to represent the interests of the Russian society for extracting, transporting, and storage and selling of oil products. Its main capital controlled by the Russian-Asian and Petrograd and Loan Banks had been at the level of 33 million rubles in 1916. The Corporation owned the kerosene and chemical plants in Baku and united such firms as "The Baku Oil Society", "Nefit", "Balakhani-Zabrat Society" and others.

Besides all above mentioned large societies in Absheron, there had been also several medium sized entities. For example, "The Oil Industrial Financial Corporation" of Herbert Allen founded before the war and consisting of three British companies in Baku: "The Baku Society of the Russian Oil" (founded in 1898), "The Oil and Liquid Fuel Society" (formerly called "Oleum", founded in 1898) and "The

European Oil Company" (founded in 1901). The Corporation of Halle had had the total share capital of 29.6 million

rubles; while the overall volumes of the extracted oil in 1915 had been equal to 17 million poods (Survey of Baku Oil Fields for the year of 1915, chapter 2, pages 2-19).

The overall amount of foreign currencies invested into the Baku oil business up to 1917 had been 111 million rubles. In 1917, 60% of the oil extraction and 75% of oil products sales in Russia were in the hands of foreign companies.

Documents prove that 70% of capital investments into the oil industry belonged to foreigners: French, British, German, Americans and Swedish businessmen., on the 31st of August 1915, "The Novoye Vremya" (New time) newspaper wrote in its article entitled "War and German monopoly of Russian oil": "...Efforts of Russia enemies are firstly directed to destroy its national productive forces... It is interesting that Rothschild, who had taken part in the agreement with the German bank soon before the War, cancelled his participation in the enterprises located in The Caucasus. We can suppose that Rothschild firm in Paris knew many things" (The State Historical Archives of the Republic of Azerbaijan, Fund 92, Inventory 4, Folder 24, page 8).

The First World War resulted in complications and further breakdown of the contacts of Russian (Baku) monopolies established earlier oil monopolies of Europe and the USA which had ensured the regrouping of forces in oil industries of Russia.

The historical events taking place in Russia in 1917 prevented further advancement of foreign capital in the Baku oil industry. In June 20 1918, the Sovnarkom RSFSR approved "the Nationalization of Oil Industry" which declared all the oil industries of Russian as the property of people. 272 private oil companies located in the Baku region were liquidated...

To conclude , the services of the largest Azerbaijani oil

industrials should be noted: - Haji Zeynalabdin Taghiyev (1838 - 1924), Musa Naghiyev (1842 - 1919), Shamsi Asadullayev (1840 - 1913), Ajdarbek Ashurbekov (1855 - 1921), Isabek Hajinskiy (1861 - 1919) and Murtuza Mukhtarov (1855 - 1920) they played a positive role in the development of oil business in Azerbaijan and Russia as a whole.

In this light, if the first five oil barons had been mainly extracting oil and refining, M. Mukhtarov was specializing in the production of equipment for the oil fields. His firm had ensured drilling, repairing and transporting services. In 1895, he created the modernized machine of rod system drilling and got the patent for that. At the end of XIX century, Mukhtarov commissioned the whole of drilling equipment in Bibi-Heybat: this had been the first industrial enterprise for production of oil equipment in the Russian Empire.



*Haji Zeynalabdin Taghiyev*

*Haji Zeynalabdin Taghiyev was one of the most famous and respected oil barons of Russian. He came from a poor family; he climbed the ladder from an ordinary bricklayer up to a businessman-millionaire. The company "H.Z. Taghiyev" founded in 1872 turned into a very powerful oil industrial institution for more than 25 years, it united all fields of the oil business. Taghiyev had put investments into all spheres of the national economy: oil extraction, construction of trading centers, flour mills, fishing etc. His name was linked to the*

*construction of the first textile plant (commissioned in 1900), which later became the main foundation of the light industries in Azerbaijan, including the first craftsmanship college in Mardakan (1892), the first women's grammar school in Baku (1895), the first gardening school in Mardakan (1899), the first Dramatic Theater and Shollar potable water pipeline. Thanks to his wide charitable activities, H.Z. Taghiyev was recognised by his contemporaries as an outstanding personality in many fields: He was awarded many orders and medals of Russia, Persia and the Emirate of Bukhara. Since 1881, he published in Baku "The Kaspi" (Caspian) newspaper which had mobilized many leading intellectuals of that period of time: Ahmetbek Aghayev, Alibek Huseynzade, Alimardanbek Topchibashev (newspaper's editor) and others. In 1897, he founded "the Caucasian Joint-Stock Society for Fibrous Materials Processing". In 1901, Taghiyev opened the Baku Women's*

*School and in 1906, H.Z. Taghiyev and M. Mukhtarov had an impact on the formation of the educational societies in Baku like "Neshri-maarif" and "Nijat" which played a significant role in enlightening the population and the rise of national identity. He also established the Baku Commercial Bank in 1914 to conduct trading operation jointly with other local entrepreneurs and was elected as the Chairman of the Board of Directors of the bank. In 1916, Taghiyev established "The Joint-Stock Society for the Fishing Industry of Taghiyev" which ran its activities in Azerbaijan and Dagestan. H.Z. Taghiyev was kind enough to realise charity works: he constructed schools, including the school for girls; a theater, which is still functioning; established newspapers and journals; hundreds of young students studied in England, Germany, France and Russia thanks to his funds, including famous personalities as Mamed Emin Rasulzade and Nariman Narimanov.*

*Musa Naghiyev is another prominent oil baron. Born in to a*

very poor family, he succeeded to become a millionaire due to his specific skills in 1915-1916, the assets of Taghiyev were equal to almost 6 million rubles in gold. M. Naghiyev had constructed many mansions in Baku - he had owned hundreds of buildings. Still today, there are plenty of beautiful buildings built from the basis of his funds.

Among them, we can name the following: a two storey building located on the 28 of May street, Winter Club (called now the Officers House named after Azi Aslanov), hotels Astoriya and New Europe (currently known as Gey-Gel), the building of a hospital (named after himself), the picturesque building of "Ismailiye" constructed in honor of his elder son Ismayil (currently, known as the Presidium of the



Musa Naghiyev

National Academy of Sciences of Azerbaijan) and others. Of which deal with the drainage of Bibi-Heybat Bay: the construction works for the drainage purpose (almost 70% of projected works had been completed by 1917). After having constructed the elementary technical school in Baku, he led this institution and paid the fees for 25 Azerbaijani children.

**Shamsi Asadullayev** - the famous oil baron and the influential businessman not only in Baku, but also far beyond its boundaries. Shamsi became a millionaire thanks to the oil boom, his creativity and talent. In 1983, founded the oil extraction firm called "Shamsi Asadullayev" with the capital of 500 rubles. In 1913, the capital of his firm was already equal to 10 million rubles. Maritime ships owned by Asadullayev had been

traversing The Caspian Sea and Volga; as far as marine and inland-waterway tonnage of all oil and oil products transporting ships are concerned. Shamsi was just behind the Nobels. Immediately as a new Nobel ship called "Zoroaster" came to light in the Caspian, Asadullayev is purchasing three oil tankers - so-called three "A" - Asia, Africa and America. In accordance with data given in the compilation called "The Documents of the Baku history for the years of 1870-1917", the overall length of



Shamsi Asadullayev

oil pipelines possessed by Nobel's firm had been at the level of 17 versts, while Sh. Asadullayev had 12.5 versts. He had opened his representative offices in Russia, Turkey, Iran and other countries of Europe. Alongside the oil business, Asadullayev was charitable, he used to build houses, open schools for children from vulnerable families. The large sums had been allocated by him for the construction of the Baku Real College (currently, known as the Azerbaijani State Economic Institute). The first ever Azerbaijani Ziverbey Akhmedbekov completed his studies in the Institute of Civil.

Engineers of Saint-Petersburg in 1901 thanks to the funds of Asadullayev. Later on, this prominent architect became the author of projects of Ajdarbek, Taza-Pir, and Mukhtarov (located in the settlement of Amirajani) Mosques. Still now, there is a building in Maly Tatarsky pereulok in Moscow constructed from the funds of Sh. Asadullayev and gifted by him to the Tatar Cultural Society. (In this building, the All-Russian

Congress of Muslims began its work on May 1st, 1917 where the number of participants had been 900 delegates instead of the planned 500, including Mamed Emin Rasulzade, Alimardanbey Topchibashev, Akhmet Tsalikov and others). The geography of the entrepreneurial activities of Sh. Asadullayev started from the Persian shores of the Caspian Sea and ended with the boundaries of European cities. In the jubilee edition called "300 Anniversary of the Romanovs' house in power", 8 of the most famous Azerbaijanies are named in the section "Trade and Industry". The first in this rank was Shamsi Asadullayev. There is also another interesting fact: one of granddaughters of Asadullayev was called Umm-Banin (who became the prominent French writer) and her writings have been read across all of Europe.

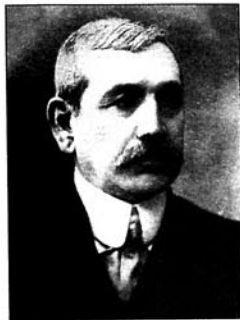


*Ajdarbey Ashurbekov*

*Ajdarbey Ashurbekov - the famous oil baron and the prominent representative of the large dynasty of the Ashurbekovs in Baku. Thanks to his knowledge, prestige and tremendous wealth, he was a much respected man among local and Russian elite. Ashurbekov was among those who welcomed the Emperor Alexander III on his arrival to Baku early October 1888. At the end of the XIX century, Ashurbekov got involved in the oil business: in 1893, the oil fountain in one of his wells in Sabunchi made*

*Ajdarbek a millionaire. After this venture, he purchased 5 additional oil wells. Two of them were administrated by himself, and the other three he rented to "The Nobel Brothers" firm and*

the last one to "S.M. Shibayev" firm. Like other oil barons, A. Ashurbekov played an important role in economic, social and cultural development of a pre-revolution Baku. The Famous Blue mosque situated at S. Virgun street in Baku was constructed with his finances in 1912-1913. (Currently, the city residents call this solemn Temple as the Ajdarbey's Mosque). Ashurbekov was a member of the Oil Affairs Committee headed by the Baku Governor.



*Murtuza Mukhtarov*

*Murtuza Mukhtarov - an oil baron; the origins come from a very poor family. As it is with other Baku millionaires, he made his fortune in oil, but his name is also linked to the development of modern technologies and equipment for oil production. Without having any special education, he was a self taught talented inventor. The drilling instrument invented by him was known all over the world under the name of "Mukhtarov" and was exported to many countries. (After the society "Murtuza Mukhtarov",*

*The following large societies of contracted drilling and the mechanical workshops famous in that epoch: "Molot", "Rapid", "Votan" and "Robur"): The Mukhtarovs adopted a young singer - the future star of the Azerbaijani (and of the Soviet, in general) opera - Fatma (Katya) Mukhtarova. Many fundamental buildings, which were funded by Mukhtarov, we can name two mosques with a couple of minarets in Amirajani and Vladikavkaz, the dome of Mausoleum of the Akhund Abuturab in Mardakan and the splendid mansion (now, a*



Isabek Hajinsky

*Wedding Ceremonies Palace) situated in one of the central Baku streets which is named after him.*

*Isabek Hajinsky - was a successful and the biggest Baku oilman. He owned oilfields in Absheron, Northern Caucasus and Turkmenia.*

## ESSAY IV

### CONTRIBUTIONS OF THE NOBEL BROTHERS TO AZERBAIJAN'S OIL BUSINESS

With years people whose external successes were casual, are erased from memories. As regards to those who influenced development of a science with their works and discoveries, their ranks as time passes absolutely become forgotten, but their names remain in history.

*Nikolay SEMYONOV  
(The Nobel Prize winner)*

The established date for the company "Nobel Brothers Oil Extracting Partnership" (hereinafter, simply "Nobel bro." company) was the 18th of May, 1879, however the activity of the Swedish family in the Absheron began earlier ("Joint-stock company of Nobel Brothers Oil Extracting Partnership" was formed and established by emperor Aleksander II with a telegraph address "Branobel").

Already in 1873, the eldest among the Nobel brothers - Robert (1829-1896), was in the Caucasus with an assignment from his younger brother - Ludwig (1831-1888), for the preparation of using wood for gun butts. Quickly having estimated an "oil" situation in the Absheron peninsula Robert invested his available capital into the oil business. The business was certainly risky, but he already had some experience of the organization in the trading of kerosene in Finland. Robert considered that the oil business would have good prospects as the Russian market at that time was filled up with imported (American) oil products.



Robert Nobel

Starting from 1875 the activities of the "Nobel" Brothers in the oil industry of Azerbaijan became more active. A charter capital for the company, founders of which were Robert, Ludwig and Alfred (1833-1896) Nobel, and also P.A. Bilderling, P.Y. Zabelsky, F.A. Blumberg, A.A. Bilderling, M.Y. Belyamin, A.S. Sundgren and B.F. Vunderlikh, was 3 million rubles for the first year of its existence. All processes within the company started from the exploration of the oil fields and ended with the sale of final oil products, which were supervised by the brothers.

In the autumn of 1876,

Robert due to a state of bad health left Baku, urgently calling Ludwig from S.Petersburg to continue the business started by him. Here, it is worth to emphasize, that Robert played the role of path breaker for the Absheron oil company. Actually he performed pioneering work, laying the basis for the company. Starting from 1876, Ludwig was engaged in a new business, which (as time would show) he would participate in up to the end of his short life.

For the first time Ludwig together with his son Emmanuel visited the Absheron (Baku) in April 1876. Here is his first impression: "Abundance of oil sources on the Absheron peninsula are so great, that they can be named as inexhaustible".

It is worth to note, that the youngest brother Alfred, (the founder of the well known International Prize), was not directly engaged in the companies affairs. However he rendered essential material aid to his brothers. Despite numerous and persevering invitations, he did not visit Baku or the Baku oil factories. He remembered the conflict with his father which happened due to nitroglycerine, therefore during his life he evaded, in every possible way, any cooperation with the members of his family.

However, Alfred was the owner of the biggest Russian oil company in Baku the "Nobel bro.", and in difficult times, in every possible way, rendered moral and financial support to the brothers. Oil pipelines, with which the "Nobel bro." company incorporated the oil areas of Baku, were invented by Alfred, as he was the person who offered the brothers the idea of delivery of crude oil from the oil fields or oil plants to their destination points. He also advised Ludwig to use oil vessels not steam boilers, with internal combustion engines.



Alfred Nobel

During crisis periods of the company, Alfred came to the city of his childhood S.Petersburg and checked all financial accounts, gave certain orders relating to reduction of costs and took part in board meetings of the company. Later, together with Ludwig he achieved getting credit from the National bank of Russia, having used stocks belonging to him as a deposit.

Ludwig wrote to his brother in Paris: "I am taking all safety

measures both for the bookkeeper, and the businessman, with a decision to carry out the duty with determination... You render invaluable support to us, and I hope, that sometime people will accept, that "the Partnership of the Nobel Brothers" - is only Ludwig Nobel".

For example; knowing the value of kerosene, Ludwig decided to use mazut (black oil) for heating steamships and steam locomotives. In order to start the process with confidence he consulted his brother, sending him a letter to Paris where he requested him to provide exact data on mazut. Soon he received an answer from Alfred where he advised Ludwig urgently and seriously to engage in this business, as "mazut" possesses a huge future... If it costs nothing or is very cheap, it is necessary to build tanks and to fill them for the future, in 5-10 years time "mazut" will bring us huge riches". Ludwig through figureheads started to buy "mazut" and to conclude long-term contracts.

In 1894, the "Nobel bro." company bought about 10 million poods of oil fuel under 21 contracts. In 1895 accordingly, they bought 32.25 million poods in Baku. The company was engaged in buying crude oil and the oil residues during the last decade of the XIX century. Owing to these activities L. Nobel became the real "black oil king" of Russia at the end of the XIX century. Between 1893-1901 due to an increase in volume of oil consumption in the country from 144.5 to 286.4 million poods the shares of the "Nobel bro." company in terms of "mazut" increased from 28 to 96 million poods, that is, more than three fold.

Similar to the example of the "Nobel bro." company, other large oil companies were also engaged in buying crude oil and oil residues in 1890. Thus, Sidor Shibaev's company constantly bought crude oil and oil residues from small and medium-sized companies during the last decade of the XIX

century. These operations took place according to long-term contracts and under firmly established prices.

Having taken the management of the company completely in his hands, (Ludwig was the first chairman of the board of Partnership until his death in 1888), L. Nobel with his persistence and great organizational skills reached enormous successes. The "Nobel bro." company became the "oil leader" by the end of the XIX century, forcing out all foreign competitors from the Russian market.



*Ludwig Nobel*

Consulting and working together with known scientists and oil chemists (D.I. Mendeleev, K.I. Lisenko, L.G. Gurvich, A.A. Letny, R.A. Vishin, M.M. Tikhvinsky.) and engineers A.V. Bari, V.G. Shukhov, O.K. Lents, I.N. Strizhov etc.), Ludwig achieved significant success in all directions of the oil business.

Here it is pertinent to note that, it was Ludwig Nobel who sent the talented engineer A.B. Bari, who subsequently became the known factory owner in Moscow, to The USA to study the oil business. The first oil pipelines with a diameter of 3 inches and length of 8.5 versts in the vicinities of Baku (Balakhani - the Cherny gorod) were constructed by Bari for the "Nobel brothers Co." in 1878. The second oil pipeline with a diameter of 3 inches and length of 11.5 versts was also constructed by him for G.M. Lianozov in 1879. (The Encyclopedic Dictionary, printing house I.A. Efron, S-Petersburg, 1897. t. XX-A, p.937).



It was in the plants of the "Nobel bro." company where for the first time, continuous refining of oil proposed by D.I. Mendeleev was carried out in 1882. Here later, dephlegmators, which received target oil products of given quality, were installed (invention of V.G. Shukhov, the patent # 9783, and 1890) at factories of the "Nobel bro." company.

At the age of 33 Lev Gurvich, who came to Baku in 1904 with the purpose of deepening his knowledge on the technology of oil refining, would be the permanent head of the Baku chemical laboratory of the "Nobel" company for the periods of 1905-1910. Starting from 1911 to 1917 he was a scientific supervisor of the chemical laboratory in the central administration of the company in S.-Petersburg.



Gustav Eklund

Among the bright specialists working for The "Nobel bro." company, the manager of the oil fields (since 1893) Gustav Eklund should be emphasised. As his organisation of the strengthening of rigging works greatly increased the productivity of the oil fields of the company in Balakhani, Sabunchi, Romana, Svyatoy-Pirallahi islands and Cheleken. Gustav Petrovich, for the first time in the oil business, applied electric power at the above mentioned fields and introduced electric

pulling in the Baku oil fields. He also replaced former rope drilling - to stem drilling. He was one of the supervisors for the construction works of oil storage in Boyuk Shor (near Baku), and also the organiser of a system of oil counting (let-

ting it pass through special gages), extracted from the state fields.

It is also worth to note, one of the strongest directors of the board of the company- Carl Hagelin, who enjoyed the unlimited trust of Emmanuel Nobel. Charles, mainly, worked in Baku, where the core of all activities of the company was located, and in certain years he directly headed the Baku Branch of the company.

*Hagelin Carl Vasilevich (1860-1954) - A Swede, was born in Russia. Since 1890 he was working for the "Nobel bro." company. In 1899 he was elected as one of the directors of the company and was responsible for a fleet and for all the Baku enterprises. In 1906, he was appointed the post of Swedish General Consul in Russia and in 1923 he was elected as an honorary member of the Swedish Academy of Engineering Sciences.*

For a long period exploration works of the company were supervised by an outstanding expert in the field of oil business Ivan Nikolaevich Strizhov (1872-1953).

Large Russian oil producers, who were cooperating and at the same time competing with the "Nobel bro." company were Haji Zeynalabdin Taghiyev, Vasily Kokorev, Victor Ragozin, Musa Naghiyev, Shamsi Asadullayev, Isabek Hajinsky, Alexander Benkendorf, Sidor Shibayev and Murtuza Mukhtarov. Ludwig and Emmanuel Nobel (father and son) developed with H.Z. Taghiyev and I. Hajinsky and supported each other on many business matters.

Finally, the activity of the "Nobel bro." company in the Absheron gave a powerful impulse to the fast development of all areas of the Russian oil industry. The Baku oil area became the base, where powerful buildings later named Nobel's "oil empire" quickly grew. Not by accident, a Professor of Harvard University Robert Tolf, who was one of the researchers of this family named the "Nobel's" as the

"Russian Rockefellers".

It is enough to note, that in 1901, the amount of oil extraction in Russia was 11.5 - 12.0 million tons, while the same figure in The USA was 9.1 million tons. According to the data of newspaper-magazine "Oil business", the following companies "Nobel bro" - 7.80; "Naghiyev Musa" - 4.13 and "Caspian partnership" - 4.07 (in million poods) provided the maximal oil production on the Absheron, in May, 1901.

*L.E. Nobel was born on June 27th, 1831 in Stockholm. He came to S.-Petersburg together with his father, at the age of 11. After the departure of his father to Sweden in 1859, Ludwig stayed in Russia and worked at his father's factory. However, he could not manage to keep his father's enterprise and in 1862 he established his own engineering factory "Ludwig Nobel" in S.-Petersburg (nowadays the "Russian diesel" factory).*

After years, working in the area of mechanical engineering Ludwig analyzed an industrial-economic state of Russia, paying attention to the nonflexible customs policy of the Russian government, which did not stimulate the development of domestic mechanical engineering.

During the period of the formation of the Imperial Russian Technical Society (IRTS) in S.-Petersburg, in 1866, Ludwig would become not only one of the founders of the IRTS, but also an active

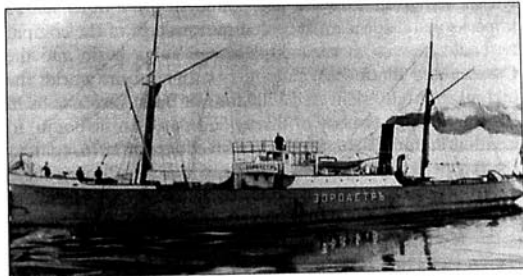
member of this Society, and starting from 1879 an active member of the Baku Branch of the IRTS (the BB of the IRTS). Among the founders and first members of the IRTS, were two industrialists L. Nobel and MacFerzen. Contemporaries evaluated the absence of interest to a new society from Petersburg industrialists as "enough disappointing fact". At a later time, the Russian entrepreneurs considered it a great honor to be a member of the IRTS. ("Swedes on coast of Neva". Collection of articles. Stockholm, 1998, p.277).

L. Nobel's huge merits in the Russian oil industry consist of the following:

1. Establishment of the company ("Partnership") unique at that time, engaged in all cycles starting from exploration, extraction, refining until delivery and the sale of the final products.

2. For the first time in the world the introduction of tankers for transportation of oil products by waterways. The first steamship "Zoroastr" was constructed under Ludwig's order at a factory in Motala city (Sweden) in 1877. It had a metal hull of 56m long, 8.2m in width and its displacement was 2.7m; "Zoroastr" was twin-screw tank truck with 19 metal reservoirs (it was designed to carry nearly 15 thousand poods or 246 tons of freight).

The origin of the name of the first Nobel steamship is curious. Starting from the middle of the XIX century passion for studying Zoroastr (Zaratushtra) was very popular; it had been progressively decoded by Europeans at the end of century. Nicshe published his famous essay "So spoke Zaratushtra". The French researcher on the Nobels Orlando



*Zoroastr - the first oil steamship in the world*

de Rudder supposed that, Ludwig being educated had been seriously interested in Zoroastrian philosophy, where the concepts on searches of purity and sanctity somehow reminded him of the procedure for oil refining. It worth to note, that L. Nobel's unique child (a steamship "Zoroastr") served for a long time. In the XX century the ship was flooded together with 7 other ships used for drilling. Jumping-off first place for oil wells on a sea area of Oil Rocks. Therefore, this area at the beginning was named "Island of seven ships". After "Zoroastr", other steamships appeared, all under names of the founders of religions and great figures of universal progress: "Buddha", "Magomet", "Moisey", "Spinoza", "Darvin", "Linney", "Nordensheld" etc.

The first metal tank barges "Elizabeth" and "Helen", appeared on the Caspian Sea in 1879, also were a property of Nobel brothers. They were, correspondingly, 75 and 172 meters in long, with a carrying capacity of 45 and 55 thousand poods. Altogether, the "Nobel Brothers Co." possessed 134 steam and 212 sailing ships.

With the advent of fleet tankers the price of kerosene in Russia fell from 2 rubles per pound in 1877 down to 25 kopecks in 1885. Steamships and motor-ships of the company could be seen in various places of Volga basin and the Caspian and Black seas. For the first time in the world, the oil tanker "Light" delivered 1700 tons of Baku kerosene from Batum, through the bay of Biscay and the Atlantic ocean, to London in June 1886. Shukhov's invention of 1876, (patent 1880) a perfect design of a sprayer, which is still used these days, made it possible to apply "mazut" as fuel for steam locomotives and river and sea steamships. Solar, developed in oil refineries of company had been used in diesel engines. Owing to its tank fleet the company expanded the export of Russian oil products, delivering them not only to Europe,

but also to Asian countries.

3. Construction of the first oil pipeline in Russia, Baku-Balakhani-Chorny gorod in 1878, carriage-tanks and also organisation of the whole system of warehouses equipped with iron tanks (the first such tank was constructed in 1879) not only in Baku, but also in many cities of Russia (Nizhny Novgorod, Saratov, Astrakhan, Tsaritsyn, Yaroslavl, Kronstadt etc.). In 1881, for the first time in the world the Nobel's started to transport oil and oil products by railway tanks. And later hundreds of tanks were running on railways with an inscription "P-ip of Nobel bro". The railway terminals of Warsaw, Kiev and Dvinsk were involved in the export of oil production to Europe. With construction of the Transcaucasian and the Transcaspien railways the company paid close attention to the supply of kerosene to Central Asia.. Ultimately, the activities of the Nobel brothers made Russian kerosene almost completely supersede the American market, becoming the most powerful competitor in the world market. As contemporaries were considering, L. Nobel's realization of oil pipelines, for the first time Russia became a rather important service in this area of the industry.

4. Financial support to the IRTS, which allowed the Society to carry out a number of scientific works in the field of mechanical engineering and oil industry (Territory "Oilgas", 2002, N9, p.38).

The Activity of the "Nobel bro." company proved, what can reach an innovative mind, the persistence and diligence of people, who laid down the aim to themselves - by bearing progress to society to be the first in everything and to lead everywhere. The efficiency of such work was obvious. In 1881, the commission on the development of rules for oil transportations and facilities of oil factories and warehouses was established, with the purpose of protection of the reser-

voirs and the rivers from pollution caused by oil products. Ludwig Nobel entered into the composition of the commission and became its most active member. In essence, it was one of the first large Russian commissions on the preservation of the environment. L. Nobel's election was not casual: he was the first, who possessed environmentally friendly (metallic) ships.

L. Nobel's tankers had high quality iron cases and it was characteristic that part of them worked up to the middle of the XX century within the composition of the fleet shipping company "Volgotanker". We shall note that all Nobel's fleet, which could escape civil war, became part of the fleet of "Volgotanker".

The company was constantly improving the production technology of oil products. At one of the kerosene factories in 1883, the cubiform battery (known under the name "Nobel's battery") for continuous refining of oil, designed by V.G. Shukhov and I.I. Yelin was installed. For the first time cooling towers for cooling technological water during hot summer times were constructed and used at Nobel factories.

The "Nobel bro." company extracted more than 26 million poods of oil (13.24% of all oil extraction) and manufactured more than 12 million poods of kerosene in 1888. (From the protocol of the session of the V congress of oil producers Baku, 1889, p.34). In 10 years time the company provided 17.7% of all-Russian (or 8.6% of the world's) oil extraction and supervised 50.1% of all-Russian kerosene distribution.

In 1900, the share of the "Nobel bro." company and Rothschild's "Caspian Black sea partnership" accounted for 21% of all extracted oil and 40% of all exported oil from Baku. In the beginning of that year, when the 6 largest oil-refining factories were manufacturing 44% of all kerosene, the "Nobel bro." was the only company manufacturing above

22 %.

Having monopolized the sales market in Russia the "Nobel bro." company began to export oil and oil products to Europe, India, China, Iran and other countries. In August 1902, the company for the first time started to carry out the export of Russian kerosene to Afghanistan through strengthening Kerki, which was situated 200 versts from the station of Charjou.

Here it is worth to note, that it was not that simple to manage Baku oil production, which brought fantastic profits. The competition among companies was leading to general mistrust (roughness and cruelty at times were reaching the limit). The fires in factories were not always accidents and often stopped production due to the discontent of the workers and turned to spontaneous striking.

The brothers, especially Ludwig, worked purposefully and persistently. The Swedish historian Eric Bergengren, who had access to archives of the "Nobel" family marked, that "everyone in the Nobel family was the owner of high moral qualities and was always ready to undertake something, and hope for success with present continuity for the started work.

The employee and biographer of A. Nobel, Ranyar Sholman (or Ragnar Sulman) recollected: "Alfred belonged to that type of owner, who aspires to keep a distance between him and others. He never crossed the border separating him from the workers. This was a total contrast to that of Ludwig who constantly worried about the conditions of the workers and who rightfully could be considered as a pioneer of social progress both among the engineers, and the lower personnel".

Ludwig's words speak for themselves: "Life without effort to me is not a life, and I do not think that I have the right to leave the work started by me. We all entered into this togeth-

er and those that serve my father and me will not be as financially secure all their life as I am".

Speaking at the IRTS assembly on October 15th, 1882, with a report "on the state of the oil industry in Russia" Ludwig emphasized: "... I have already for more than 20 years tried to apply to my enterprises, which makes each person who works with me, the participant of achieved results, that is, the one who shares my efforts, could have a right to share my success too".

L. Nobel's contribution to the development of Russia's oil industry was a merit noted at the All-Russian art-industrial exhibition in 1882, in Moscow, where the "Nobel bro." company received the highest award - the right to the image of the State Emblem on their advertisements and on signboards. (Later, in 1896, at the All-Russian exhibition in Nizhny Novgorod the company again would be given this highest award).

In 1884, the special organisation of entrepreneurs the "Council of Baku oil industrialists" was established in Baku, this organisation was headed by Ludwig Nobel up to his death in 1888. This organisation played a huge role in the coordination of Russia and in particular, Azerbaijan's oil business.

The historian-publicist and secretary responsible for the commission of the organisation of the oil business at the Caucasian anniversary exhibition (02.09.1901), Startsev G.E. noted: "It should be accepted that one of the biggest monuments of activity of the congresses of the Baku oil industrialists was their decision on the complex and extremely difficult issue of the insurance of workers against accidents. At present time the majority of companies insure with us their workers against the consequences of accidents and in private insurance societies. Almost 62% of all workers were insured

with us. Here it is pertinent to note that the overall development of the insurance of workers was taking place in the oil industry. In other branches of the Russian industry the percentage of insured workers was fluctuating between 10 and 50%".

In the book of the known Russian publisher I.A. Efron "World fair and Russian exhibits", it described the participation of the "Nobel bro." company in the world's fair in Antwerp (Belgium) in 1885: "the whole phalanx of various forms and sizes of columns and pyramids is filled with samples of Russian oil. The most outstanding companies of the Russian industry on this branch were obviously the so-called "queen of the oil industry" - the company "Nobel bro.".

It is necessary to note, that from the moment of establishment (1879) the "Nobel bro." company took part in the following exhibitions:

- 1882 - All-Russia exhibition in Moscow.
- 1884 - International hygienic exhibition in London - (Nobel oil products were awarded a gold medal).
- 1885 - World's exhibition in Antwerp
- 1888 - The All-Russia exhibition of illumination and heating subjects in St.-Petersburg.
- 1889 and 1900 - World exhibitions in Paris.
- 1893 - World exhibition in Chicago.
- 1894 - World exhibitions in Antwerp and Lion.
- 1896 - All-Russia exhibition in Nijniy Novgorod
- 1897 - Art and industrial exhibition in Stockholm.
- 1901 - International exhibition in Glasgow.

For his outstanding merits in technical and industrial business the S.-Petersburg Institute of Technology conferred to Ludwig Nobel a rank of the processing engineer.

When Ludwig died on March 31st, 1888 all the famous



Peter Bilderling



Mikhail Belyamin

newspapers of the world provided information on his death, in which they wrote, "L. Nobel was registered as a Swedish citizen, but spent his life in Russia and devoted to it, all his remarkable energy and outstanding mental abilities to it".

The Professor of the College of Mining, known oil chemist Konon Lisenko spoke about Ludvig: "I will not list everything, that was made by Nobel in the area of oil refining but I will specify only the main thing: for the first time he arranged continuous refining, put the cubes and mixers on open air, brought the careful control of distillates and ready products, arranged warming up of the oil, which was subject to refining with hot residues, introduced refining of oil to kerosene with overheated steam...." (L.E. Nobel's Memories.

Sob, 1889, p.47).

The representative of the chapter of the American trust "Standard Oil" expressed about the deceased L. Nobel: "...The excellent person who had cleverness and understanding of Russian business, high communications and experience of working with imperial bureaucracy"

More than 25 thousand employees were working at Nobel's "oil empire" whose capital by the time of the death of Ludvig Nobel in 1888, was estimated at more than in 35 million rubles in gold, which made up a 1/5 of the general capital of foreign investments into the oil business in Russia.

In 1889, in S.-Petersburg the "Nobel bro." company by establishing the prize named after L.E. Nobel, simultaneously proposed, and later put into practice some more measures for the immortalization of Ludvig's memories.

It was envisaged to establish with the means of a company scholarships (more than 48 thousand rubles), in S.-Petersburg's Mining and Technological Institute named after L. Nobel, a vocational schools of Tsesarevich Nikolay and in S.-Petersburg and Baku the first real schools, for children of

Nobel employees and workers. Three grants named after L. Nobel, Carl Ludvigovich Nobel and Peter Bilderling were established. Apart from that the company still allocated separate grants to students in need, for up to 10 students, of 30 rubles a month for the whole time they attended the course including payment for studying. There was still a special capital in the amount of 6000 rubles (named after M.J. Belyamin), percents of which were allocated in the form of grants for the training of children". The steamship of "Petrolia" company sailing in the Baltic Sea was renamed after "Ludvig Nobel".

L. Nobel lived for 46 years in Russia and was buried in the Smolensk Lutheran cemetery in S.-Petersburg next to his son

Carl.

In his report, devoted to the 25th anniversary of the "Nobel bro." company (1904) Konon Lisenko noted: "Each person on a decline of his days should involuntarily dart a glance at life time passed by and at a trace left after. I dare think that Ludwig Emmanuel died with full consciousness, that his efforts in life were not worthless, and that his acts would go through some more generations ". These words of the venerable scientist can rightfully be applied to the other brothers.

It would be desirable to conclude that Ludwig Nobel's activity in Russia and in particular in Azerbaijan with the words of Startsev G.E.: "... all activities of Nobel can so be defined: he replaced the Asian organization of the oil industry to Europe, where it was possible; Not being afraid of exaggerations, it can be said bravely, that his energy and mind of our industry is obliged by its present position, in that amount, of certainly, in what generally success of the industry can depend on an activity of this or that person. ... Nobel showed capital the road to an oil empire, and the capital followed him".

Generally, the "Nobel bro." company existed for 47 years. From 1888 up to 1917 the oil business of the Nobel family in Russia was headed by Ludwig's son - Emanuel. For political reasons he was compelled to leave for his home country in 1918.

Having headed the "Nobel bro." company for 29-years Emanuel, in every possible way, promoted the increase of its power and has simultaneously engaged in its distribution of Rudolf Dize's engines in Russia. (Ultimately the "Russian" diesel engine would capture all the world - 98% of all diesel machines were manufactured by the factories of E. Nobel in S.-Petersburg. In 1891, the company's factories received 36

million poods of oil, and refined 17 million poods of kerosene and 1.5 million poods of lubricant oils (I.A.Efron's the Encyclopedic Dictionary, 1897, v.21, p.216). In 1908, for the first time in Baku the Nobel factories natural vaseline (both white and yellow) of very high quality was received from Cheleken oil. (Artificial Vaseline had been use in Baku from the beginning of the 1890's but was very poor quality).

For the first time in the world large diesel vessels, tankers-steam-ships "Vandal" (1903) and "Sarmat" (1904) were constructed under E. Nobel's supervision. The length of the first national steam-ship "Vandal" was 74.5 m and had a carrying capacity of 750 tons and a speed of no more than 7.4 units (1 unit = 1 mile/hour or 1,852 km/hours). In five years time (October 2nd, 1908), at Kolomen factory in Nizhny Novgorod, a giant steam-ship "Kirghiz", which cost 190 thousand rubles, and was capable of carrying, up to 600 thousand poods (around 9830 tons) of oil products, was constructed under the order of the "Nobel bro." company.

It is characteristic, that Baku oil industrialists under the Baku Branch of the IRTS founded awards in Baku (1904) named after Emmanuel L. Nobel, who continued in a worthy manner the business of his grandfather and father (for more details about the Russian Nobel Prizes see essay VI).

Here we will note the names of the Russian Nobel Prize winners and years of their awards. The owners of "Ludwig's, Petersburg award for steel were:



*Emmanuel Nobel*

A.I. Stepanov (1896), V.I. Baskakov (1898) and A.N. Nikiforov (1905). The winners of "Emmanuel's" Baku awards were - V.F. Herr (1909), A.M. Nastuykov and K.L. Malyarov (1911), and S.G. Isaakov (1914).

At the Caucasian agriculture and industries exhibition (Tiflis, 1889) the "Nobel bro." company was awarded gold medals "for their merits to the oil industry and for putting on practical ground the business of regeneration of alkaline dross". Gold medals also were awarded to the companies of "Shibaev S.M." and "Caspian Partnership" for high quality products and processing of oil and the correct organization of factory business. (The Caucasian calendar, 1890, p.71)

Towards World War I the "Nobel bro." company was the largest combined organization. It is characteristic that in 1910, when the next term of agreement between the "Nobel bro." company and Rothschild's society of "Mazut" was expiring, information on the forthcoming alliance of the company with the American trust "Standard Oil" began to leak into the press.

This led to an open speech of members the board of the company E.K. Grube emphasized, that " ... all hearings and talks on the agreement between the Nobel company and the American trust are deprived of any basis. The American trust, as before, remains the strong competitor of the Nobel Company". ("Transcaucasia", N 193, from 27.08.1910)

However, 10 years Later "Standard Oil" (probably considering the short-lived Soviet authority) got plenty of cancelled stocks of nationalized oil facilities of the "Nobel bro." company. Paris newspapers provided information on this by publishing a statement by "Standard Oil": "Right after the war the negotiations between the representatives of the "Nobel" company and society of "Standard Oil of New Jersey" related to sale of the last shares in the Nobel's possessions. In the

beginning of the summer of 1920, the sale was accomplished and "Nobel" and "Standard" became equal participants in Nobel possessions related to Russian oil. (Oil facilities, 1926, N10, p.597).

Thus, it is obvious, that large international oil tycoons among themselves conducted both open and secret negotiations with the purpose of possessing the oil of Baku.

In 1914-1917, the "Nobel bro." company had a fixed capital of 30 million rubles and owned more than 13 factories (including 6 oil refining), and in 1916 its total oil extraction was 76 million poods of oil.

The "Nobel bro." company was one of the first prospering enterprises of Russia where civilized relations between owners and their workers were established. For the first time the Nobel brothers introduced 10 hour working day (instead of 14 hours) in their factories and facilities in the Absheron. Apartment houses for married couples and barracks for bachelors were constructed for workers and technicians. In Baku, for Muslim workers special premises were allocated where they could make namaz.

For senior employees of the Baku administration L. Nobel behind Cherniy Qorod constructed a special settlement, which received the name of "Villa Petroleum". At this place a magnificent park with a flower garden and greenhouse was created. The park was developed by the known European expert-gardener E. Bekle, whose name stands for many parks and gardens. E. Bekle selected the planting material from Lenkoran, Batum, and also from farms in Russia and Europe. In the villa's park they planted about 80 thousand bushes and trees among which there were plenty of fruits. For their watering the Nobel tankers instead sand carried irrigation water from Astrakhan. (By the way, the park created by the company had several names after 1920: after



Lunacharsky, "the Rote Fane", after Nizami..... probably the, time has come to name the park with the name of its founder - Ludwig Nobel).

In the Buzovny settlement on the Absheron, the company had its country settlement where employees could rest during the holidays; and in Sabunchy, in Nobel's working settlement, still live hundreds of families of the oil men. The same idea with "small towns" was implemented in other places (Tsaritsyn, Saratov). In all "small towns" baths, canteens, bakeries, hospitals, drugstores, sanitary inspection services and elementary schools for children of workers were constructed and the Nobel's were carefully training personnel for their enterprises.

At the conclusion of this essay about the famous Swedish family, it would be desirable to quote from the Professor V. Samsonov, who noted in 1996: "It is imagined, that the time has come to give due memories of remarkable people - enthusiasts of the development of the Russian industry - to the father and brothers of the Nobel family, and to immortalize their names in S.Petersburg and Baku.

## ESSAY V

### ALFRED NOBEL - IS GREAT INVENTOR OF THE XIX CENTURY

**There is nothing less often than mind going on a new way.**

*VOLTER*

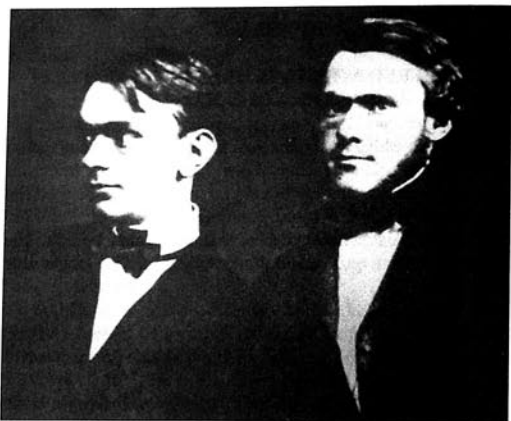
**The greatest achievement of human genius is that, the human being can understand things, which he is no longer able to imagine.**

*Lev LANDAU*  
*(The Nobel Prize winner)*

Each time at a presentation of the Nobel Prizes we come to the conclusion, that the history of the most prestigious international prize is a mirror in history of human civilization. Because, the Nobel Prizes, which cover almost all thinking areas of people, reflect his full development along the line of ascent.

The founder of the well-known prize is Swedish inventor, engineer-chemist Alfred Bernhard Nobel - the son of known businessman (an architect by education) Emmanuel Nobel (1801-1872), who lived and worked in Russia for a certain period of time.

Alfred Nobel was born on October 21, 1833 in Northlangatan - the center of Stockholm. He wrote an autobiographical poem at 18 in which he wrote the following words: "My cradle looked like a bed of dead people, and for many years my mother, anxious, frightened, stayed awake



17-years old Alfred and his older brother Ludvig

next to it: so small were the chances to keep this flickering spark. I found the strength for breathing sometimes spasms started to suffocate me. My body was trembling in agony, waiting for an inevitable death".

In spring of 1840, Alfred's father came to S.-Petersburg with the purpose of restoring the well-being of a bankrupted family. Having had the audience of general Ogaryov, E.Nobel told him about his invention - "the charge of gunpowder placed in metal case" -The general became interested in "useful" invention and suggested to Emmanuel to continue his researches. When 'Nobel', demonstrated the act of his invention (mine) to high military ranks, the time of long-awaited success came to him: Russia provided the Swede with

all means necessary for working.

During the same period, 'Nobel' constructed the heating system with circulating hot water. It is characteristic, that Emmanuel's vigorous activity in military-industrial business in Russia did not remain unnoticed: he was awarded the gold medal of the tsar's government "For diligence and development of Russian industry". This award was very important and rare for foreigners (as time would show his children would inherit professional qualities from their father, Alfred would not be an exception).

Having grown rich and becoming authoritative in the Russian military and scientific circles, Nobel called his family from Sweden. In October 1842, his spouse Andrietta with their three children - Robert, Ludwig and Alfred arrived in S.-Petersburg. The new world opens before nine year old Alfred, and poverty is gradually forgotten passing to unpleasant memory...

Being in Russia, his father not only paid off all his Stockholm creditors, but also provided a first class home education for his children. They had an outstanding Russian chemist N.N. Zinin as their teacher, and B.L. Santesson as a teacher of languages and history. According to memoirs of the brothers, these two people rendered invaluable influences on them.

*Zinin Nikolai Nikolaevich (1812-1880) - (Zinin N.N. was born on August 13, 1812 in Shusha, former capital of the ancient Karabakh khanates; subsequently, Shusha - the regional center of the Azerbaijan Republic). The well-known Russian chemist; graduated from Kazan university; in 1837, he left for Europe where he worked in various laboratories, mostly, at Justus Liebig. After coming back to Russia defended his dissertation for a doctorate of natural sciences. Remaining the professor at the Kazan University until 1847, Zinin the same*



Zinin Nikolai

year was invited to S.-Petersburg as a chemistry professor to the medical-surgical Academy. In 1853, Zinin was studying explosive prosperities of nitroglycerine, trying to arm the Russian army in Crimean war (1853-1856). (Not once did he talk over this with his talented student - Alfred Nobel). Since 1865, he was an academic of the Imperial Academy of Sciences. He was the chairman of the Russian chemical society since its establishment 10 years before (1868-1878). His numerous works was mainly devoted to organic chem-

istry: having laid the bases for aniline-dyes, industries, invented a method of acquiring aromatic amides by the restoration of aromatic nitro combinations (Zinin's reaction), for the first time synthesized aniline and other combinations by this method (1842). Under Russian chemical society the premium after Zinin's and Voskresensky's memory, as the first Russian chemists, was founded.

At 17 years, Alfred could speak fluently in Swedish, Russian, German, French and English; and he understood world history. And later life showed the bases of chemistry received from Zinin, subsequently, benefited him very much. Alfred's favorite poet was Englishman Shelley Percy Bysshe (1792-1822).

As a child Alfred showed enormous curiosity to all events, his thirst for knowledge had no boundaries. Everything, that he read was acquired by him without effort. He was helping

his father at the factory, and later became an engineer at the same place. His father was proud of him and supported him in every possible way; not talkative and at the same time not inclined to compliment, he wrote to his brother in law - to L. Altse: "All our family is simply subdued by his knowledge and the surprising working ability of our darling Alfred".

Alfred travelled much from 1851: to The USA, England, France, Italy, and Germany (this was promoted by his father who wished to work together with his son on chemical enterprises in the future). Travel lasted more than three years; during his travels Alfred accumulated facts and data. As it would be proven in future, he could manage rationally to take advantage of knowledge acquired during travel - and would establish his manufactures in many countries of the world. In Paris, at the laboratory of professor T.J. Peluza, he got acquainted with Ascanio Sobrero, with whom he would cooperate with up to the end of his life.

**Sobrero Ascanio (1812-1888)** - the known Italian chemist. Upon graduation from Turin university worked for a German chemist J.Libih and French chemist T.Peluza. In 1847, by studying the action of nitric acid on organic connections, he formed a nitric acid from glycerin nitroglycerine, which subsequently received application in the manufacturing of explosives (dynamites), and also a nitric acid ether of mannitol (nitro-mannitol), which is partially applied as a detonator. He was the professor of the higher technical school in Turin since 1849. He published four volumes of "Course of technical chemistry" between the years 1851-1878.

In 1861, Alfred again went to Paris to survey the means for researching nitroglycerine as an explosive substance, where he met with the Pereira brothers, prominent financiers from an epoch of the Second Empire. Common interests, vigorous activity and business character of these people led to the

"Society of creditors under real estate" and gave Alfred a loan of 100 thousand francs, which he invested into the research and manufacture of nitroglycerine.

The Result of fruitful works was the patent on "manufacturing and use of explosive substances", which Alfred received on October 14, 1863. The essence of the patent was "increasing the explosive force of gunpowder by means of adding into it nitroglycerine."

On May 5th, 1865 Alfred proposed a new method of manufacturing nitroglycerine and the management of its explosive forces. It was preceded with 50 trials after which he would patent a new kind of detonator. It was the first and most significant invention of Alfred Nobel, causing a revolution in the knowledge of explosives since the invention of gunpowder.

However, the liquid nitroglycerine was very dangerous to store, transport and handle; proof of this is evident in the numerous explosions, with tragic outcomes, which took place both in laboratories, and in factories during its production and storage (Helenborg, San Francisco, Aspinval, Sydney, Kryummell, and Vintervinken).

Therefore Alfred worked to define safe ways of manufacturing the application of nitroglycerine: he invented dynamite, patented it in England (May 7, 1876), and later - in Sweden (September 19, 1876).

Addressing scientists and experts at one of the conferences, Alfred explained the creation of dynamite in such a way: "New explosive substance which I named dynamite is not other than, a connection of nitroglycerine with very porous silica. Giving it such a name, I did not try to conceal its nature. I made it only drawing your attention to its explosive qualities, which changed so much, it that required new name.

The superiority of dynamite over the previous explosives was so obvious, that it was used in the making of underwater explosions, which before was generally conceived as impossible. If 11 tons of dynamite had been produced and sold in 1867 then in 7 years time this figure made 3120 tons. The dynamite invented by Nobel was used on many largest constructions of the 19th century: "San Gottardo" tunnel (1872-1873), the Corinthian channel (1881-1893), and also for the destruction of huge rocks surrounding East-river in Hellgate, near New York (1876-1895).

*The official recognition of the merits of the tireless engineer's - father and son Nobel came in 1868, when the Swedish Academy of Sciences awarded them with an annually presented premium "for achievements in the field of art, literature or sciences and for the important inventions, which benefited mankind". Emmanuel Nobel was awarded for "expansion of use of nitroglycerine, as an explosive substance", and Alfred - "for the invention of dynamite".*

Alfred's vigorous activity was ongoing: in cooperation with other engineers he established more than 15 factories in various cities of the world: Engene (Norway), Kryummele and Schlebusch (Germany), San Francisco (USA), Hanko (Finland), and also in Scotland, Spain, Portugal and Hungary. It led to the growth of competition, especially in Germany, where the factories, which had been in Cologne, Dresden and Hamburg since 1860, created a threat to Nobel's enterprises. Therefore associating these factories with his own enterprises, Alfred decided to take organisational concern, both in England and in Germany.

After overcoming numerous obstacles and difficulties connected with organizational concern, he managed to involve investors based in Great Britain in the largest factory "British Dynamite Co Ltd.". The factory, constructed in Ayrshire

(Scotland) under the supervision of A.Lidbek, was the biggest among A.Nobel's factories. 45 buildings, in which several hundreds of people were working, located in territory of 420 hectares. The capacity of the factory was 1000 tons of dynamite and more than 1400 tons of nitroglycerine; kieselguhr was delivered from Germany, saltpeter - from Chile.

The factory owned the port, which was connected to a system of railways constructed by large Scottish companies. Later, when there was a need for their own fleet all cargo vessels were constructed, taking into account safety rules for transportation of dynamite and nitroglycerine.

Severe disciplines were followed at Nobel's factories, requiring absolute obedience to daily routine regulations and safety rules. Competitors were comparing him with the military leader, who owned and disciplined the loyal army.

In 1868, Alfred together with a French company "Barb, the father and the son" organized an association, which included several metallurgical factories in Liverden.

In 1876, he patented new plastic dynamite for the creation of which he together with assistant George Ferenbaugh, had carried out 250 laboratory experiments. New dynamite was much more effective and cheaper than nitroglycerine, did not react to impacts and was perfectly suited for underwater explosions. Trading names of this dynamite were various and varied depending on its composition and the purposes of application: "Dynamite Extra", "Dynamite Express", "Explosive gelatin", "Saksonit" and "Helenit".

The following year's dynamite became the most widespread form of explosives, more having pushed previous ones aside on quality. The most zealous opponent of Nobel, the known chemist, the expert on explosive substances F.A. Abel, whom Alfred as a joke called "the glorified lawyer of pyroxylin", in 1884 publicly announced, that new dynamite

was "from all points of view the most perfect among all known".

One of the problems among scientists-chemists of the 19th century was the creation of smokeless gunpowder. While using strong smoking black gunpowder the artillery appeared to be defenseless before the enemy as it was disclosing its location. Alfred was intensively working over the issue, and as a result of several experiences had been carried out with G. Ferenbaugh the ballistit (smokeless gunpowder C-89) was invented in 1887, it was subsequently named "Nobel's explosive gunpowder".

Its composition, basically, was repeating plastic dynamite: equal proportions of nitroglycerine and nitrocellulose with the subsequent addition of 10% of camphor. For the first time the manufacture of ballistit's was started at Nobel's factory in Onfler (Norway).

In 1892, A. Nobel participated in the Bern international congress of pacifists, where he defended his principles related to issues of the peaceful co-existence of people, asserting, that "The balance should be based on fear". He noted at congress: "My powder factories will make wars useless earlier, than all your congresses". Certainly, he wasn't favorably accepted by participants of the congress the majority of whom considered disarmament as an only solution for the peaceful development of countries.

In 1893, in San Remo (Italy) Alfred become acquainted with Ranyar Sholman or Ragnar Sulman (1870-1948) who at that time had graduated from the Stockholm institute of technology and worked in Chicago, at a factory for manufacturing of nitroglycerine and dynamite. Nobel invited a young chemist to his laboratory to the post of assistant. In future Sholman (Sulman), faultlessly coping with the work, would become his best colleague and friend, and after

A.Nobel's death - one of biographers said of his boss. In his book "Life of Alfred Nobel", written with co-authorship with G.Shyuk, was published in London in 1929, and had tremendous success.

*Here are the words, Ragnar Sulman used to describe his first arrival to the Caucasus and taking the work Alfred's Nobel offered: "... already being the student of Stockholm institute of technology, I took an advantage of the presented case and traveled to The Caspian sea on a Swedish tanker transporting oil products. The route of these voyages ran through Ladoga Lake, further along the river Svir and the Mariinsky channel passed to the Volga and came to an end in Baku on The Caspian Sea. I went to Baku to have a look at Nobel's factories and derricks and got acquainted with Robert Nobel at a country house "Petrolia", with the sons whom we had attended school together. From Baku, I took a long journey to the Caucasus. ... I had often been asked, where are you from, and it was difficult to explain, as the word "Swede" meant nothing to local residents. But when I mentioned, that I came from the same country, as Nobel, the same remark was always followed as an answer: "O! So you are Nobel's!" In order not to complicate life, I eventually decided to accept this title, not even suspecting that I would remain "Nobel's" up to my dying day. ... My surprise and delight can be imagined, when in September, 1889 still in Chicago, I received a telegram from Stockholm, in which the personal secretary to Alfred Nobel proposed to me, the contract inured immediately!"*

Starting from 1896, in San Remo Nobel had started to test his next invention - "progressively blowing up smokeless gunpowder" for where in Sweden he would receive the patent # 7552. Alfred as before was interested in explosive substances and fire-arms, but only in the theoretical part of the problem. Nobel would say: "As me, with pleasure would send to hell all

these guns and everything, and all that is connected with them that is the best place for their storage and at the same time the best place for their testing".

Industrialist Henry Schneider (1840-1898), engaged in the manufacturing of weapon, subsequently noted that with genuine surprise he had listened to the words of Nobel: "improvement of weapons, which increases power, is not enough to achieve peace. Limitation in capabilities of explosive substances is - only proof to it. It should be made so that death became as real for the simple population, as it is real for the soldier at the front. Put this Damocles sword above the head of everyone and you will see how a miracle will take place: all wars will stop immediately, as soon as bacteriological weapon appears".

That "Italian period" in Nobel's creative life was the most fruitful: the number of inventions and improvements, made by him in San Remo, surprises with quantity and quality. He modernised many household appliances, developed mufflers for canons and guns, and also a new way of hardening metal. Possessing a wide outlook and an inquisitive mind, Alfred was also interested in optics, biology, physiology, carried out experiments with definition of scopes of application of rubber (caoutchouc) and manufacturing of varnishes on the basis of nitrocellulose.

It is characteristic, that varnishes and paints now in use, basically, repeat Nobel's inventions.

He was also interested in the phone, telegraph and aeronautics and sponsored S.A. Andre's trip to North Pole in 1896. Alfred was considering, that "if Andre could reach his defined purpose, it would be only half way. The real display of force occurs when travel forces the imagination to work and by that stimulates occurrence of new ideas and inventions. Also in this area, I would like to serve the world issues;

any invention and opening leaves an indelible trace in the consciousness of people, and it allows us to hope, that there will be more of those who are capable of changing culture, to make it better and more absolute, in generations which will alter us".

Four months prior to his death he wrote to Sholman: "I wish to launch a small balloon equipped with a camera, parachute and clock. At a certain height the camera would separate and automatically fall down to the ground. So I shall receive the image".

In this way, Nobel explains the essence of his numerous ideas and interests: "If among thousands of ideas coming to my mind within a year, at least one is a good one then I am completely satisfied".

Nobel's life in Italy had the most beneficial impact not only on his health and fruitfulness of his scientific-philosophical ideas, but also on his intellectual activity.

Here are characteristic given to Alfred Nobel by one French researchers of his biography Orlando de Rudder: ".....The flexibility and strenght of mind of Nobel and universality of his personality should not be underestimated. His notes and draft sketches were accessible after his death.... These sketches present either poems, or research plans, or philosophical problems over which he was going to focus. Here is one of such sketches: The interaction of atoms; functions of brain, idea, memory; matter and world; interosculation of religions; questions of economy and taxation; new system of chemical notation; researches in the field of explosive substances; macrocosm and microcosm. These various ideas, which require - The combination into a harmonious and complete system, probably, had already found unity in Nobel's mind. But, unfortunately, we cannot assert it with all our confidence. However also other impression, which is

much closer to the truth, is created: in this citation - it's Nobel's sense of philosophical inheritance, which he left for us - to his descendants....."

By the end of his life, in 1890, Nobel thought of moving back to home, to Sweden, however, due to the state of his health lived there only in the warm seasons. In Byekborn, Varmland, he acquired an old metal factory "AV Bofors Gullspang" and organized a laboratory in its grounds. Nobel fundamentally reconstructed and modernized this factory: if prior to him cannons with caliber 160mm had been manufactured at this factory, already in 1897 (a year after the death of A. Nobel) at an industrial exhibition in Stockholm the cannon weighing 30 tons and with a caliber of 250mm were exposed.

The Swedish king Oscar II (the grandson of Napoleonic marshal Bernadott), having visited The Nobel Brothers factory, delivered a speech, which glorify Alfred and all the Nobel's family.

Apart from metallurgy Nobel was thinking of maximum usage of water's energy and for this purpose he constructed moderate a power station at Karassk waterfalls.

Up to the end of his life he possessed unrestrained energy. In the year of his death, in the summer and the autumn of 1896, Alfred with Sholman were working at a factory in Byekborn, but his health was already getting worse, doctors had hinted to him about the necessity to put his business plans into order. Nobel solved the issue in the most unexpected form by writing his well-known testament.

R.. Sholman wrote on this occasion: " the establishment of strong relations with his native country in the last years of his life, and also the fact that, he made the final decision on further destiny of his wealth has, appeared to give him the feeling of steadiness and satisfaction, despite more frequent and

more heavy attacks on his illness. It seemed like his new purpose appeared in his life completely occupying his attention and ideas.... For the last few years of my dialogue with him I had never witnessed an attack of depression, which quite often happened even during his stay in San Remo".

Having finished with the testament, Alfred went back to San Remo where he continued his experiments on the creation of artificial leather.

By the time of death Alfred Nobel was one of the richest men in Europe: for his numerous and never-ending trips and travels (which exclusively were business trips) Victor Hugo named him "the richest wanderer of Europe".

His property was estimated more than 33 million Swedish crowns; Alfred had considerable capital also from the Baku oil fields, which would make more than 12% of prize funds and would accelerate formation of the most prestigious International Prize (assertion of Swedish historian Eric Bergengren).

Some words about "oil pages" of the talented inventor's life. As it is known, Alfred Nobel, despite numerous and persevering invitations from his brothers (Robert and Ludwig) to visit their Baku factories, he was well informed about all events relating to activity of the company (see essay IV). It can be said that, Alfred even corrected some actions of his senior brothers. For example; despite significant profits, existence of company in the first years of its activity had been fragile. Ludwig immediately was directing all earned profits directly to the development of manufacturing. There had been a lack of available capital for disposal, therefore the management of the company made a decision to issue bonds, which was extremely dangerous (there was the possibility of completely losing any control over the company).

During this difficult period Alfred supported Ludwig

(both morally, and materially) he sent a letter to him where he wrote "the only point where, in any way, we cannot converge with you is that you first start building, then search for money whereas I prefer to adhere to return sequence. If not to take into account this small difference, in other respects our views on the development of manufacture coincide". (Alfred allocated 4 million francs for the company, and also insisted on necessity of decreasing in dividends).

Alfred Nobel died on December 10th, 1896, in San Remo; on December 29 he was buried in Stockholm in a Northern cemetery, near to the ashes of his parents and brother Emil (who died in 1864, in an explosion at a factory in Helenberg).

In 1897, his testament was opened, of which paragraphs relating to the establishment of the prize surprised not only the scientific world...

Particularly, it was noted by the testament: "... The capital transformed into secured value by my legal representatives, will make fund, percents from which will be annually distributed in the form of awards to those who, within the expired year rendered the greatest services to mankind. This sum will be divided into five equal parts and distributed so: The first part will be given to people who make the most important opening or the invention in the field of physics; the second - to one who will make an opening or significant improvement in the field of chemistry; the third - to the author of the most important opening in the field of physiology or medicine; the fourth - to one who will present the best literary work in the spirit of idealism; the fifth - to one who will work better than others in the areas of uniting nations in the interests of destruction or reduction of constant armies, and also for formation and propagation of the congresses of the world... My will is such, that no discrimination can be let in distributing the prizes among nations and that the premiums are award-



ed to worthy ones not depending whether he is Scandinavian or not" (the Charter of Nobel's establishment, published in Stockholm 29.06.1900., SPb., 1902, p.3).

Starting from 1901, The Nobel Prize has been annually awarded in the field of physics, chemistry, physiology (or medicine), literature and peace.

Here, we shall try to explain the absence of the premium in the field of mathematics. Nobel was considering, that "mathematics is not a science in the strictest sense of the word as it represents discipline which is engaged in quantity, discipline and measure. The mathematics seeks presentation of the form of an idea that concerns more likely to philosophy, rather than to any other empirical science, and it is less applicable in practice". Certainly, language of mathematics is applied in other sciences, but Alfred was considering, that "the chemical equations- are not the same as mathematical equations". Further, as considered by O.de Rudder, at times of A. Nobel physicists, physicians and other scientists not so widely applied mathematical methods in their researches as it currently takes place. Therefore, the mathematics hardly could be in the interest of Nobel. By his opinion, "mathematicians could neither take part in prevention of wars as weapon is invented by chemists and physicists, nor in improvement of mankind as for this purpose there is an art". That is, Nobel did not have reasons to establish the prize in the field of mathematics. Until now some people believe in a ridiculous contrivance that Alfred did not establish prize in this area because his wife betrayed him with the mathematician. However Alfred

Nobel was not married! The woman, Sofi Hess (1856-1919) with whom he lived for 15 years, betrayed him not only with mathematician ... When in 1891, she gave a birth to girl from Hungarian officer, Alfred left her without scandal, hav-

ing appointed an inheritance to her in the amount of 300 thousand Hungarian marks (Sofi was also mentioned in his testament among heirs).

Each prize consists of a gold medal with the image of the founder and corresponding inscription, the diploma to this medal and cheque for the determined sum of money, amount of depended on profits of the Nobel fund (in 2003, it made 10 million Swedish crowns or 1,3 million US dollars).

Presentation of the Nobel Prizes, according to A.Nobel's testament, is carried out by the Royal Academy of Sciences in Stockholm (for physics, chemistry, the memorial premium on economics); by Karoline medico-surgical Institute in Stockholm (on physiology or medicine) and in Swedish AS in Stockholm (on literature). In Norway, the Nobel committee of Norwegian parliament (storting), especially appointed by them, awarded the prize for activity on strengthening the peace.

Currently in the Nobel fund, there are 15 administrative officers for the Nobel Prizes (three per each prize) who determines Administrative Council. The King of Sweden appoints the president and vice-president of this Council, who together with executive manager organizes ceremonies of prize presentations. R.Sholman (Ragnar Sulman) for a long time had been the head of the Nobel fund acting as an executive manager.

An interesting fact is that: Ragnar Sulman's son - Rolf, for a long time, had been the ambassador in Sweden to the USSR. The ambassador's son - Michael Sulman studied at Moscow school number 10. He was an executive director of the Nobel fund in Stockholm since May 10, 1992.

Let's note the two time winners of the Nobel Prizes:

Maria Sklodovskaya-Kuri from France (1903- in physics, 1911 - in chemistry) and Americans - Laynus Poling (1954 -

in chemistry, 1962 - peace prize), John Bardin (1956 and 1972 - both in physics), and also F.Segner (1958 and 1980 - both on chemistry).

Three times Nobel prize winner became the International committee of the Red Cross (1917, 1944 and 1963.).

The Nobel Prize winner for the year of 1962 was the physicist *Lev Davidovich Landau* (1908-1968) - an outstanding scientist, theorist of the XX century who was born in Baku.

*Son of David and Lyubov Landau - Lev was born on 22nd of January, in 1908 in Balakhany; He graduated from Baku gymnasium whose trustees were the largest oil industrialists and the patron of the art of the Caucasus - H.Z.Taghiyev and the manager for all Baku oil fields of the Rothschild brothers - David Landau (the father of the future prize-winner). Ahead of schedule entered to physical faculty of Azerbaijan State University, Lev in a year of 1924 transferred to Leningrad state university, where he graduated in 1927. In 1929, he worked in Germany (Leipzig) and Denmark (Copenhagen) where he cooperated with Nils Bor, a scientists-physicist, the Nobel Prize winner of 1922. The area of their researches was - low temperature, atomic and nuclear physics, physics of plasma and quantum electrodynamics. L.D. Landau - is the author of a classical theoretical physics course (together with E.M. Lifshits).*

By established tradition - on December 10th, on the date of Nobel's death (in Sweden - it is an official day of the raising of the national flag), in Stockholm, the king presents gold medals to winners, and the Norwegian king takes part at a ceremony in Oslo. By the rules of the Nobel fund, the selected winner should act with so-called Nobel lecture (on subjects of his work) within half a year after the reception of the prize in Stockholm or in Oslo.

It would be desirable to finish this essay with the words of

a known scientist Vladimir Vernadsky, which in our opinion, are completely characteristic for Alfred Nobel: "Intellectual and working person is a measure to everything. He is grand planetary phenomenon".



*Sweden's ambassador in the USSR, Rolf Sohlman, at the request of the Nobel Committee, presents Lev Landau with the Nobel Prize for Physics (1962). With his wife Conkordia, standing behind him and M. Keldish - President of the Soviet Academy of Sciences.*

## ESSAY VI

### KNOWN AND UNKNOWN NOBEL PRIZES

In order to evaluate someone's quality, it's necessary to possess some part of this quality also in yourself.

*William SHAKESPEARE*

It is known, that the Nobel Prizes are the weightiest all over the world. Here it is taken into account not only the amount they cover (there are also other large monetary premiums, for example, the German prize of Karpinsky or the American Premium founded by the company Ford Motors Co.), but also their civil honour. These prizes reveal the most outstanding personalities and lead to scientific and also literary-political achievements of winners and, as a whole, bring huge advantages to mankind. They inspire new, possible candidates to unique performances, which ultimately facilitate the world's scientific progress.

More than 100-years in the history of awarding Nobel Prizes, in general, represents to us, a perfect and most valuable "review" of the development of science of the past years. Here it is pertinent to mention the words of the French writer Andre Mauro: "the sum of knowledge and the memories saved up by generations, that is, what is our civilization. Only under one term one can be its citizen - having got acquainted with the ideas of the generations lived up to us".

In the present article the issue will be over the prizes of the Nobel family, that is not only about the known international prize founded by the younger of the brothers Alfred Nobel (1833-1896), but also about the little-known Nobel Prizes,

founded in Russia in the honour of Ludwig Nobel (1831-1888) and his son - Emmanuel Nobel (1859-1932).

*The International Nobel Prize*

Its founder - a talented inventor and businessman - Alfred Nobel three times made his well-known testament in 1889, 1893 and 1895, but only the last dated November 27th, 1895 was checked by him in the Stockholm bank "Enskilda Banken". He bequeathed the prizes to those working in the field of physics, chemistry, physiology medicine and literatures and for the strengthening of the peace; precisely specifying in his testament that prizes should be granted to the most worthy candidates, irrespective of their nationality and religion (irrespective of, "whether they are Scandinavians or not").

Here it's pertinent to note a reasonably interesting fact of explanation by Alfred Nobel (who devoted his life to the creation of mighty means of destruction) on the inheritance of certain parts of his means for prizes of the peace: "I would like to invent a substance or a machine possessing such a destructive power that any war, in general, becomes impossible"

At Bern International congress of pacifists which took place in 1892, Alfred Nobel declared: "... balance should be based on fear. My gun powder factories will make wars useless sooner, than all your congresses".

And that is how, A. Nobel explained his desire to acquire the biggest Swedish newspaper "Aftonbladet" in a letter to his nephew Emmanuel: "If I became the editor of the newspaper, my position would be the following, not regretting powers for struggling against all kinds of arms. I would propose, that factories, engaged in the manufacturing of weapons, not to trade them in but to produce them only for the needs of our army. As the only justification for the exist-

tence of a war industry is the safety of a nation". That is the way, "apostle of the world " reasoned all versions for the termination of military madness.

A. Nobel was one of the richest men in Europe: Victor Hugo jokingly called him "the richest European tramp". Actually, he wasn't registered as a permanent resident anywhere, from the moment of his departure from Sweden to Russia when he was nine-years old.

The amount his property was estimated at was more than 33 million Swedish crowns (9 million USD under the prices of that time). His considerable share of capital was received from the oil fields in Baku. According to the statement of the Swedish historian Eric Bergengren, who had access to the archive of the Nobel family; Alfred's decision to withdraw his share of capital from the Baku oil fields, accounted for 12% of the prize fund promoted the prompt formation of the international prize. This was confirmed also by N.Stole, who acted as one of the directors of the Nobel fund for a long time.

It is characteristic, that when "Alfred's" testament was opened and the Nobel committee started to work, the "Nobel brothers" oil company transferred to the committee a total sum (5.23 million Swedish crowns) to the amount of A. Nobel's property in Russia, not including the Russian securities (in the sum of 1.69 million Swedish crowns) which had been kept in Deutsche Banks. It gave the basis to name one of the articles about Alfred Nobel - "Nobel Prize "came out" of oil fountain".

The official date of the establishment of the Nobel fund is considered to be on June 29th, 1900, that is, after the Swedish king recognized it; but its establishment dates back to a much earlier period, December 10th, 1896. The fund was directed by an executive manager, whose duties included; the man-

agement of the investment policy of the Administrative Council and the organization of the awards ceremony. For many years this honorable mission was carried out by Ragnar Sulman (or Ranyar Sholman) a true employee and associate of Alfred, who after his death became his legal representative and also one of his biographers.

His book "Ett Testamente", printed out with posthumous edition in Sweden (1950), had enormous success as it represented the only biography written by a person closely known to A. Nobel. The book covered the real life of Alfred and the historical circumstances under which his testament was written.

The prize presentation ceremony takes place every year on the day of Alfred's death (10th of December) in Stockholm Concert House where the king of Sweden as an established tradition, presents diplomas and gold medals to the winners. The prize for the strengthening of the peace is presented in Norway, Oslo, in the city town hall. The list of the names of new winners, as a rule, is published on Alfred Nobel's birthday on the 21st of October.



*Ludwig Nobel*

Let's note the first Nobel winners in 1901: in the field of physics - Wilhelm K.Rentgen from Germany, in the field of chemistry - Jacob H.Vant-Goff from the Netherlands, in the field of physiologies and medicine - Emil A. fon Bering from Germany, in the field of literature - Ren Syulli-Pryudom from France and for the strengthening of the peace - Anri Z.

Dyunan from Switzerland.

As the capital of the Nobel fund is in constant turnover, payments to Nobel winners are constantly growing: if in 1901, the amount of the prize was 150.8 thousand Swedish crowns, in 1994, the amount of Nobel Prize was 7 million Swedish crowns (about 1 million USD), and in 2003, the prize fund was 10 million Swedish crowns (about 1.3 million USD).

*The Russian Nobel Prize named after Ludwig Nobel*

Alfred Nobel's elder brothers Robert and Ludwig were inseparably connected with the Russian oil industry. The peak of its power the "Nobel Brothers Oil Extracting Partnership" (hereinafter: "Nobel bro." company) which was officially established in May 1879, in S.-Petersburg, by the second brother Ludwig Nobel and after that his son - Emmanuel Nobel.

The primary capital of the "Nobel bro." company in 1879 was 3 million gold rubles, and at the time of Ludwig Nobel's death on March 31st, 1888 the capital of the company was estimated at more than 35 million gold rubles. Between the years of 1888-1917 the company was successfully managed by Emmanuel Nobel, who in 1918, due to political events left for Sweden.

From the end of the XIX century to the beginning of the XX century the "Nobel bro." company controlled up to 90% of Russian oils; and up to 1901, Baku was producing more than 50% of the world's extractions. During this period the "Nobel bro." company was taking a visible place not only in Russian, but also in the world's oil industry. In 1899 the company extracted 93.2 million poods which made 17.7% of all-Russian oil and 8.6% of the world's oil extractions.

In July 1888, the "Nobel bro." company made a decision on the establishment of the prize and gold medal which was named after Ludwig Nobel, having allocated for the Imperial

Russian technical society (IRTS) the capital in the amount of 6000 rubles. (IRTS, established in 1866, in S.-Petersburg, was the organization, which united all advanced, scientific and technical minds of Russia with the purpose of rendering assistance to the development of technology and industry in the empire).

In a report written by the "Nobel bro." company's board following a general meeting of shareholders on July 30th, 1888, it was noted: "on March 31st, of this year in Cannes, after a long illness, the founder of our Partnership and Chairman of its Board Ludwig Emmanuel Nobel died. By establishing the enterprise Ludwig Nobel laid the basis to the fast development of the Russian oil industry, which during the existence of the Partnership decupled in productivity. In 1876, 4264 poods of kerosene was taken out of Baku, and in 1887, that number was 39826 thousand poods. This four times reduced the market price of lighting oil, and absolutely pushed out from the Russian market the imported goods and entered into the European market by successfully competing with American kerosene. Just this one merit already puts the name of Ludwig Emmanuel Nobel along with paramount figures in this field on the pages of history as a development of national industry ... "

Here it is necessary to note the role that the IRTS, played in the immortalization of L.Nobel's memory. A year after Ludwig's death a solemn assembly (31.03.1889) in memory of him took place in the IRTS. Speech making engineers and scientists (I.A. Snessarev, P.A. Bilderling, K.I. Lisenko, A.A. Zarubin etc) spoke about Ludwig's invaluable contribution to the oil business of Russia, and in particular, of Baku. M.N. Tripolitov's, (a processing-engineer, and a member of the Constant Commission on a technical education under the IRTS) speech came to an end with the words: "L. Nobel was

not a Russian, but we are proud of him".

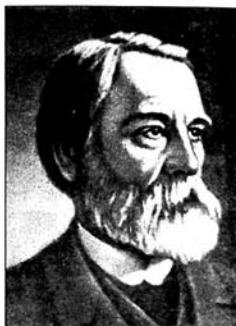
At this assembly the establishment of the prize named after L.Nobel and the gold medal with his image for "the best composition of research on metallurgy or, oil production or, any outstanding inventions or, improvements in technologies of these manufactures, taking into account their greater application to development of the industry in Russia" was announced.

On January 18th, 1891, the IRTS Council approved regulations on the prize. In Document N8 "Regulations on the prize and a medal named after Ludwig Nobel, established under the IRTS by the Nobel Brothers Oil Extracting Partnership" it was noted:

- Presentation of the prizes is given to the IRTS Council.
- The session in which the final awarding of the prize should take place, should always be appointed to March 31st in memory of the date of Ludwig's death.
- Information on approaching terms of the awarding of L.Nobel's prize should be published not less than once a year in the "IRTS notes" and in most widespread capital newspapers, and also in "Baku provincial bulletins".

The first competition was supposed to be held in 1895 and the names of outstanding chemists appeared in composition of the competition commission -D.I. Mendelejev, F.F. Belyshsteyn and N.S. Kurnakov. Altogether, only three prizes were awarded, and two of them were awarded before the international prize ("Alfred's"). The amount of the prize determined by the IRTS was about 1200 rubles ["Proceedings of IRTS", 1893, # 11-12, p.2-3; "Oil Business", 1900, # 6, p.320].

*Belyshsteyn Fyodor Fedorov (1838-1906) - the known organic chemist, the academic of the Imperial Academy of Sciences. He received a first class chemical education; he stud-*



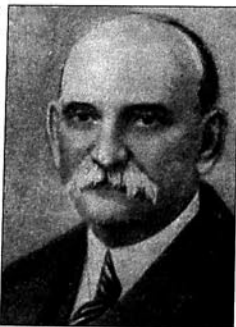
*Fyodor Belyshsteyn*

*ied in Heidelberg at Robert Bunzen, in Munich under Professor Phillip Zholli. In 1858, he received a doctorate of philosophy in Goettingen and starting from 1858 to 1859 he worked in Paris with Adolf Vyurts. In 1865, he received a faculty in Petersburg institute of technology and had a degree of the honorable doctor of chemistry from Moscow University. The main scientific works of Belyshsteyn were devoted to the chemistry of carbonaceous combinations. His most important work related to an aromatic series in which he devel-*

*oped Kekul's hypothesis about a structure of aromatic combinations. He also investigated Caucasian and Absheron oil, having proven their essential differences from American. He determined that, naphthen hydrocarbons prevailed in Baku oil which didn't enter into direct connections with bromine. Belyshsteyn was also engaged in the development of both general ways of chemical analysis, and electrolytic. Belyshsteyn's capital work "Handbuch der organischen Chemie", which collects all known combinations, for that time, in organic chemistry, with the full information on sources of the literature, represents the unique dictionary in the organic chemistry, which ran several editions. Belyshsteyn's Institute published the Dictionary-directory in Germany (Frankfurt-on-Main city) after 1945. Apart from the dictionary Belyshsteyn's brochure "Introduction to the qualitative analysis" had big popularity among chemists-analysts.*

*Kurnakov Nikolay Semyonovich (1860-1941) - the known*

scientific physico-chemist, the academician, the professor of the Petersburg's mine and polytechnic institutes. Known for outstanding research on alloys and in many other areas of physical chemistry. Kurnakov is the founder of physico-chemical methods of studying of metals and alloys. The creation of thermal analysis on a method of fusibility is connected with his name.



*Nikolay Kurnakov*

The first Russian Nobel Prize and attached gold medal was awarded to engineer-technologist A.I. Stepanov (1866-1937) in March 1896 for his research on "the Basis on the theory of lamps".

*Stepanov Alexey Ivanovich (1866-1937) - the outstanding chemist-technologist. In 1899 he was graduated from the complete course of sciences of the S.-Petersburg Institute of Technology with a rank of the technologist; he worked as the laboratory assistant at chemical laboratory of Institute (1899-1899). In this laboratory he worked at his first scientific works under the direction of famous scientists - F.F. Beylshtein and E.A. Vroblevsky.*



*Alexey Stepanov*

In January of 1899, he lectured the chemistry at Institute as managing a teaching department; in 1907, Stepanov was appointed as adjunct professor of S.-Petersburg Institute of technology on chemical technology, and from 1914 he was a Professor of institute on chair of chemical technology. Under the direction of Professor K.I. Lisenko, Stepanov began to study more profoundly hydro carbonic raw materials: Lisenko has suggested to Stepanov to investigate conditions of burning of Russian kerosene in lamps. His work "Basis of the theory of lamps" has been highly appreciated by world scientific community and has been published in French and German languages. For his scientific works he has been made in Full State Councillor (1916), also he was awarded by St. Anna's awards of 3 degree (1905) and 2 degree (1913) and St. Stanislaw's order of 2 degree (1910). In a Soviet period (1921-1930), in parallel with professorship in the Institute of Technology, Stepanov taught in Economic academy of RKKA, worked in laboratory of Petrograd branch of the Russian food scientific and technical institute, and also as an expert at Committee on inventions' business. He wrote more than 60 scientific works.

The second presentation of the prize took place in March 1898; it was received by doctor V.I. Baskakov for his work "Oil heating of apartment houses without an oil burner" in which he solved the problem of complete burning of oil without using the spraying method.

In May 1905, the last presentation of the prize named after L.Nobel was given to engineer-technologist A.N. Nikiforov for his work "Method of acquiring benzene and its homologues from Russian oil" took place.

*Nikiforov Alexander - Russian chemist, the talented inventor; on request of Nikolay Zelinsky has built in the University (in Zelinsky's laboratory) the installation on oil distillation in a small scale which allowed to decompose daily about 10 litres*

*of oil and to receive thus benzene, xylene and other aromatic hydrocarbons. In the letter to D.I. Mendeleev who has become interested in Nikiforov's work, Zelinsky wrote: "...I do not doubt that production of benzene from the Caucasian oil, transformation of last into the big chemical values will strongly recover our chemical manufacture" [Zelinsky N.D. Letter to D.I. Mendeleev from 21 of November, 1903, Moscow]. Nikiforov has offered new methods of oil decomposition under the high temperatures; from the beginning of 1915, the famous professors M.M. Tikhvinsky and N.D. Zelinsky have conducted the serious researches on oil decomposition by Nikiforov's methods.*

On December, 24 in 2004 in Russia (Moscow), the Russian Nobel "Ludwig" prize and its Gold medal were restored due to efforts of International Union of Russian scientific and engineering societies.

Our information:

On December, 24th 2004, in Moscow, in a building of the International Union of scientific and engineering associations (Kursovoy lane, h. 17) solemn ceremony of signing of the joint decision of the International Union of scientific and engineering associations, National Academy of oil and gas of Russia and the Union of Russia's oil-gasmen about revival of "Ludwig's" award has taken place. The signatures under the document were put by the president of the International Union of scientific and engineering associations, academician Yu. Gulyayev; the president of National Academy of oil and gas of Russia, academician A. Dmitriyevsky and the chairman of the council of the Union of Russia's oilmen Yu. Shafrannik. From 2005, the "Ludwig's" Nobel Prize and the Gold medal to it will hand over to the Russian scientists and experts for the outstanding scientific contribution to development of scientific and technical progress, achievement to

the organisation of manufacture and preparation of highly-skilled personnel for the oil and gas industry, and also in adjacent areas: metallurgy, oil-field, oil-gas chemical and transport mechanical engineering, oil refining, oil chemistry and gas chemistry.

*The Russian Nobel Prize named after Emmanuel Nobel:*

In 1904, the Baku oil companies Rothschild's "Mazut" and "Shibaev S.M." paid a capital in the amount of 15 thousand rubles. Founded under the Baku Branch (BB) of the IRTS a new prize was named after Emmanuel Nobel (Son of Ludwig Nobel) worthy successor of his grandfather's and father's work in Russia (the BB of the IRTS was established on March 24th, 1879 in Baku).

Having become the head of the "Nobel bro." company after the death of his father Emmanuel Nobel, in every possible way, promoted the development of its power and simultaneously engaged in the proliferation of Rudolf Dize's engines in Russia. Characteristic data: Nobel's S.-Petersburg factory produced 7 diesel engines in 1900, but in 1904 the number was 50.

*Emmanuel Ludwig Nobel (1859-1932) - was born in S.-Petersburg, he went to the school of Sacred Anna, and worked at a mechanical factory. Under his management wide social programs were carried out in S.-Petersburg. Residential areas, schools for workers and employees of the mechanical factory "Ludwig Nobel" were constructed; and free-of-charge health services for factory workers etc. were organized. In 1889, Emmanuel Nobel accepted Russian citizenship; by his initiative in Baku town, schools, libraries were created and evening courses on technical education for workers were organized. He donated huge funds for the establishment of the Institute of experimental medicine during the cholera epidemic (1892). In*





Emmanuel Nobel

the future, he would repeatedly donate large sums for the needs of this establishment and in general for medical purposes. In 1890, he became the treasurer of the Society of Moral, Intellectual and Physical Development of Young People. Here it is worth to note, that when many (including the king of Sweden Oscar II) tried to protest the testament of his uncle Alfred Nobel, Emmanuel insisted on the execution of the testament and provided its execution. The Swedish king, the grandson of Napoleonic Marshal

Bernadott, was decisively against the establishment of prizes with A. Nobel's funds (especially against the prize for the strengthening of the peace). Having invited Emmanuel to his palace he tried to convince him to prevent the execution of the testament, by saying: "These fanatics of the world affected your uncle, especially - this Austrian woman!" He meant Berta Kinski who was married to Fon Zutner). The nephew was not afraid of objecting to the king: "Sir, I would not like to defy my duty before my descendants and to refuse a science funds which, belong to it and nobody else". In 1897, on the demand of E. Nobel all of Alfred's contributions were withdrawn from industrial production for the establishment of a special Nobel fund (at that time it made about 2 million pounds sterling) which became the financial basis of the Nobel Prize. In 1909, on the 10th of June, on the 50th anniversary of the date of birth, the Russian emperor Nikolay II granted him the grade of Actual councilor of state for exclusive donations for the benefit

of science and national education.

Emmanuel Nobel while making a speech to the board of the "Nobel bro." company explained his enthusiasm for diesel engines: "We guessed that the diesel engine-motor will appear most suitable for Russia where not so large enterprises prevail. We took into account, that fuel for diesel engine-motors (oil) is naturally rich here. So demand for new production will be continuous and will grow with acceleration".



Berta Kinski

It is characteristic that although under the direction of Ludwig the first oil tanker steamship in the world "Zoroastr" (1877), opened a new era in the oil business, with a capacity of 15 thousand poods was constructed. Under the direction of his son - Emmanuel the first oil tanker motor vessels "Vandal" (1903) and "Sarmat" (1904), both had a capacity of 50 thousand poods were constructed, which opened a new page in the history of the Russian fleet. The three axis motor vessel "Vandal", which was constructed at a factory in Sormovo and on which irreversible three-cylinder diesel engines, put in action by generators of a constant current were installed, had been sailing in the waters of The Caspian Sea since 1903.

Emmanuel Nobel's mass production of diesel engines for a fleet of oil tankers was organized in Russia, and Russia became the first "diesel" power in the world. For example, on October 2nd, 1908 in Nizhni Novgorod under the order of

the "Nobel bro." company the huge tanker-motor vessel "Kirghiz" was constructed, which was able to transport up to 600 thousand poods of liquid cargo. And in two years time there were 4 tanker motor vessels wandering in the Caspian Sea, 3 tankers belonged to the "Nobel bro." - "Emmanuel Nobel", "Robert Nobel", "Carl Hagelin" companies and 1 to Merkuriev brothers ("Delo") which made up to 4000 voyages in a year.

In 1913, the total number of motor vessels in the world was 80, out of which 70 belonged to Russia. This was undoubtedly to the merit of Emmanuel Ludwig Nobel.

Emmanuel Nobel's prizes were intended to be presented annually for the best works or inventions in the field of the oil business. The amount of the prize annually established by the BB of the IRTS was representing capital in the amount of 1000 rubles ["Transactions of BB IRTS", 1910, # 3-4, p.10-11; "Oil Business", 1910, # 13, p.35]. Substantive provisions:

- Candidates for prizes can be both Russian and foreign citizens.
- Candidates should present their works in Russian no later than three months prior to the awarding of the prizes, that is, not later than February 25th, of the given year.
- The day of the public announcement is appointed to May 25th, that is, the day when the "Nobel bro." company was established.

- The works presented for candidacy, should be supplied by mottos, and the name of the author should be written in a closed and sealed envelope, enclosed work, would be known only after the termination of the awarding of the prize.

- Results of the competition are declared both to the "Nobel bro." company, and to the companies taking part in the formation of the present fund.

E.L.Nobel's prize was awarded three times in 1909, 1911

and 1914.

The first Baku Emmanuel's prize "laureate" V.F. Herr Baku oil-chemist who was awarded the prize in 1909 for his work "acquiring of the dibasic acids (adipinic, glutaric, acetic and amber) with oxidation of narrow oil fractions by nitric acid".

*Herr Victor Fyodorovich (1875-1940) - the famous oil chemist, Professor of Chemistry. The first winner of the Baku Nobel Prize named after Emmanuel Nobel in 1909. On III International oil congress in Bucharest (on September, 8-13th, 1907) he, together with A.T. Predit, has given the report on a chemical composition of Baku oils which has caused a great interest in delegates. He was the manager of laboratory BD IRTS and the editor-in-chief of the oldest oil magazine "Works of BD IRTS" (magazine was based in Baku in 1886). In a Soviet period, V.F. Herr was a manager of the chair of organic chemistry in Azerbaijan teacher's training college and closely co-operated with Yusif Mamedaliyev. He has been arrested and shot in 1940, charged in undercover work for the use of Germany.*

The second Baku Emmanuel's prize was awarded to a Professor of Moscow University A.M. Nastyukov and to his assistant K.L. Malyarov in 1911 for their work on "Acquiring the properties of liquid products condensation of nonsaturated hydrocarbons of oil with formalin "[Transactions of BB IRTS", 1911, # 7].

*Nastyukov Alexander Mikhaylovich (1868-1941) - the known Russian chemist. In 1890 he was graduated from the Moscow University; from 1908 he was a professor of this university. In 1903 he has opened reaction of formaldehyde with aromatic hydrocarbons in the presence of the concentrated sulphuric acid (this reaction received his name) and has applied it to research oils and synthesis of new kinds of plastics. Further,*

*this reaction has formed a basis for creation domestic phenol-formaldehyde resins and plastics on their basis (newphormalite). In 1912 Nastyukov was in business trip in the USA for the purpose of studying of the American methods of oil extraction, processing, oil refining on lubricant oils; acquaintance with work of factories and the laboratories processing oil production. In 1914-1919, he has developed ways of receipt of sulphurous dyes - black and khaki. In 1921, he was a manager (chair) of a laboratory of technical chemistry of the Moscow University. From 1933 he was a Professor of the Moscow chemical-engineering institute.*



*Konstantin Malyarov*

*Malyarov Konstantin Lukich, from 1917 on 1921 was one of the active teachers of chemistry and one of the leaders of chemical researches at the Moscow University. His activity passed on the physical and mathematical faculty of this University which secretary he was. In Soviet period, Professor Malyarov K.L. developed scientific works on microchemistry and analytical hydrochemistry at the chair of analytical chemistry of Moscow University. He was a founder of the course of micro chemical*

*analysis in the USSR.*

The third and last Baku Emmanuel's prize was awarded in 1914, to a Baku mining engineer S.G. Isaakov for his work on "A tartan drum, operated exclusively by hand and connected to a spoon on a tartan pulley to prevent dragging" ["Transactions of BB IRTS", 1914, # 2].

It is desirable to restore in Azerbaijan, the Baku Nobel "Emmanuel" prize and to reward with it the scientists and engineers for distinguished deserts in the field of oil business.

Now we will try to find a connection amongst the Nobel prizes:

Alfred Nobel, the inventor and world known industrialist, linguist and philosopher, in our opinion, should know about the prize named after his brother in Russia founded in the city of his youth S.Petersburg. Officially, for the general public (as we have mentioned above), the establishment of the prize named after Ludwig Nobel was declared on March 31st, 1889.

Already being a "dynamite king", Alfred came to S.-Petersburg by the request of his brothers Robert and Ludwig, to help them in the companies (where he was one of the owners) affairs, both morally, and materially. For example, he was trying to connect the Baku oil business with the capitals of the solid western banks with the purpose of expanding the material resources of the "Nobel bro." company, and to subsequently expand the business on a global scale. Alfred had never been to Baku, although the elder brothers repeatedly and persistently invited him to visit their oil factories.

Later, Ludwig wrote to Alfred in Paris: "... You render us invaluable support, and I hope, that one-day people will cease to approve that, the "Partnership of the Nobel brothers" is only Ludwig Nobel".

The existence of "Ludwig's" prizes alongside with other objective and subjective reasons affected the text of Alfred's unique testament, relating to the prizes.

"Ludwig's" prize was founded and awarded before the well-known "Alfred's").

It is characteristic that, all the prizes of the Nobel family ("Alfred's", "Ludwig's" and "Emmanuel's") were awarded in

areas from which the scientific world were expecting the greatest progress for the benefit of humanity and that all of them especially the last two were created on the basis of the capital acquired from Baku's oil business...

In summary the fact of the creation and establishment of the Russian Nobel extraordinary testament in 1895, which immortalized the name of "Nobel" in the history of science, which rendered indisputable influences on a course of its development and allowed better understanding the culture of Sweden, Norway, and all Scandinavia as a whole.



Керосиновый заводъ Нобеля, въ Черномъ-Городѣ.  
Баку. L'etablissement Nobel a la Ville noire.

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*Kerosene plant of Nobel in the Black City (Cherny Gorod).*

## ESSAY VII

### THE ROTHSCHILD BROTHER'S CONTRIBUTION TO BAKU'S OIL INDUSTRY

*Ability to observe indeed is a great gift.*

*John LEBBOCK*

The Rothschild brothers, co-owners of the Rothschild brother's banking family of Paris, became interested in the Russian oil industry from the end the XIX century. On May 16th, 1883, the official establishment of a new company in Baku the "Caspian- Black Sea oil industrial and trading society" (hereinafter abbreviated to "Caspian-Black Sea society") took over, the bankrupted Batum oil industrial and trading society. Running forward, we shall note that the Rothschild brothers basically focused on the foreign market as a sphere of activity, and already by the end of eighties appeared to be on top of the export of Russian kerosene.

Starting from the date of establishment, the company developed vigorous activity; to buy on mutually advantageous terms 135 minor and middle enterprises of kerosene production to send to deeper parts of Russia and to other foreign countries. Besides, contracts for the commission of sales of kerosene Rothschild's' concluded on a preferential basis for enterprises, which finally led to the following: if the export of oil products abroad and from Baku, in 1884, made 2.4 million poods, 5 years later this figure was about 30 million poods. It is characteristic, that for the Rothschild's' the first touchstone became the voyage of the vessel motor oil tanker "Fergusson" with kerosene from Baku to Antwerp;

later kerosene started to be delivered to London also ("Ferqyusson" vessel was constructed at the factory in Motala city, Sweden; where earlier Nobel's "Zoroastr" had been constructed).

It worth to note, that having in Russian safes 6 million gold rubles and 25 million francs of starting capital the Rothschild's were able to engage in business with high energy.

For its successes the "Caspian-Black Sea society" was also obliged to those relations, which the Rothschild's had adjusted in higher echelons of Russian authority. Along with the "Nobel bro" company the Rothschild's "Caspian-Black Sea society" also became one of the leading companies in the Russian oil business in the end of the XIX century.

David Landau, was for a long time, the chief engineer of Rothschild's' in the oil-field facilities in Baku. He was the father of the future Nobel Prize winner (1962) on physics, Bakuviet Lev Landau. (L.D. Landau was born on January 22nd, 1908, in the Balakhani settlement in Baku). And one of the managing directors well known chemist Adolf Guhman (1866-1914) - A Board member of the Baku Branch of the Imperial Russian Technical Society.

The founder of the "Caspian - Black Sea society" Baron Alphonse Rothschild (1827-1905), had been heading the Paris banking family since 1868. He was the son of a famous banker in Paris, James Rothschild (1792-1868). A characteristic detail: for his services to the government the King of France Lui Philip made James Rothschild the officer of an honorable legion. After the death of his father, the Alphonse took over conducting all Parisian bank affairs. He would become the biggest magnate of financial capital playing an important role in world politics. By the end of the XIX century, Alphonse Rothschild supervised a significant number



*Alphonse Rothschild*

of industrial enterprises, railways, insurance companies; sharply strengthened his influence to state policy, having certain relations in governance ministries. It is enough to note, that it was A. Rothschild who organized the payment of contribution of France following its defeat in 1871 in Franco-Prussian war, thereby, having kept at the power head of the French government Adolf Tera. Commander of order of Honorable legion the Alphonse Rothschild was elected as a member of Academy of fine arts

(Prize named after A. Rothschild had been established at the Academy after his death); and was in the structure of Board of directors of National bank of France.

Through A. Rothschild the imperial government issued a number of loans in France. So, the construction of the Transcaucasian railway, connecting Baku and Batum, was completed in 1883, due to the loan given by A. Rothschild. Therefore, he acquired the rights to the preferential possession of Baku oil enterprises. In the year 1884, about 5.6 million poods of oil products were transported by The Transcaucasian railway, which opened doors to the West for Russian oil, having laid the basis for a severe and long (about 30 years) struggle for world oil markets.

Here it is pertinent to note, that Rothschild's' "Caspian-Black Sea society" having received permission for the installation of its own carriage-tanks on The Transcaucasian rail-

way, put an extra 300 carriages-tanks in 1887, when the existing number (600ea) had been already insufficient to satisfy demand for transportation means, they also lent money to many factory owners (2 million rubles) for the installation of more than 1500 ea of carriages-tanks under the terms of repayment of debt in 5-years time with a 6 percent annual rate. As a result of this, from the 3932 carriages with kerosene sent from Baku, the Rothschild's company received 1800 in Batum, in December 1888.

By the end of the XIX century, in Transcaucasia, Gryazetsaritsin and other cities of Russia the greatest number of carriages-tanks belonged to the grand oil companies: The Nobel Brothers, Rothschild's, Mantashev's, Shibaev's and Unanov's.

Following the death of Alphonse, his younger brother Edmond started to directly engage in Russian oil affairs. Chief engineer of the Parisian house of the "Rothschilds' brothers" - George Aron, who locally supervised the oil enterprises, export and sale of the oil and oil products was also one of the key figures in the oil business.

On December 2nd, 1898 G. Aron wrote from Baku to the director of the International Commercial bank in S.-Petersburg A.Y. Rotshteyn: "... Here, is a week that I am in the center of my activity, in Baku ..., the oil industry since the time of my last visit, that is, three years ago, had developed enormously, and I think, that due to increasing consumption of liquid fuel in the regions of Russia connected through Volga, we will witness, that the process will be even greater in the future".

The Board of the "Caspian-Black Sea society" company consisted of three directors - Moris Efrusi (A.Rothschild's son in law), Prince A.G. Gruzinky and Arnold Feygel. The last supervised over all preliminary and preparatory work of

the company.

Commercial adviser A.M. Feygel was an authoritative person; he was the chairman of the Council of congress of the Baku oil industrialists, for several years, based on public terms. He was the only person in Baku, possessing the trust of the Rothschild's society. At a session of the committee on issues of export tariff for diesel fuel, which took place on December 19th, 1901, under the Department of Railway Affair he was awarded the most outstanding personality

of the Russian oil business by the decision of the Council of the session - Arnold Feygel (from Rothschild's "Caspian-Black Sea society") and Carl Hagelin (from the "Nobel bro." company) as representatives of oil industrialists.

It is characteristic, for the unification of the Russian export trade A. Rothschild's was the first acting company, which starting from 1887, along with exporting of its own product, started to commission the sale of kerosene of other 40-50 Baku oil-industrialists. ("Caspian sea", 1888, N 260) As a result of the precisely organized business in 1888, export of



Caspian-Black Sea Oil Industrial and Trade Society

kerosene by the Rothschild's company was more than 16 million poods, which amounted to 58.6% of all Russian export. Besides the Rothschild's own enterprises only 2.5 million poods had been developed, that is, "some kind of syndicate had been established, which concentrated more than half of the export of kerosene from Russia".

By the end of the XIX century in the Russian oil business the process of concentration of production had been amplified, which was testified by the following figures: 7 largest factories making about 10 % of all factories of the empire, produced 68% of all manufacture of kerosene (22.5 million poods.).

These are the factories of companies the "Nobel bro." - 10.7 million; the Caspian partnership - 3.5 million; H.Z. Taghiyev's - 2.4 million; the Baku Oil Society - 1.7 million; A. Rothschild's - 1.5 million; M. Naghiyev's - 1.5 million and S. Asadullaev's - 1.2 million poods. (Mining productivity of Russia in 1885., p. II, SPb., 1888, p.112-117).

In 1890, only 13 factories (about 9% of the general number of factories) produced 3/4 of all of the lighting oils (51 million poods.) out of which 17.9 million was the share of the factories of the "Nobel bro." company, and 4.7 million was the share of the Rothschild's factories. (The Review of Baku oil industry for 1891., Baku, 1892).

Here it is pertinent to note, that the cancellation of the lease-out system in Russia at the end of 1872 led to unprecedented growth in the number of oil refineries. In 1893, there were 69 factories in the Baku area out of which 13 had from 30 up to 100 workers, and 3 factories had more than 100 workers. These were the factories of - Sidor Shibaev (580 workers), the Alphonse Rothschild (227 workers) and Hajji Zeynalabdin Taghiyev (126 workers).

Willing to conquer the domestic market, A. Rothschild

opened the offices of the "Caspian-Black Sea society" in the cities of the Volga region: Nizhni Novgorod, Samara, Tsaritsyn, Astrakhan, and also in the Baltic, Belarus and Poland. Transportation of oil products to these regions was carried out through waterway by the trading-transport society "Mazut" founded by A. Rothschild in 1898.

Subsequently, "Mazut" would become the largest oil exporting association possessing 13 tankers only in the Caspian Sea. (List of ships of Caspian water fleet with indication of capacity. Publishing house of Council of session of Baku oil industrialists, Baku, 1912)

According to the data of newspaper-magazine "Oil business", the work of the Caspian oil fleet for June 1915 looked as follows: 64 steam schooners out of which 11 working schooners belonged to the "Nobel bro." company, (84 voyages were made), 9 to Rothschild's association "Mazut" (54 voyages) and 3 to S. Asadullaev's company (24 voyages).

As the Transcaucasian railway could not completely cope with the volume of transportations of oil and oil products the water transport across the Caspian Sea acquired major importance, where oil tankers had been distributed on categories based on ship owners. Maintenance of oil tankers of the Caspian fleet was carried out either in Baku or in Astrakhan where the greatest number of ship-repairing

enterprises had been located. Up to 1900, in the Astrakhan province there were about 30 ship-repair enterprises available, the largest of which were owned by the "Caucasus and Mercury" society (237 workers at the enterprise), Rothschild's "Mazut" (195 workers), East Society (176 workers) and the "Nobel bro." company (170 workers) (the List of factories and plants of Russia. S.-Petersburg, 1910, p.262).

Here it is worth to emphasize, that following the opening of the Transcaucasian railway in 1883, and the establishment

of services across The Caspian Sea and Volga the idea arose of the construction of the Baku-Batum pipeline.

American Herbert Tvedl, for the first time, made an attempt for the real construction of the Caspian -Black Sea pipeline, with the purpose of self-statement both on the Absheron and the Caucasus.

D.I. Mendeleyev who since 1863 studied economy and the state of the Russian oil business wrote about the necessity of the construction of pipelines from the factories to the moorings to pour the oil into the tankers.

Among industrialists, really supporting the idea of the construction of the pipeline were A.D. Rothschild, H.Z. Taghiev, I.P. Ilimov, S.I. Baghirov and others.

The Kerosene Baku-Batum pipeline started to operate in June 1907, becoming a unique event in the "oil" life of the empire. It was the longest (885 km) and best kerosene pipeline of that time whose annual throughput made 60 million poods.

In 1900-1901, there was a cartel agreement between the "Nobel bro." company and the association "Mazut" where it was decided to coordinate the trade policy in local markets for an establishment of control over the market of oil products. That is Emmanuel Nobel (Ludwig Nobel's son) and Alphonse Rothschild's united their efforts in the export of Russian kerosene to foreign markets. Already by the end of 1901 cartel "Nobmazut" transported 43% of mazut, 57 % of kerosene and 67% of technical oils refined from Baku oil.

By conducting coordinated economic policy "Nobmazut" could successfully resist to American syndicate "Standard Oil", which had been trying in every way to get into the Caucasian and Absheron oil markets.

It is characteristic, that "Standard Oil", in every possible way, tried to merge with the Rothschild's' "Caspian-Black

Sea society", however no transactions contradicting the interests of Russia, took place. There had been speculation on The Rothschild's' relations with the American trust Rockefeller in the Russian mass media.

Thus, the newspaper "Astrakhan information list" of 28.08.1888, marked, that from Rothschild's companies "... did not show any sign of indirect denying of participation both in collusion with the Standard Company, and in preparation of the export of crude oil issues in favorable terms for foreigners". Further the newspaper summarized: "So, the fact of a campaign against the Russian oil business exists, undoubtedly. Whether an attempt will or will not be a success - all depends, on the way of thinking, exclusively from the energy of those who will counteract the capture. Energy of the counteraction depends on the depth of belief in its necessity - that is, the level of expected damage".

On this matter, in 1891, Alphonse Rothschild wrote to S.Y. Vitte the Director of the Department of Railway Affairs in the Ministry of Finance of Russia: "First of all, we consider it necessary to inform you, that the persistent existing rumours on an agreement between our company and "Standard Oil" are deprived of any basis".

The establishment of "Nobmazut" caused the resistance of numerous competing companies, which as a counterbalance measured to the agreement of Nobel-Rothschild created company "Tocamp" under the financial trusteeship of Englishmen in 1901. And if not the agreement, achieved by E. Nobel with English industrialists about joint trade in kerosene in Germany, the company "Tocamp" would become a powerful counterbalance for cartel "Nobmazut".

Later, a group of several large and middle oil industry companies (the annual extraction of which made 150 million poods) established the union with the purpose of getting free



from the cartel "Nobmazut's" intermediation in the business of oil and oil products delivery, and from the influences of these two companies on the regulation of prices both in Baku, and in external markets.

At the beginning of 1907, the Nobel-Rothschild's cartel used the warehouses located in many regions of the Russian empire. It is natural, that the basic, most extensive system of storage of oil products had been created in Baku: until 1900, there had been about 2000 various storehouses generally with the capacity of 276.5 million poods. But the huge number of warehouses had been also in cities along the Volga region. For example: in 1900 in Astrakhan there were oil warehouses generally with the capacity of 35 million poods, and in Saratov there were 46 iron tanks. There were also plenty of earthen holes for the storage of oil products belonging to the "Nobel bro." company, and Rothschild's "Mazut", East society and the Ryazan-Ural railway, with a general capacity of 20 million poods.

Later, the majority of the oil fuel supply belonged to The Nobel Brothers and The Rothschild's, out of 8.9 million poods of oil residues, which remained in the warehouses of Nizhny Novgorod by April 1899, the "Nobel bro." company owned 2.96 and Rothschild's association "Mazut" owned - 2.90 million poods or more than 65%.

Having monopolized oil production, "Nobmazut" started to monopolize kerosene production. By the end of 1907, the cartel owned 75% of sales of kerosene in domestic markets of the Russian empire. As a result of E. Nobel's and Rothschild's skilful operative actions, in 1909, the share of "Nobmazut" cartel was 90% of wholesale markets of all oils manufactured in Baku, the remaining 10% was the share of other companies. Cartel "Nobmazut" possessed a powerful oil-tanker fleet; for example: in 1913, they owned 72 oil

tankers in Volga out of 160, of which 46 were owned by the "Nobel bro." company and 26 belonged to the "Mazut" society.

Here it is worth to emphasize, that the London oil joint-stock company "Consolidated Petroleum Co.", established in August 1900 with a charter capital of 500 thousand pounds sterling and who were competing with the American oil companies, had been under general control of "Nobmazut". In international markets "Nobmazut" was the only representative of English companies.

It is characteristic, that the times when Russia outstripped The USA in oil extracting, distribution of oil extraction among companies in June 1901 looked as follows (according to newspaper-magazine "Oil business"): the "Nobel bro." company - 5.7 million poods, "Caspian-Black Sea society" - 3.9 million poods and "the Baku oil society" - 3.4 million poods.

The success of the company established by A. Rothschild was mainly explained with the presence of trustworthy information, which it owned. Rothschild's received the exact data supported by economic and technical calculations both in Paris and Baku. The correct awareness of the oil business, the skill to observe and sensitively react to all changes in the Russian oil industry allowed Rothschild's to base strongly not only in the Absheron, but also in the Caucasus (Grozny, Maykop), and in Turkmeniya (Cheleken).

For example: the comparatively weak enterprises "Russian standard" and "the Moscow oil industrial society" under the powerful trusteeship of Rothschild had effectively been conducting explorations and development of the oil fields in Grozny, Kuban area and in Maikop since 1902. As a result, the North Caucasian region, before purely agricultural, became an oil industrial region by the activities of the

largest companies, especially, A. Rothschild's, E. Nobel's and I. Akhverdov's.

Baku entrepreneur I.A. Akhverdov based on geological researches of mining engineers A.M.Konshin and L.I. Baskakov, put the first well on the Yermolovsk site of Grozny in June 1893, which on the 6th of October of the same year at a depth of 132 m gave a powerful oil fountain, which operated for 5 months with daily extractions of 500 thousand poods of oil. This day is considered to be the beginning of the industrial development of the Grozny oil fields. The real success to Akhverdov came with his seventh well laid in May 1895 on August 27th of the same year at a depth of 141 m it gave an oil fountain with a quota debit of 1 million poods. In 1895, Akhverdov commissioned a large oil refinery for the manufacturing of kerosene, becoming subsequently a basis for the Grozny oil refining industry, that is, the year of 1895 is considered the year of birth of Grozny in the oil-refining industry. Scientists-oilchemists I.G. Fuks and V.A. Matishev fairly considered Baku oil industrialist I.A. Akhverdov as the founder of large capacity oil manufacture in Grozny.

In 1907, Rothschild's through the "Russian-Asian bank" subsidized and then also controlled many oil companies: the "Absheron oil society", having taken 40 % of its actions; and "Shikovo" and "Melik's"; "Russian oil company".

In 1910-1911, Rothschild for the sum of 2 million rubles acquired major part of stocks of the Russian "Oil" partnership "G.M. Lianozov and sons", stocks of these companies had been highly quoted at the Paris stock exchange. As a result, Rothschild's owned more than 35% of the total sum of the share capital of 15 large enterprises of the Russian oil industry before the revolution in October 1917.

The nationalisation of the "Caspian-Black Sea society"

company and "Mazut" association by decree of Baku commune of June 2nd, 1918, did not have direct impact on Rothschild's, as in 1912, they had sold their Russian oil enterprises to anglo-dutch trust "Royal Dutch Shell" (the major competitor of the American syndicate "Standard Oil"), having received in exchange 27.5 million rubles, and also 20% of stocks of the trust of "Shell" in Paris. And only starting from 1913, English businessmen had started to lead in oil business of Russia.

Possessing trustworthy information on the approaching First World War some years prior to the October revolution in Russia, Rothschild's conceded their oil business to Englishmen. Thus, in revolutionary Russia the losses of these brothers (unlike the Nobel brothers) was minimal. E. Rothschild (the successor of Alphonse in banking) was considered "as the most prudent person in Europe", who already in 1911, stopped crediting imperial government.

It is obvious, that the monopolistic tendencies in the activities of large companies appeared from the beginning of the last century in the form of various agreements or cartel associations with the purpose of the monopolisation of manufacture. For example: by possessing the powerful system of crude oil storage, and also major means for transportation of oil across the Caspian Sea, Volga and on railways, the Nobles' and Rothschild's by the end of the XIX century controlled up to 70% of Russia's oil trade.

In 1905, the German historian and economist Eydel in his book published in Leipzig "the Attitude of large German banks to the industry, in particular to metallurgical" had noted, "the world kerosene market ... is divided between two large financial groups: the American "Kerosene trust" (Standard Oil of Rockefeller) and the owners of the Russian Baku oil, the Rothschild and Nobel. Both groups act in close

communication among themselves..." That is, at the beginning of the XX century the world markets had been divided between oil tycoons; and participation of large Russian oil industrialists alongside with American influence. Distribution came out as a result of powerful centralisation and concentration of the capital in the Baku oil business.

In summary we shall note, that Rothschild's, as well as the Nobel Brothers, were engaged in charities in Russia: in Baku



*Office of "Caspian-Black Sea Society" in Baku*

they allocated large sums for construction of fine buildings and schools in the White city and in Bayil., in one of them - the Museum of the fine arts of Azerbaijan (a private residence of de Bur, on Sadovaya street, later - Chkalov, nowadays - Niyazi, constructed in 1891 by engineer N.A. fon der Nonne) is located. In another - General Prosecutor's Office (building of the main office of "Caspian-Black Sea society", on Kolyubakinskaya street, later - Saratovtza-Yefimova, nowadays - Rafibeyli Nigar, the house 13; constructed in 1899, by civil engineer K.B. Skurevich).

In I.N. Glushkov's article "Historical essay of the activity of the BB of the IRTS", published in magazine "Works of the BB of the IRTS" (May-August 1904.), it was especially emphasized, that Rothschild's "Caspian-Black Sea society" together with the companies "Nobel bro", Alexander Benkendorf's and K.Ya. Zubalov's supported the activity of the BB of the IRTS with annual payments.

The obligatory insurance of workers was introduced by the Rothschild's enterprises, which provided workers with significant allowances in case of a mutilation or cases of illness. Thus, in the reports of "Mazut" association for 1908, it was noted, that by the general decision of the shareholders 100 thousand rubles was deducted into the insurance capital from the income.

The heads of Rothschild's enterprises acted also as the trustees of city grammar schools and commercial schools and rendered generous material aid to Jewish communities in Russia. For example, in Baku, at a synagogue on Caspian street, (later - L. Schmidt, since 1991 - Rashid Beybudov) - there was all free- males' technical school with a four-year course and a female professional school, with Saturday evening classes. (Nowadays the Theatre of Music named after Rashid Beybudov is located in this building).

## ESSAY VIII

### THE SIGNIFICANCE OF THE IMPERIAL RUSSIAN TECHNICAL SOCIETY IN THE DEVELOPMENT OF THE OIL INDUSTRY IN BAKU

Regardless of any special talents you possess, by yourself you will not make great inventions in science. On the contrary, the collective will always be as if the resonator, the amplifier of your ideas at the same time you - as a part of this collective - will be the amplifier, the resonator of the ideas launched by others.

*Nikolay ZELINSKY*

The Imperial Russian Technical Society (IRTS), established in 1866, in S.Petersburg, was an organisation uniting all advanced and scientific-technical ideas of Russia. The purpose of the society was to render assistance to the development of the empire's technology and industry.

Uniting scientists of various universities and institutes of the empire, the IRTS coordinated almost all-scientific activity in Russia until 1917. In order to evaluate the role of the IRTS in the development of the Russian oil business we shall note, that considerable influence on the oil development of the country was channeled by the IRTS through the IRTS Council and the 1st department of the IRTS in S.-Petersburg (established in 1866), the Caucasian Branch of the IRTS (established in 1868) and the Baku Branch (BB) of the IRTS (established on the 24th of March, 1879).

The IRTS played an essential role in studying the structure and properties of the Caucasian and Absheron oils, including

the development of methods for their rational use.

The role of the BB of the IRTS was directly related to the studying of Absheron oil, until 1910. The Russian oil industry had been almost Baku's industry (the percentage of extraction of other fields was rather small). For the first time in the history of the oil business of Russia, the BB of IRTS united their efforts of scientists, engineers and oil industrialists.

The first meeting of members of the BB of the IRTS took place on the 13th of May, 1879, where the immediate objective of the Branch was defined as follows: "assistance to the sound development of the oil industry and manufactures, and also research on other natural resources located in the Baku provinces and in adjacent areas..." Already in the first year of its establishment the BB of the IRTS, in one of its following assemblies (in September), created a commission under the direction of mountain engineer Pavel Semyannikov for his organisation of measures on the improvement of the lighting properties of kerosene.

The BB activity and the works conducted by it rendered a huge impact on the development of the oil extraction and oil-chemistry in Azerbaijan. The first chairman of the BB of the IRTS was P.

Semyannikov, who along with other known engineers and chemists (S. Kvitko, A. Doroshenko, A. Bulgakov, N. Lebedev, V. Abramovich, I. Safarov, A. Mancho, V. Delov, A. Guhman, V. Herr, A. Muat, K. Harichkov, D. Landau, P. Ostreyko, F. Rustambekov, A. Adiyasevich) largely contributed to the development of the oil business in Azerbaijan. Later on, for a long time, well-known oil industrialist A.M. Benkendorf occupied this post. In 1900, the oil company of "Alexander Benkendorf" which had a charter capital of 4 million rubles was founded in Baku.

The magazine "Works of the BB of the IRTS", issued in Baku starting from January 1886, was the first local periodical publication, it widely highlighted the problems of the Russian (Baku) oil business. In an anniversary edition of the magazine (May-August 1904.) an article "A Historical essay on the activities of the BB of the IRTS" was published by I.N Glushkov. In this article he outlined the objectives of the Branch, which had been solved during the first year of its formation.

The list of the most important issues on the means for improvement of the manufacture of kerosene; on introduction of obligatory tests for the flash of kerosene; on measures of accident prevention on oil

fields, on measures for the destruction of soot in Baku, on the suitability of asphalt for roadways. The branch was involved in this since 1879, which shows how much its activity had been diverse and fruitful.

The greatest input for the expansion of activity of the BB of the IRTS was the help of professors D.I. Mendeleev, K.I. Lisenko, academician F.F. Beylshteyn and also the large Baku oil companies e.g. The Nobel Brothers, The Rothschild brothers, A. Benkendorf's, K. Zubalov's which supported the Branch with their annual payments. Until now the beautiful building of the BB of the IRTS has been preserved in Baku (Nizami Street, 115). It was constructed in 1899, the project was ran by a civil engineer I.V. Goslavsky. Also, special technical courses for workers were conducted in the building of BB of IRTS in the evenings.

The BB of the IRTS, in every possible way, promoted the speedy development of oil-chemical sciences in Azerbaijan; among its members there were Azerbaijani scientists: M.Khanlarov, F. Rustambekov, M.Hajinsky, A. Mirzoyev, I. Rzayev, who were educated in Russia and Europe. Here it

is especially necessary to note the first two Azerbaijani scientists who had their hands on the Baku oil business.

**Movsumbey Magomed ogli Khanlarov (1857-1921)**, the first Azerbaijani Doctor of Chemistry who defended his dissertation at Strasbourg University in Germany in 1883. In 1884, he came back from Germany to Azerbaijan and became known in the scientific circles of Russia. The same year on the 13th of September, by the recommendation of D.I. Mendeleev, N.A. Menshutkin and D.P. Kononov he was accepted to the BB of the IRTS. In Baku, Khanlarov developed wide scientific activities, established factory laboratories,



*Movsumbey Khanlarov*

schools for the training of experts on oil extraction and presented the scientific reports on the rules of quality checks of oil and oil products. In 1920, Khanlarov was appointed the post of process engineer to the Department of National Economy under the Supreme Council of Azerbaijan SSR; much effort was made by him for the involvement of local personnel to work in the oil and oil refining industry.

**Menshutkin Nikolay Aleksandrovich (1842-1907)** - a well-known scientist/chemist. Graduated in 1862, from the faculty of physics and mathematics of Petersburg University, where he was engaged in chemistry under the Professor Nikolay Sokolov (the founder of the first Russian chemical magazine). In 1863, he was in Germany, where he attended the lectures of Professors Adolf Shtreker, Adolf Vyurts and Herman Kolbe.

In 1867 he was elected the Associate Professor of Petersburg University, and in 1869, following the defense of his thesis for a doctorate on the theme "The Synthesis and properties of resides". He was appointed the extra-ordinary professorship in chemistry. In 1891, he received the rank of honorary professor. In 1902, he left the university and was appointed the dean of the metallurgical branch of Petersburg Polytechnic Institute. Menshutkin's teaching activity was not only limited with lecturing in analytical and organic chemistry, but also starting from 1867, the introduction of obligatory practical courses in analytical chemistry for students of Petersburg university. The edition of his book "Analytical chemistry", which was published, not only in Russia, but also in Europe in 1877 (the book was published in 9 editions). From the beginning of the 1870's he worked in the field of physical chemistry, developing various issues of chemical mechanics. Menshutkin received the prize of the Russian physical and chemical society (named after N.N. Sokolov) for his work on the influence of spirits and acid isomers for the formation of complex ethers. From the moment of the establishment of the Russian chemical society in 1868, up until 1891, Menshutkin was its clerk and the editor of the magazine of this society.

**Konovalov Dmitry Petrovich** (1856-1929) - the well-known chemist; was educated in Petersburg Mining Institute. He worked for Alexander Butlerov at Petersburg University and for August Kundt at Strasbourg University. Since 1884, he was a private-associate Professor, and in 1886, he was appointed as the Professor of chemistry at the Petersburg University. Konovalov's major works were devoted to the studying of contact processes, the theory of liquids and electro conductivity of solutions.

**Fatullabey Asad ogli Rustambekov** (1867-1946), a well-known engineer-technologist, graduated from S.-Petersburg

Institute of Technology in 1893. From 1906 to 1919, he worked as a general manager for the company "Nagiyev Musa", which was established in 1887. Between the years 1923-1930, he took the post of Technical Director of the largest Soviet association "Azneft". In 1923, under his supervision successful testing of the turbo-drill invented by M. Kapelyushnikov took place in Azneft. In May 1925, Rustambekov F.A. was awarded with an Order of the Red Banner of Labor of the USSR for his invaluable contribution to the development of the Russian (Soviet)



*Fatullabey Rustambekov*

oil business, for which M. Kalinin expressed his personal gratitude. In 1929, he was sent on an official mission to the USA. Between the years of 1934-1937, he was chief engineer of the trust "Azneftproyekt". He published a series of scientific articles in "Azerbaijan's oil economy" magazine, based on the studies of national and foreign experiences, which for the first time, and stated the theoretical and practical aspects of exploration of underwater oil pools, organisations of drilling works and construction of oil wells in the Caspian Sea. His major contribution to the Azerbaijan's oil business was defined by the following innovations: the transition from a percussion boring to rotary boring with the use of electric drive, usage of screw casings instead of valve columns at posting deep wells, changing the bail-down method of oil extraction into well pumping, the application of the gas lift and the replacement of wooden towers with metal.

In the chemical laboratory of the BB of the IRTS works on studying the methods of refining and the analysis of oil products were organized and for the first time the methods for their research were standardised. For example: by researching Baku oil, Mendeleev separated pentane and hexane; Beyshteyn by studying the structure of distillates boiling at a lower temperature and detected the presence of substances possessing properties of paraffin in them. At that, Beyshtein (together with A.A. Kurbatov) has shown that in the Baku oil there are the hydrocarbons, identical with the products of hydrogenation of the aromatic hydrocarbons, for the first time in details investigated by Felix Vreden in 1876-1877. The appreciation of the work of Beyshtein and Kurbatov ("Research of the Caucasian oil", in the Journal of Russian Chemical Society, 1883, №15, pp.5-32) was given by N.A. Menshutkin: "Research of Vreden has not paid sufficient attention as not coinciding with a science current until F.F. Beyshtein and A.A. Kurbatov have not shown that the main component of the Baku oil consists of the hydrocarbons received by Vreden. The gap has been punched, and research of these new polymethene hydrocarbons or naphthenes as Markovnikov named them, began to do fast successes".

*Vreden Felix Romanovich (1841-1878) - the talented Russian oil-chemist, has graduated from the Petersburg University in 1863; from 1873 he worked at the Warsaw University and last three years of a life he was the Professor of the Petersburg College of Mines. The major contribution of F.R. Vreden to organic chemistry was his works on receipt (for the first time) of hydro naphthalenes by the action of iodine hydrogen (NJ) on naphthalene and the proof of possibility of the aromatic hydrocarbons' transition into cyclonaphthenes. His works on hydrogenation of benzene (benzol) and its deriv-*

*atives composed the subject of his doctoral thesis (in 1876).*

In the future, all laboratories of the Baku Branch were transferred to the newly established Baku Technical Institute named after M. Azizbekov, which is nowadays the Azerbaijan State Oil Academy. The decree on the establishment of high school was signed by Nariman Narimanov, chairman of Azrevkom on the 14th of November, 1920.

V.V. Markovnikov, who had repeatedly been in Baku since 1870, for more than 10 years successfully engaged in researches of Caucasian and Absheron oil, for which he was awarded a premium after Professor P.A. Ilyenkov.

*Markovnikov Vladimir Vasilevich (1837/8 - 1904) - well known chemist-organic, a Professor and founder of the scientific school. He studied at Kazan University at the camera branch of the faculty of law and at the same time was engaged in technology. After graduating from university, he acted as laboratory assistant to A.M. Butlerov. In 1865-1867 he took a business trip to Berlin, Munich and Leipzig, where he worked at the laboratories of A. Bayer, E. Erlenmeyer and G. Kolbe. Having defended his dissertation for his master's degree in chemistry, he received an associate professorship in the faculty of chemistry in Kazan. In 1874, he took the faculty of chemistry in Moscow University, where he arranged the chemical laboratory for scientific researches. The subject of his master's thesis was on "Isomery of organic combinations", and his doctorate was on "Materials related to the issue of mutual influence of atoms in chemical combinations". He established numerous regularities, including a rule named after him (1869). Markovnikov was one of the organisers of the Russian chemical society in 1868. Since 1870, he was engaged in research of Caucasian and Absheron oil and he invented naphthenes. His research conducted in the chemical laboratory of Moscow University was the preliminary stage in studying*

Absheron oil and ultimately led, to the occurrence of chemistry of alicyclic hydrocarbons as an independent scientific direction in the chemistry of oil. The major works in chemistry and chemistry of oil were published in "Magazine Russian Chemical Society", "Liebig's Annalen", "Zeitschrift für Chemie", "Bulletin Soc. chim. de Paris", "Journal für practisch. Chemie", "Mining magazine" etc.

*Ilyenkov Paul Antonovich (1819-1877) - the chemist-technologist, was educated in S.-Petersburg University. After getting his masters degree on technology in 1847, he started to deliver lectures on technology to students of the cameral faculty at the same university. In 1849, owing to the efforts of Ilyenkov and partly to his means a technical laboratory was arranged at the faculty. In 1865, Ilyenkov received a degree of the Doctor of Technology. Except for separate scientific works, Ilyenkov made the best work for his time "The Rate of Chemical Technology" (1851), whose second edition was published with additions 10 years later.*

In 1900, the international oil congress awarded Vladimir Markovnikov a gold medal for his research of Caucasian and Absheron oils. In Paris, at the first international oil congress he reported on Russian oil, in which the chemical compounds of Baku, Grozniy, Galichiyask and Pensilvansk oils were presented, and their characteristic differences were noted.

Major works in the research of Baku oil belonged to the "Nobel bro." company whose employees in the chemical laboratories in S-Petersburg and Baku carried out complex research on Baku, Caucasian and Cheleken oil.

Thus, in 1901 in Germany, in the publishing house of "Vieweg und Sohn. Braunschweig" a book by R.A. Vishin, a Baku engineer and manager of the paraffin department of the "Nobel bro." company, "Naphthenes (cyclic polymethylenes of oil) and their position in a number of other hydrolyzed

cyclic hydrocarbons" was published, which represented the first full systematized scientific work on naphthenes, becoming the irreplaceable directory on this group of organic combinations.

In K.I. Lisenko's report, published in 1876, there were facts testifying the impossibility of the acquiring of technical progress in Baku kerosene factories under the operating Rules in 1872. The special commission established under the IRTS for the removal of obstacles for the development of the oil business, came to a final conclusion on exemption of the petroleum industry from any taxes for at least 10 years. Only in September 1877, by decision of the State Council, the excise Rule of 1872 was cancelled.

Documents testify, that they might have also dissolved the work of the IRTS's commissions, to which progressive scientists and oil industrialists (D.I. Mendeleyev, K.I. Lisenko, L.E. Nobel, H.Z. Taghiev, V.I. Ragozin) were involved, who explained the necessity for carrying out radical restructuring in the tax policy for acquiring significant income in the near future.

At the end of XIX Century and at the beginning of the XX Century the first researches on oil problems were carried out as follows: D.I. Mendeleyev's "Oil industry in North-American state of Pennsylvania and on the Caucasus" (1877), "Where to build oil factories" (1881), "Baku oil business in 1886", K.I. Lisenko's "Oil manufacture" (1878), V.V. Markovnikov and V.N. Ogloblin's "Research of the Caucasian oil" (1883), V.G. Shuhov's "Mechanical constructions of an oil industry" (1883), "Oil pipelines" (1884), "Pipelines and their application to oil industry" (1895), V.I. Ragozin's "Oil and an oil industry" (1884), D.P. Konovalov's "the industry of the United States of Northern America and modern receptions of chemical technology" (1894), G.E.





Konstantin Harichkov

Startsev's "Baku oil industry. Historical and statistical essay" (1901), K.V. Harichkov's "About composition and technical properties of Russian oil wells" (1902), "Cold fractionating of oil" (1903), I.N. Glushkov's "Guidelines to drilling wells" (1904), "Exploitation of boreholes. Extraction of liquid minerals: oil and brines" (1913), V.F. Simonovich's "Oil and oil industry in Russia, historical-statistical essay" (1909), G.N. Kizhner's "About an origin of oil" (1915), M.I. Ginzburg's "Oil and Baku oil industry" (1915),

S.A. Vyshetravsky "About it oil facilities of Russia in connection with the future of the Absheron" (1915) etc.

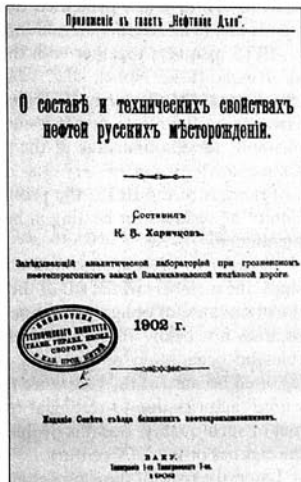
It is characteristic that all these works at the beginning were reported at the IRTS assemblies (basically, the BB), and then issued in separate monographies. IRTS members were publishing articles on major issues of exploration, drilling and operation of oil in the magazine "Works of the BB of the IRTS" and in the newspaper-magazine "Oil business" (Neftyanoye delo), published in Baku starting from 1899. (In May 1920, this edition would be renamed to the magazine "Azerbaijan's oil industry" which is still published).

Almost all the inventions relating to the oil business were discussed at general meetings of the BB of the IRTS and certain decisions were made. For example; on the 12th of April, 1886, engineer A.A. Bulgakov acted with a report "Combustible gases as a source of moving force" and chemist K.V. Ha-

richkov in 1892, reported on new methods of chemical analysis.

D.I. Mendeleyev' a trainee under the influence of his teacher moved to Baku where his talent as a scientist-oil chemist was revealed. Except for two books (which were both published in Baku in 1902-1903) he wrote more than 100 scientific works on chemistry and oil refining. Having researched in detail, the chemical properties of Absheron and Grozny oils, in 1899 Harichkov noted, that "... Grozny oil, and particularly the parts that boil at low temperature, give out many nitro compounds as they consist mainly of naphthenes with a six-carbon skeleton whereas in Baku prevails naphthenes with a pentatomic kernel".

The engineer-chemist F.A. Inchik received a patent for the invention of "Improvement during the process of refining lighting and lubricant oils". In 1906, oil chemist V.F. Herr, manager of the chemical laboratory of the BB of the IRTS and the editor-in-chief of the magazine "Works of the BB of the IRTS", researched the compositions of Surakhani, Bibi-heybat and bal-



K. Harichkov's oil book printed in Baku

akhani oils, proving that they mainly consist of naphthenes and aromatic hydrocarbons.

In 1912 S.K. Kvitko was given the patent No 21963 for the invention of "Acquiring gasoline by using high-temperature splitting of the mazut under pressure and without it" (he patented this invention a year before the American W. Barton). However test installations for the cracking-processing started only in 1925. S.K. Kvitko's invention before the war was assumed to be used by the naval ministry with the purpose of processing part of the oil from state sites. Partly, the equipment from abroad was already ordered, but the start of World War I prevented the realization of the envisaged plan. (The Azerbaijan's oil industry, 1925, # 5, p.9).

IRTS members together with the largest oil-industrialists of Russia (L.E. Nobel, H.Z. Taghiev, M. Naghiyev, S. Asadullaev, V.I. Ragozin, I. Hajinsky) held reports and discussions on the most current issues of the oil business. For example: for the first time at the sessions of the Baku and Caucasian

Branches of the IRTS, the prompt expansion of application of oil residues for heating in industry and transport was mentioned.

In order to prevent fires and explosions in factories and ships, the members of the BB of the IRTS in 1881, supported the observance of obligatory temperature of flash (Tf) for oil residues not below 70°C. However, developed in 1882, the rules on ostentation of necessary Tf (70°C) they were not legalised because of the resistance of middle oil industrialists whose factories due to technical reasons could not develop fuel of such quality. So, this problem was not solved during the eighties of the XIX century.

Later, the issue of the establishment of obligatory Tf norm was again raised on the demand of large companies (The

Nobel brothers, Rothschild brothers, H.Z. Taghiev, S.M. Shibaev). In 1898, in the BB of the IRTS V.M. Latkin's report "to the issue of establishment of normal temperature of flash for oil residues" was discussed. In this report, he proposed to establish a Tf equal to 60°C as that time in the markets of Russia Grozny's mazut with Tf up to 60°C was also used. After discussions over the proposed report the special commission was established, which was considered suitable for export to Russia the oil residues only with a Tf. above 70°C, that is, the commission appeared to be on the part of large companies.

In 1902, at the IRTS special commission under K.I. Lisenko's chairmanship relating to fires in oil barns (warehouses) was formed. The structure of the commission included known chemists and engineers - N.S. Kurnakov, Ya.G. Krussel, N.I. Pantyuhov, A.I. Odintsov, A.I. Stepanov (winner of "Ludwig's" Nobel Prize) and P.I. Sokolov. In the conclusion directed to the BB of the IRTS, the commission supported the desirability of regulating the size of barns according not to poods of capacity, but to the area, which they occupy.

In 1882, from the 23rd of August until the 14th of September, the work of the first congress of the IRTS in Moscow was lightened in central and Baku media. At the sessions of this congress a broad range of questions were considered, including the oil business: The role of the "Nobel bro." company in the oil facilities of Russia also were discussed. The essence of the problem was the following: a company, using a weak position of oil-industrialists, in the summer of 1882, suggested that all other factory owners hand over to it, for cash payment, all crude kerosene produced by them. That is, there was an attempt to control all kerosene trade in Russia.

The proposed offer of the "Nobel bro." company was criticised by some members of the BB of the IRTS: thus, V.B. Abramovich in his report declared a formation of new "transportation" monopoly, which without any words, can be competed. He openly called for the necessity of "providing railways by themselves with carriages, accessible to any consumer".

L.E. Nobel acted against such charges at session of the S.-Petersburg branch of the IRTS with an extensive report "About the petroleum industry of Russia"; where he listed the merits of company in the development of the Russian (in particular, the Baku) oil business, especially in forcing out American kerosene from the Russian market.

Here it is pertinent to note, that the "Nobel bro." company took a visible place not only in Russian, but also in the world's oil industry. In 1899, the company (already managed by the son of Ludwig - Emmanuel Nobel) extracted 93.9 million poods of oil that made 17.7% of (Russian) and 8.6% of world oil extracting. The "Nobel bro." company during this period was the first-ever vertically integrated oil company with a very high level of integration. The Russian treasury received the largest incomes (in the form of excise) as a result of the activities of this company. The leading position of the company in the Russian (Baku) oil business, in our opinion, can be explained, first of all, by Ludwig's, Alfred's and Emmanuel's technical-engineering and administrative talents.

During the same period (the 1890's) one of the largest oil companies "H.Z.Taghiyev" prepared the special charter on the establishment of the All-Russian syndicate, which was exporting oil to foreign markets. On January 11th, 1886, Haji Zeynalabdin Taghiyev spoke at a session of the BB of the IRTS and reported "How to leave the crisis in the oil indus-

try". Mainly, the report was devoted to the organisation of the export of kerosene. The matter was that, in the crisis conditions of the petroleum industry when the domestic markets were already completely full with produced oil products, Baku entrepreneurs decided to move toward the foreign markets.

Taghiyev considered that it was necessary to be united in the union of kerosene manufacturers, which completely would destroy the local market competition and would accelerate the capturing of foreign markets. He believed that, the union within an association, in future, would lead to an increase in the manufacturing of Baku kerosene factories, at least, by 50 million poods (in 1885, in Baku 30 million poods of kerosene was produced) and to reduce prices in the export market. "This measure may exist until the time we take back from the Americans the markets which are necessary for the surpluses of our manufacture, but we think with some probability, that the Americans will not be late to enter into agreement with us, and we shall divide the markets in order to stop a mutual competition" - explained Taghiyev to press. (Caspian, 18.02.1886) "Caspian" - the daily, political-literary newspaper, has been published in Baku since 1881 by the known public figures of Azerbaijan, H.Z. Taghiyev and A.M. Topchibashov.

H.Z. Taghiyev's idea proposed in 1886 moving to world markets with the subsequent separation of spheres of influence was repeated by V.I. Ragozin three years later. (Caspian, 22.01.1889) And, both entrepreneurs considered, that the contract with the Americans on the distribution of the markets was possible only in the case of success in competition, which could be won in case of the establishment of union of the Baku kerosene manufacturers. Taghiyev's report on the kerosene trade was so actual at that time that it was

printed out and distributed to all members of the BB of the IRTS and oil industrialists.

Later, in 1893, Taghiyev's idea was brought into life in S.-Petersburg, at a meeting of oil industrialists the "Union of Baku kerosene manufacturers", which later being the monopolistic syndicate controlled the sale of oil products both in internal, and in external markets. More than 95% of oil refining was the share of oil industrialists, united by the "Union", which included: the "Nobel bro." company, Rothschild's "Caspian-Black Sea society", and also a group of minor and middle oil-industrialists who joined "Baku standard".

The issue of the construction of the unique Baku-Batum kerosene pipeline was repeatedly discussed at numerous sessions of the IRTS. It is necessary to note, that the first people to speak about the advantages and necessities of the given pipeline for the Russian empire were D.I. Mendeleyev, I.P. Ilimov, H.Z. Taghiyev, the Rothschild Brothers and the Nobel Brothers.

Thus, already in 1889, after the death of his father - Emmanuel Nobel finished the construction of the 70 kilometer pipeline along the railway of Baku-Batum in a mountainous area Kvirili-Mikhaylovo through the Suramsky pass to overcome the problem of a mountain obstacle on the railway export of kerosene to Batum.

In his book "Baku's oil business" in 1886 Mendeleyev noted that, "... 160 Baku wells gave almost as much oil, as 24 thousand wells in America. But such enormous riches of the Absheron, did not correspond the means of export of oil from the Caucasus, and extracting as much as America, Russia exported 6 times less oil... It's more favorable for the country to increase demand for oil in other cities of Russia, which could be possible by several railways connecting Baku with other places of consumption. But most importantly it is

necessary to say that the Transcaucasian oil pipeline Baku-Batum, with which the Caspian oil will go to the coast of the Black Sea, and from there to all countries of Europe".

The idea of constructing a kerosene pipeline (product pipeline) was also supported by the Baku oil-industrialists (H.Z. Taghiyev, S.I. Baghirov etc.), who submitted on October 3rd, 1886, an application regarding this to the Minister of Finance N.H. Bunge, on March 23rd, 1887, to the Minister of State Property M.N. Ostrovskiy and on March 30th, 1887 to the grand prince Mikhail Nikolayev.

It is worth to note, that the discussion of the project of the Baku-Batum kerosene pipeline at sessions of the IRTS in 1885-1887 passed very loudly as not all of the scientists and oil-industrialists were in agreement in regard to this issue. Serious discussions on the given problems took place also in the Society for the Assistance of Russian Industry and Trade (February, 1886) where reports from D.I. Mendeleyev, H.Z. Taghiyev, I.P. Ilimov, M.I. Lazarev, V.I. Ragozin, L.E. Nobel and other supporters and opponents of the export of crude material and oil products abroad were heard.

The society with the majority of votes supported the construction of the kerosene pipeline and spoke against the prohibition of the export of crude oil, having directly reported their decision to the Ministry of Finance of Russia.

On the 21st of June 1907 (the construction of the pipeline lasted exactly 10 years) construction of the world's largest kerosene pipeline Baku-Batum, at a length of 829 versts was finished. The kerosene pipeline, costing about 50 million rubles and belonging to the Transcaucasian railway, subsequently rendered invaluable help to Russia in the struggle against the American oil policy, having opened access of Baku oil to the world market. (Starting from 1932, after the reconstruction and maintenance for the export of oil, the

kerosene pipeline became an oil pipeline).

The IRTS also had huge merit in perpetuating the memoiry of Ludwig Nobel (1831-1888), who significantly contributed to the development of the oil-industrial complex of Russia, and in particular, Azerbaijan .

L. Nobel was one of the founders of the IRTS and its most active member. In 1859, in his articles published in "Magazine for shareholders", Ludwig declared an idea of creation to the scientific and technical society uniting scientists and engineers with industrialists. He not only acted by writing reports in the IRTS and participated in the work of various commissions, but he also rendered material aid to the Society.

Being a honorary member of the standing commission on the technical education of the IRTS from 1884 to 1888, Ludwig secretly (through academician A.V. Gadolin) made contributions to the IRTS of 5000 rubles for various technical developments, which allowed the Society to carry out actual scientific researches, including the development of measures on the introduction of the metric system in Russia.

*Gadolin Aksel Vilgelmovich (1828-1892) - the scientist-crystallographer. A general from the artillery, honorary Professor of Mihaylovsk Artillery Academy and the Institute of Technology. A doctor of mineralogy, an academician of the Imperial Academy of Sciences. In 1847, he graduated from Finnish military school and was admitted to Mihaylovsk artillery school, and upon completion he was appointed as a teacher of physics in the same place. In 1866, he was employed as a Professor of Technology in the Artillery Academy; his scientific works on mineralogy, technology and different branches of artillery science. In 1858, Gadolin was sent to America to collect data on artillery technology. As a member of the artillery committee, he took an active part in the development*

*of new kinds of instruments, and was engaged in the improvement of powder making and the introduction of smokeless gunpowder's etc. Gadolin wrote a lot of textbooks, both for the artillery school, and for the Institute of Technology. In the Academy of Sciences he chaired the faculty of applied physics, but his favorite subjects remained to be crystallography and mineralogy: the main theoretical conclusion on the existence in nature of a possible 32 kinds of symmetry crystal systems and their divisions with one general beginning is connected with his name. Gadolin was one of the founders of the new school of crystallography, considering this science as a pure mathematical (deductive).*

After Ludwig's death the "Nobel bro." company made a decision on the establishment of the prize and gold medal named after L. Nobel, having transferred capital in the amount of 6000 rubles to the IRTS fund, thus, having made "the List of the main bases" for the regulations of this prize. Considering Ludwig's huge merits in the development of the oil business in Russia, the IRTS's Council approved on January 18th, 1891, regulations on the prize, taking into account "the main bases" (RGIA, f.90, op.1,d.322,l.27)

The prize named after L. Nobel for the best works "on metallurgy or the oil-industry in its general volume or for any outstanding inventions and improvements in the techniques of these manufactures, considering most their practical application to the development of the industry in Russia", founded at the IRTS in the amount of about 1200 rubles, was awarded three times: in 1896, 1898 and 1905.

Results of the rewards were published in the "IRTS" notes, "Baku provincial news" and in the most widespread capital newspapers. ("Baku provincial news" - a weekly journal published in Baku since 1894). The first "Ludwig" premium and gold medal with its structure was received in 1896 by engi-

neer-technologist Aleksey Stepanov (1866-1937) for his research of the "Basis of the theory of lamps".

Oil industrialists "Rothschild's" "Mazut" and "Shibaev Sidor", contributed capital in the amount of 15000 rubles in Baku in 1904 they also founded a premium named after Emmanuel Nobel, which stood for the best works or inventions in the field of the oil business and was about 1000 rubles (the sum of the premium was annually determined by the BB of the IRTS). Candidates for the award could be both Russian, or foreign applicants. It is characteristic that the works presented for competition, should be supplied by motos, and the name of the author written in a closed and sealed envelope enclosed with the work, and announced only after the awarding of the premium. "Emmanuel's" premiums were awarded only three times in 1909, 1911 and 1914.

The first "Emmanuel" premium was awarded in 1909, to the head of the chemical laboratory of the BB of the IRTS Victor Herr (1875-1940) for his work "Acquiring of dibasic acids by the oxidation of narrow oil fractions by nitric acid".

*Emmanuel Nobel (1859-1932), the worthy successor of his grandfather's and father's business in Russia. In 1888-1917 he headed all of the enterprises of the Nobel family in Russia. In 1918, on political grounds he had to leave Russia to go to Sweden.*

The role of the IRTS, particularly the BB of the IRTS in the development of the Baku oil business is clearly visible from the above mentioned. The BB of the IRTS carried out collective researches, organized lectures (for example: reports of professor N.D. Zelinsky on toluene and process-engineer S.A. Vishetravsky about the practical acquiring of benzene and toluene from oil and coal, conducted by them in December 1915, in the BB of the IRTS), in schools, courses, exhibitions etc. Thus, up to 1900, the BB of the IRTS opened

four free-of-charge national reading rooms in the working settlements of Baku, in the Black and White cities and also, in Balakhani and Bibi-Heybat.

*Zelinsky Nikolay Dmitrievich (1861-1953) - the well-known oil-chemist-organic; before his appointment in Moscow was giving lectures at Odessa University. Being the Professor of the Moscow University he repeatedly visited Baku with the purpose of studying the structure and properties of the Absheron oils. In 1915, he invented a coal gas mask. Since 1929, he was academicien of AS of the USSR. He was one of the organizers of the Institute of organic chemistry of AS of the USSR in 1934.*



*Zelinsky Nikolay in 1889.*

*(Nowadays the institute is named after Zelinsky). He was one of the founders of organic catalysis and oil chemistry; he has written fundamental works on the chemistry of hydrocarbons of oil and their catalytic transformations into the products of higher chemical value.*

Scientific works of Russian (Baku) scientists essentially influenced the world's oil industry. In 1918, on the basis of the works of Markovnikov, Zelinsky created catalytic ways of acquiring gasoline from the heavy oil residues. L.G. Gurvich developed a physical and chemical basis of refining oil and oil products, having improved the methods of processing.

High class specialist, engineer-chemist Gurvich organized the first factory chemical laboratory in Baku. Since.

September 1900, until August 1901 he edited the weekly journal "the Chemist", the reporter of chemical technology and laboratory practice", published in Vilno; and later, from 1911 to 1917 he became the scientific supervisor of the chemical laboratory in the Central Administration of the "Nobel bro." company in S.-Petersburg. Gurvich's research on the technology of oil refining has not lost its value today. His world famous work "Scientific bases of oil refining were published for the first time in German in 1913 in Germany, and the first Russian edition was issued in Baku in 1921. (Until now this is still considered a very valuable educational supply for oil-chemists and technologists). In 1920, Lev Gurvich was elected the professor of both Baku Polytechnic Institute, and Azerbaijan State University (founded in 1919). He is a founder of the Baku Scientific School of chemists-technologists in oil refining.

Industrial classification of the Caucasian and Absheron oil and methods of their refining was developed by K.V. Harichkov, N.D. Zelinsky, A.M. Butlerov and M.M. Khanlarov. In 1902 they established, that cyclic hydrocarbons of oil are not motionless systems and by means of some chemical reactions can be transformed to spirits and acids. In their scientific classification they, divided the oil into two parts: paraffin (with the greater content of paraffin and rich with limited hydrocarbons) and non-paraffin (or with naphthene).

The works of A.M. Butlerov on the polymerization of alkenes, and N.D. Zelinsky on the catalytic transformations etc promoted the emergence of a new direction in the chemistry of oil and oil-chemical synthesis.

Historically the developed role of Azerbaijan as the main oil base of the Russian empire and the merits of the above mentioned scientists, engineers, inventors, together with tal-



*Alexander Benkendorf*

ented entrepreneurs (V.A. Kokorev, P.I. Gubonin, H.Z. Taghiyev, L.E. Nobel, E.L. Nobel, V.I. Ragozin, A.M. Benkendorf, M. Naghiyev, S. Asadullaev, M. Mukhtarov, I. Hajinsky, I. Ahverdov etc) defined the way of the rational development of the oil business both in the Absheron, and across all Russia.

## ESSAY IX

### THE ROLE OF BAKU OIL IN THE SCIENTIFIC ACTIVITIES OF MENDELEYEV

The scientific importance of an individual is determined not only by what he left as a legacy, but how he used to encourage his contemporaries and next generations via them.

#### *Heinrich de BARY*

The oil topic had interested D.I. Mendeleev since the early 1860's when he became the Professor of Saint-Petersburg Technological Institute and made his first visit to the Caucasus and Absheron (Baku) in 1863.

We should note that starting from 1860 this scientist had been studying extensively and deeply all issues related to the development of the oil industry in Russia for over 40 years and visited the Baku oil region several times - 1863, 1880, 1884, 1886 (twice).

*Mendeleev Dmitry Ivanovich (1834-1907), a prominent scientist chemist was born in the Siberian city of Tobolsk. After finishing his studies at the grammar school, he was admitted to the Saint-Petersburg Pedagogical Institute; being a student, he wrote the work on isomorphism. In 1856, he started to work as associate professor at the Saint-Petersburg University where he obtained a master degree due his successful dissertation. In 1859, he was engaged for two years on a long scientific expedition abroad; then, he was working in Heidelberg at the laboratories of Robert Bunsen and Gustav Kirkhgoff. The scientist had also participated in the International Chemical Congress in Karlsruhe. In 1863, he was nominated the post of Professor at*

*Saint-Petersburg Technological Institute; 3 years later, he wrote the dissertation work to obtain a doctorate of chemical sciences. From 1866 to 1890, he had been the chemistry Professor of the Saint-Petersburg University and since 1893 - as the administrator of the Main Chamber for Weights and Measures (later known as the All-Soviet Scientific Research Institute named after Mendeleev). In 1868-1870, he wrote the book entitled "The Basics of Chemistry" where for the first time; he demonstrated*



*the principle of his Periodic System of elements which had resulted in discovering new elements and new formations. This writing published in the 7th edition in Russia in 1906 was translated into many foreign languages. He is also the author of countless fundamental research works relating to chemistry, chemical technologies, oil business, physics, metrology, aerostatics, agriculture, economy and public education. Among all his creations, we can also note the following: "Correlation of features with the atomic weight of elements" ("Journal of Russian Chemical Society", 1869, chapter 1); "Zur Frage uber das System der Elemente" ("Ber. d. Deutschen Chem. Ges.", 1871, 348); "About Gas Pressure" ("Journal of Russian Chemical Society", 1875); "Studying the water solution by its specific gravity" (Ibidem, 1887) etc.*

For the first time, Mendeleev arrived in Baku by the request of Vasily Kokorev, owner of the kerosene plant in Surakhani. In 1859, the Russian entrepreneurs like Vasily



Kokorev and Peter Gubonin, as well as the German baron H.E. Tornow constructed the first in The Absheron - a large kerosene plant (later, in 1874 Kokorev created the complete oil industrial company called "Baku Oil Society" in Baku). From the 6th of September to the 8th of October 1863, Dmitry Mendeleev was working with Kokorev, carrying out research works on oil refining and giving many proposals to improve the kerosene production.

Having applied a whole set of recommendations to the scientist, the enterprise significantly improved the kerosene product. In 1867, the Surakhani plant was already producing 100 thousand poods of kerosene per year which supplied Moscow, Saint-Petersburg, Baku and other big cities of the Empire. Later on, advices of Mendeleev had been taken into account in the plants of N.I. Vitte, H.Z. Taghiyev, V.I. Ragozin, L.I. Nobel and S.M. Shibayev.

Not concentrating on his achievements, Mendeleev started another expedition to the North Caucasus, in Grozny where he was studying the oil business and in particular, oil transportation from Grozny to the port of Petrovsk (Makhachkala) and then, by the Caspian and Volga.

Mendeleev says, that a pioneer oil business in Kuban is A.N. Novosiltsev: "Oil extraction in Kuban already has its roots in this area and this business will hopefully not fade away, but will be revived... Novosiltsev had obtained the first oil fountain in Russia (Kudako settlement) and built the large fanagory kerosene plant". Accepting oil refining as the main task in the oil business, the scientist had noted that "Novosiltsev had well understood the gist of the affair: he had founded the plant in Taman... The name of the first driller of the Kuban region is colonel A.N. Novosiltsev. His name will not be forgotten in Russia".

It should be pointed out that since 1860, export of

American kerosene into Europe is taking place; meanwhile, in 1863 Baku (Balakhani) kerosene is also starting to be produced in Russia which was called as photonaphtil. But kerosene made from Balakhani oil was inferior in its quality in comparison with the American one. Local kerosene prices were also lower than the latter.

Enterprises which had been dealing with oil extraction and refining were on a drastic rise both in US and Russia, but Russia had been lagging behind US at the rates of oil extraction in 1870. The reason was linked to the lease-out system which still existed within Empire in that period. By the order of the Ministry of Finances in 1877, Mendeleev had elaborated the report about the status of the oil business in Russia where he had strictly indicated the necessity to abolish a lease-out system applied on oil. During one of his meetings of the Baku Branch of the Imperial Russian Technical Society (the BB of the IRTS) the scientist had noted that first of all, it is important to abolish the lease-out system at an excise on kerosene for the creation of a complete oil industry and which will lead to the capitalistic development of Russian oil business.

In his letter to M.N. Ostrovsky - minister of public properties of Russia (brother of famous playwright A.N. Ostrovsky), he explains: "The Baku oil industry promises to meet all expectations once it gets the freedom and this will happen when non-existing possibility of the export of inexpensive and various Russian oil goods in large quantities to world markets will be ensured".

During the oil crisis of 1874-1875, oil and oil products (kerosene) prices in Russia fell drastically. The government commissioned a study of the situation of the oil business in Baku and Saint-Petersburg. Being a member of one of such commissions, Mendeleev had noted the following:

"...Together with other members, I thought that the unique efficient measure which can eliminate this evil and serve to further development of our oil business is to abolish fully any excise on oil. But the issue was complicated because not everyone had understood that the loss of 300 thousand rubles collected for the Treasury as excise will be compensated by development of the oil business for many millions of rubles..."

The scientist wrote: "Having in mind the intention to depart for an exhibition organized in America, I wanted to collect some data which can clarify the situation of oil in the United States and declared it to the commission. My desire coincided with the purposes of commission and wishes of the Ministry of Finances to get information about the situation with the oil business in America..."

In 1876 (from June 21 to July 12), Mendeleyev visited the USA to participate in a World Exhibition held in Philadelphia. The main purpose of the visit was to define the reasons for the price fall in kerosene and precisely the contemporary status of the oil business in America (the Russian Ministry of Finances which had organised this visit had vital interests in this cause). After studying and analysing such American reports "Reports of a Commission appointed for a revision of the revenue system of the US" for the years of 1865-1866 as well as "Laws of the US relating to internal revenue", Mendeleyev came to the following conclusion: "... It is not difficult to produce kerosene from Pennsylvania oil because the oil itself, possible to say, is the non-pure kerosene and the separated part is just something more than its fifth part. Our Baku technologists do not need to learn anything from Americans about refining. It is possible to borrow some mechanical devices, but it can be usefully used only in such large plants as American ones".

One year later after the visit to America, his fundamental book entitled "Oil industry in North American State of Pennsylvania and in the Caucasus" came into light where the scientist had written the following by concluded all he had seen in the USA: "Taking lessons from America, it is expedient to accumulate greater capitals and choose special fields of oil industry and pay the efforts of personal entrepreneurial skills for oil business..."

His journey to America had brought the scientist to the fact that it is absolutely wrong to produce only kerosene from oil. He used to say: "...this mistake is pardonable and historical, but ruinous. It was related to the reason that Baku oil and American oil had been considered as the same ones." In this case, Mendeleyev thought that Russian oil business had been depending fully on American (on price of American kerosene). For this issue, Mendeleyev had also received the support for Konon Lisenko who expressed the following opinion in one of the meetings of IRTS in 1876: "Here is the result which had been generated for us by a decision to ensure important technical economic terms at the basis of Western examples... Our aspiration to solve issues like it takes place in the West made us forget about our independence".

By finalising "the American" topic, we shall make reference to one of the main conclusions reflected in the book of the scientist written by him after his visit to America: "Excise which limits oil production should be abolished in our country like in America... A large tax is out of the question. Otherwise, it will breakdown fully the production, and less tax will not be a sound measure".

It is interesting that M.Kh. Reytern, minister of finances in Russia in that epoch, who treated previous proposals of Mendeleyev as "the Professor's dreams" had finally understood the scientist. This had led to the final abolition of excise

in 1876 and the Russian oil business had started to advance intensively. The result, since 1887 Russia had begun to use fully its own (Baku) kerosene.

The next visit of the scientist to the Caucasus took place in 1880. It had covered Baku, Grozny, Vladikavkaz, Tiflis, Batum and Novorossiysk. The main purpose was to clarify why oil production in Baku is just 7 million poods, while there are large quantities of oil; and what hinders its production; why Baku and Kuban oil fields located near the sea are used so inefficiently...



*Vladimir Mendeleev*

On May 29-30, 1880, Mendeleev together with his son Vladimir visited oil fields of H.Z. Taghiyev; he participated in the opening of oil fountain named as Vladimir Mendeleev.

In his letter sent from Baku to Petersburg's newspaper "Golos" (1880), he wrote the following: "The most important thing worth mentioning: there is no place like this one where you can find so much oil. I saw oil resources in Pennsylvania and

can say with full confidence that here, oil is much more and oil extraction is easier... Recently, I have participated in the opening of a fountain (named after my son) in the oil field of Mr. Taghiyev... The well in depth is 50 sazhen has been drilled by Mr. Lenz, a local famous technician. His method of drilling is really impressive and adapted well to local soil conditions. The well drilling had been cleared in our presence and after first 10-15 minutes it produced such a strong fountain that stones weighing 20-30 feet were thrown up in the air

by oil pressure... There is some quantity of oil. We should clarify volumes of oil that can lighten Russia, East and West. It is not enough to do it in large quantities only by the force of Baku residents: they have made what they could and did it successfully. There is a need... for new forces, knowledge, foresight and skills..."

In his article entitled "What is to be done with Baku oil?" published in "Golos" newspaper (22.09.1880), Mendeleev kept his independent opinion while considering the rational positioning of the oil refining industry and sometimes conflicting with the oil industrialists. The scientist used to prove that oil plants should be constructed not in the places of its extraction, but in places where there are all necessary materials for organizing oil products as well as good manpower; e.g. it should be done in places where the oil delivery is profitable from an economic point of view.

On the 21st of October 1880, in his article "About the issue of Baku oil" ("Novoye Vremya" newspaper), Mendeleev had sounded his remarks about Ludwig Nobel and Konon Lisenko, who made statements against his idea on the rational positioning of oil refineries. In his articles, the scientist had proposed for the first time to use oil residues remaining after kerosene separation for production of lubricants. He noted that Baku oil is ensuring more than 20% of high quality lubricants while the Pennsylvanian oil is giving just 7%; for this reason, he recommended generating



*Haji Zeynalabdin Taghiyev*

from Baku oil - 10% of spindle oil, 23% of engine oil and 7% of Vaseline, e.g. almost 40% of lubricant from the overall weight of oil.

In this regard, it should be noted that in spite of tense relations formed between Mendeleev and Viktor Ragozin, talented oil industrial (1833-1901), the scientist had highly valued his active works in the Russian oil business. After his return from the Caucasus (1880), he wrote: "first of all, I judged necessary to discuss the issues again with Mr. Ragozin, famous oil industrial; during last years, he had already succeeded using quality Baku oil for generating excellent lubricants which resulted in good sales and a high price inside Russia and outside the country!".

We should note that in 1878, V.I. Ragozin demonstrated samples of Russian lubricants during the Paris World Exhibition, and these products won many competitions for their quality.

It is at the plant of Ragozin (located in Konstantinov); Mendeleev tested his apparatus of uninterrupted oil refining. In 1882, the industrial uninterrupted oil refining proposed by Mendeleev was realised for the first time by the Baku plant "The Nobel Brothers" (these enterprises had produced more than 106 thousand tons of oil products: lamp oil, straw oil, spindle oil, engine oil and cylinder oil).

Furthermore, Russian lubricants generated from Baku oil at the plants of Rogozin (on Volga); plants of Frolov, Roys and Petukhov (in Saint-Petersburg); Nobel, Rothschild, Taghiyev, Shibayev and others (in Baku) had successfully conquered the positions of American lubricants from France, England and other European countries.

The role played by D.I. Mendeleev is significant in the development of the BB of the IRTS (founded on March 24, 1879) where Movsumbek Khanlarov (1857-1921), the first

Azerbaijani Doctor of Chemistry, who came to Russia from Germany in 1884, had started to work by the recommendations of Mendeleev, N.A. Menshutkin and D.P. Kononov. Later on, M.M. Khanlarov will be elected as the member of revision commission of the BB of the IRTS.

In 13 May 1886, Mendeleev came back to Baku. His speech at the meeting of the BB of the IRTS on May 19, 1886 had been devoted to the measures for further development of the Baku oil industry. On May 21, the scientist sent a letter to Semyon Kvitko, Baku mining engineer describing in detail the method of observation of oil levels in wells located near Balakhani and Sabunchi oil fields.

Later in Saint-Petersburg, the 1st and 2nd meetings of the commission under the Ministry of Finances of Russia related to the tax issues on oil with the participation of Mendeleev, as the representative of the Baku Exchange Society and the Ministry for Public Properties, held on December 8 and 15. During these meetings, the scientist had presented a detailed report entitled "Lamp kerosene of Russian and American oils".

In his book "Baku oil business in 1886", Mendeleev summarises the results of his research works fulfilled by him during 1860-1880, at the request of Vasily Kokorev and Ludwig Nobel, oil industrialists.

Mendeleev wrote in his book the following: "All that I have seen and studied in Baku had brought me to the idea that it is very important to speak loudly and insistently on establishment of plants in the center of Russia - the time is right for that". Later, in his message sent to Nikolay Bunghe, minister of finances (1886), the scientist had noted inexpediency of imposing tax on oil products. In the same year, the article of Mendeleev "About the issue of oil pipeline" had been published in newspaper "Novoye Vremya" (New Time).

*Bunghe Nikolay Khristianovich (1823-1895) - the prominent economist and statesman of Russia. In 1881-1886, he was the minister of finances; from 1887 to 1895, he had been working as the chairman of the Committee of Ministers. He had done a lot for the preparation of currency reform (1897). N.Kh. Bunghe is also known as the scientist: since 1850, he had been the Professor of the political economy and statistics at the Kiev University. Starting from 1890, he had been the academician in the chair of the political economy at the same University. Main scientific writings of Bunghe are the following: "Basics of political economy and the theory of credit" (1852); "Course of Statistics" (1865); "Historical Survey of Economic Studies and various fields of economy" (issued in 1869-1871) and many other original works done in the field of economy. In general, Bunghe had been in the middle of an old classical school of economists and an emerging new historical one. He had preferred the latter. It is obvious that his main achievements as the minister of finances had been the direct result of realisation of his scientific vision formed long before.*

Mendeleyev linked the problem of the Baku-Batum pipeline construction and its long lasting debates to the rational use of oil wealth. Newspaper "Bakinskiye Izvestiya" wrote (in 1884): "The very future of our oil export depends mainly on reduction of transportation prices to the extent that any lowering of prices for American kerosene could not replace our oil products from foreign markets".

However, the idea of the construction of a kerosene pipeline was not supported by all. For example, the Ministry of Agriculture of Russia had sought the construction of pipeline as inexpedient and it's organizing and financing had been put on the shoulders of oil industrialists. Oil industrialists in this issue had not been of the same opinion. Mendeleyev had been disappointed by it: he wrote the following (in 1888): "If

now I could stop and concentrate on these issues of the Baku industry, it will happen only because of rejection of Baku-Batum oil pipeline which in my opinion could direct Baku oil business in undesirable direction and deprive Russia industry for any success".

Furthermore, he used to say: "The oil pipeline is still being constructed and our talks on this have continued for the last five years, but in the reality, everything is still unclear".

Early in 1885, during the meeting of IRTS about the issue of kerosene pipeline and measures to develop the oil business in Russia, Mendeleyev had been considering a pipeline "as a tool of inexpensive delivery of Baku oil to the shores of Black sea, as well as a mean to revive and develop all oil industry". In his report sent to Sergey Vitte, Minister of Finances of Russia (in 1895), the scientist is explaining the profit of Russia in "construction of oil pipeline from Baku and Grozny to the Black Sea and from Baku to the Persian Gulf, from Grozny to Volga etc."

Earlier, in 1888, he wrote: "Countries with hot weather, in particular China, and Dutch India are seeking and cannot find the way to produce safe lamp oil and will be the first consumers of Bakuoil if the latter will get an access to the Black sea shores". (Bakuoil is the Baku lamp oil invented by Mendeleyev and named by him due to his ignition temperature of 40 - 60oS, specific gravity of 0.82 - 0.84. It has been used in ordinary kerosene lamp).

*Vitte Sergey Yuliyevich (1849-1915) had been one of outstanding ministers of the Russian Emperors Alexander III and Nikolay II. In his activities, he had been representing the largest banking and industrial bourgeoisie. Being the minister of finances (1892-1903), he had undertaken a whole range of successful measures in the field of finances (introduction of gold currency, wine monopoly etc.); in the field of railroads*



Vitte Sergey

construction (initiator of construction of the Siberian railways: after the Siberian railways had been constructed, it became possible to transport oil products from "The Nobel Brothers" till Vladivostok). He had intensively supported the development of capitalism in Russia. In 1905-1906, he was the chairman of the Council of Ministers of the Empire. His memoirs called "Vospominaniya" composed of three volumes (published after his

death in Berlin and re-printed in USSR) are very important material to understand better Vitte himself, as well as the life of the elite society and the Imperial Court of the last three Romanovs.

In this case, it worth to point out that the famous oil industrialist Haji Zeynalabdin Taghiyev (1838-1924), the founder of the firm "H.Z. Taghiyev" in 1872 fully supported Mendeleyev in the issue of the pipeline by understanding the importance of its construction for the economy of native Azerbaijan. As a counterbalance to the opponents of this construction, he wrote a message to A.M. Dondukov-Korsakov, Main Administrator of Civil Affairs in the Caucasus in October 1886 about the necessity of the urgent construction of the Caspian - the Black Sea's kerosene pipeline. Furthermore, local entrepreneurs headed by Agabala Guliyev (1862-1924) had created joint-stock company in Baku which financed these works by the initiative of Taghiyev.

It is necessary to mention also the friendship which united

two prominent personalities of that epoch: on the one hand, the great scientist, inventor of the Periodic system of elements, the Periodic law and on the other hand, the largest entrepreneur on the Caucasus. They had been united by many factors: their love for the Motherland, economic interests that had been above all for them; enthusiasm and selflessness in doing the work.

The scientist had been fully supporting talented chemists and oil specialists and helped them with his advice and actions. The charity of Taghiyev had been known not only in Azerbaijan, but also far beyond the national boundaries of Russia. The photo of the scientist with engraved memorial writing had a feature on the table of Taghiyev in his room.

In encyclopedic dictionary of F.A. Brockhaus and I.A. Efron (SPb., 1897, volume 20, page 941) in "Oil" section, Mendeleyev had noted the services of Taghiyev for the development of the Russia oil industry:

"...Haji Taghiyev should be considered as a quite important local driving force of the Baku oil business with his great insistency. After having acquired the settlement of Bibi-Heybat located near the sea and Baku, he had started drilling works there; many drilled wells had been constructed by him which almost all had been fountaining; he also built the plant near the oil extraction locations; later on, Taghiyev started Russian and foreign sales and led all affairs with caution and the crisis taking place in Baku passed with tranquility. He continued to demonstrate to himself a clear example of the man who sought to accumulate immediately as many assets in the oil business through his rational approach to all operations while he had very few of them in the beginning (in 1863, I knew Taghiyev as a little merchant)".

In the years of 1880-1890, the company "H.Z. Tagiyev" had been holding 4th place by its capacity among its oil

refineries (the following firm "Nobel Brothers", Rothschild's "Caspian and Black Sea Society" and "The Caspian Company"). The book of Charles Marvin, famous English traveler, writer and journalist (1854-1890) named "Baku - the Oil of Europe" published in 1886 in London indicates that Taghiyev had been one of pioneers whose plants had been producing a new fuel from Baku oil - the petrol.

The staunchest advocates of the Baku-Batum kerosene pipeline construction had been the Rothschild's brothers - Baron Alphonse and Baron Edmund. In order to speed up the pipeline construction, they invested 1 million rubles in 4% bonds of internal loans in the Saint-Petersburg branch of Lyon Credit Society. In April 1897, on the eve of main construction works, Alphonse Rothschild had written the following in Saint-Petersburg: "I have all grounds to pin my hope that the venture which will be launched by us will yield profits due to the invested capitals and it will favour industrial and commercial development of the country".

On 16 February 1889, the "Novoye Vremya" newspaper published the article of Mendeleyev entitled "Rothschild and pipeline" where the author had characterized the status of the oil business in Russia and demonstrated the exclusive importance of a pipeline for the selling of Russian oil products.

In 1907, just 10 years since the beginning of construction, the kerosene pipeline was completed. The worldwide mass media described this as the largest world pipeline with a capacity of 60 million poods per year in detail and compared "this miracle" with the Eiffel Tower in France and the Trans Siberian railroad in Russia.

Mendeleev's idea about the pipeline had proved to be absolutely right because this unique kerosene pipeline made a positive impact on Russian oil policy. This became a real triumph of all progressive forces and supporters of the proj-

ect and first of all, such persons as Mendeleyev, Taghiyev, the Rothschilds and others.

It is interesting that Mendeleyev had always underlined the innovative role played by large oil barons: "...technical success in Baku is only possible for large plants owners... I will always stand and struggle between the large and the small and will join the latter because I regard them as the true regulator of Russian industrial affairs, knowing the fact that The Nobles, The Rothschild's and so will definitely defend themselves. But it does not mean at all that only the small industries should remain and oust the largest ones; not at all; the large industries are, of course, needed and as important. They make real achievements. The small producers are just not allowing them to overcome the natural obstacles to hide away and be forgotten, in particular about the price determination. I will wholeheartedly support the largest industries if the things get worse".

On October 31st, 1888, Mendeleyev wrote the letter to Ludwig Mind, the President of London Chemical and Technological Society and V.I. Anderson, chairman of section of the British Association about the current status and future development of the Caucasian oil industry where he rejects rumours about the exhaustion of Baku oil reserves. In particular, the scientist wrote the following: "...stirring the rumours about forthcoming exhaustion is stemming out partially from a total ignorance about the processes of the oil exhaustion duly studied in Pennsylvania and the jiggery-pokery which diffuse these rumors for its own interests".

At the request of S.Yu.Vitte, Mendeleyev had prepared a detailed introduction for the book "Factories and Plants Industry and Trade of Russia" on January 3, 1893 (1st edition, 1893; 2nd edition, 1896) destined for visitors of World Columbia Exhibition held in Chicago on the occasion of 400

anniversary of the discovery of America. This article had ensured the full historical survey of the Russian oil business and contained two sections: "Chemical Industry" and "Oil Industry" where the scientist had been analysing the status of each field and demonstrating the ways of its future development.

For instance, in the section "Oil Industry" at the basis of statistical data Mendeleev had been mentioning the rise of oil extracting and refining industries of Russia during the period of 1870-1892 and criticising its everyday problems: oil extraction and refining; rational use of oil residues; oil and oil products transportation; rapid construction of Baku-Batum pipeline and railway connection from Donetsk coal mines to Volga to facilitate coal delivery had ended "the irrational large incineration of Baku oil residues in steam boilers."

On 11th March 1898, Mendeleev had been chairing the Main Chamber at the meeting of the Commission for the issues to increase sales of Russian oil products in France; the Commission had also elaborated "the Project of desired changes in the French Customs tariffs for oil products". The importance of the problems solved by the commission is ensured by the participation of important people in that meeting: high ranking officials from the Ministry of Finances of Russia, Emmanuel Nobel, (son of Ludwig Nobel), the head of the largest Russian oil firm "Nobel Brothers" from 1888 to 1917 as well as employees of this firm like M.Ya. Belyamin and Ya.G. Krussel, consul of France and others.

It is necessary to point out that the table of specific gravity of oil products elaborated by the scientist had tremendous importance and became the handbook in all oil refineries of Russia.

It is interesting that the name of Mendeleev is linked not only to the development history of the Russian (Baku) oil

business, but also at the beginning of the publication of the first books about oil and oil refining in Russia. Since June 1891 Mendeleev had become the editor of technical and chemical sections of the encyclopedic dictionary of F.A.Brockhaus and I.A.Efron by the proposal of famous publisher I.A.Efron. It should be noted that out of almost 500 publications on this scientist more than 70 writings are devoted to the development of Russian (Baku) oil business.

As a conclusion, it should be underlined in particular the following fact: at the end of his life, the scientist had made the biographical notes collected throughout the years however only one year 1886 is full of extraordinary events. But he had mentioned just two of them - the birth of Mariya and Vasilij after his second marriage and his visit to Baku. Mendeleev wrote: "In 1886, I was twice in Baku: alone in May and with Lyolya in August...".

All materials mentioned above are clearly describing the importation contribution made by D.I. Mendeleev to the development of the Russian oil business and the role played by Baku oil in the scientific activities of the scientist.



ESSAY X

VLADIMIR SHUKHOV - "ALFRED  
NOBEL" OF BAKU

Life, which is sated with outstanding events, is immortal.

*Author*

The name of Vladimir Grigorevich Shukhov (1853-1939) is inseparably connected with the Baku oil business, in which there is not any area where he didn't leave his bright trace. Running forward, we shall note, that this period of Shukov's life was one of the longest and most fruitful. "Shukov's" invention of the cracking process made an epoch in oil refining as it promoted the acquiring of gasoline - the most valuable fuel for auto-and aircraft engines.

*Shukhov V.G. was talented inventor, scientist hydraulic technician, heating engineer and oil-chemist). Created designs, differing in boldness of the decision, novelty, practicality: sprayer for the burning of mazut, air-lift process, oil pipelines, oil storages, gas holders, bulk-oil barges, bulk-oil tanks, installations for thermal cracking and pyrolysis of oil, steam boilers, inertial piston and pumps with cord, bridges, net-shaped and arch shaped coverings, hyper-*



*Vladimir Shukhov*

*boloidal towers (including with height 80 m in Kherson and 160 m in Moscow) and others. Most of his inventions acquired wide application in the USA.*

V.G. Shukhov was born on August 26th, 1853, in the City of Grayvoron in the Kursk province (nowadays the Belgorod area). He received his secondary education in one of the grammar schools of St.-Petersburg, upon completion of which he was admitted as a student to an engineering-mechanical branch of a Moscow vocational school, which soon was transformed to the Imperial Moscow Higher Technical School (where outstanding teachers of that time - Professors N.E. Zhukovsky and F.E. Orlov would teach him). Shukhov graduated from school with a distinction in the specialty of mechanical engineering.

The young specialist was sent to the USA for a year with the purpose of the practical improvement of his engineering knowledge. On his return from America, he started to work as an engineer, and later as the Chief of the Drawing Bureau of Warsaw Railways. In the XIX century Shukhov moved to Moscow, where he got a job as chief engineer at a technical building bureau (later "Stalmost") with known factory owner A.V. Bari. In the future, due to his health he moved on South, to Baku, where the oil business had been intensively developing at that time.

Shukhov looked closely to the oil business, with which, he earlier had not been familiar, and not satisfied, started to find solutions to major technical problems, concerning storages, transport, refining and the burning of oil.

Shukhov solved the issue of transportation of oil over land in the following manner: he suggested pumping it through the pipeline, similarly to water. Already in 1878, the twenty-five year old specialist, under supervision of A.V. Bari (1847-1913), had projected and built the first oil pipeline in Russia.

Balakhani-Cherny gorod (Black city), at a length of 9 km and a diameter of 3 inches for the Nobel brothers Co. (Oil was pumped from Balakhani oil facilities to the oil refining factories in Cherny gorod in Baku) Here it is worth to note, that having studied the process of oil pumping through the pipeline constructed by him and based on his experiences, Shukhov calculated an empirical formula for the calculation of the movement of oil in pipes. Later "Shukhov's" formula would be used by engineers all over the world.

In order to pump oil residues Shukhov invented a special



*Vladimir Shukhov and Alexander Bari*

method based on their preliminary heating, using the heat from pressed steam in direct-acting steam pumps of Vartington. The essence of this method consists of the fact that, as a result of heating the viscosity of the oil residues considerably falls, and then they can be pumped similarly to water. Based on numerous experiments, which Shukhov carried out first on the mazut pipeline constructed by him in Baku, he created his following formula for the calculation of, once again, projected mazut pipelines, and became the first inventor to pump oil products by heating, and with that considerably outstripped the American specialists.

In 1879, a second oil pipeline Balakhani - Cherny gorod at a length of 12 km and a diameter of 3 inches was put into service. Until 1884, the Balakhany facilities had 5 oil pipelines with more than 200 thousand poods of oil per day through out; all of these oil pipelines were constructed under the supervision of talented engineers Alexander Bari and Vladimir Shukhov.

The problem of burning oil and oil residues in fire-chambers Shukhov solved, by having constructed a steam sprayer for burning oil. He knew before the invention of a "Level nozzle" and applied the same mechanical ideas in his invention of the sprayer (the patent N 1880; 1876): transformation of oil into the small dust parts used for this purpose, with the force of steam running out from narrow holes. Shukhov's sprayer was one of the best in the world, which until now was used in industry and owing to which it has been possible to use mazut as a fuel for steam locomotives, river and sea steamships. It is characteristic that for the first time, the Nobel company adapted it for practical use; having outstripped American "Standard Oil".

Shukhov, the first to start building bulk-oil vessels (schooners for transportation across the Caspian Sea and

iron riveted barges for transportation along the Volga) in Russia (after the Nobel brothers), and with that, solved the problem of transportation of oil and oil products. Thus, under his drawings, the building of huge riveted iron barges up to 150m in length at the Saratov ship-building factory was started; at that time it had been miracle of technology, as process engineers yet had no concept about the exact breakdown of patterns. Shukhov had showed how in his drawings it had been possible to collect enormous riveted iron designs.

The invention of above mentioned sprayer by Shukhov, which is used in industry to date, made it possible to apply mazut as a fuel for steam locomotives, river and sea ships. Manufactured from oil refining factories of the "Nobel bro." company, solar was used as a fuel in diesel engines. And as a result, the much improved bulk-oil vessel fleet allowed the Nobel company to expand export of the Russian (Baku) oil products, delivering them not only to Europe (Poland, Germany, Austria.), but also to Asia (India, China, Afghanistan).

On the Absheron, primarily oil was stored in wooden tanks with a capacity of up to 200 pounds, located near to the oil derrick, later they began to store in underground barns - small pantries with capacity up to 70 thousand pounds. At strong blowout of wells underground barns were filled within 2 hours, thus the huge amount of oil was leaking into the ground and was evaporating. Considering such storage and the non economical - greater losses, "Nobel bro." company started to create in Russia a reservoir service in close cooperation with construction bureau of A.V. Bari, in which (as we already know) Shukhov worked as the chief engineer. The issue on storage of oil and oil products was brilliantly resolved by Shukhov, through greater riveted iron reservoirs (there were more than 20 thousand metal tanks constructed

across all Russia; their design is still used today).

The question is that, at that time the issue of construction of the bases under such tanks was not precisely clarified, and expensive base devices had been constructed. Shukhov having understood, the huge resistance made by flat earthen basis, rejected construction of expensive bases, marking, that it was possible to reach significant savings of iron (necessary for construction of tank) if to use the elementary rules about the minimal weight of tank. Thus, he worked out his well-known "shukhov's" rule on construction of iron tanks of constant height; that is, by simple rationalization Shukov achieved almost double reduction in costs of manufacturing of iron tanks.

Thus, owing to considerable share and to "Shukhov's" talent, "Nobel bro." company already until 1881 had owned greater reservoir parks not only in Baku, but also in Astrakhan, Samara, Moscow, Kazan, Rybinsk and other cities of Russian empire. And the result did not keep itself waiting long: well organized systems of storage and transportation of oil and oil products allowed the Nobel Company to lead in oil business of Baku and all Russia. In these tanks, which had been located on facilities, factories and numerous Nobel warehouses, practically all-liquid oil products (kerosene, oils, etc.) had been stored. Besides, on each tank there was an inscription "Partnership of Nobel bro."

As is known, the "Nobel bro." company continuously improved the "know-how" of oil products at factories belonging to it; in 1883, in one of the kerosene factories in Baku the company established cubiform battery (known under the name "Nobel's battery") for continuous refining of oil, designed by Vladimir Shukhov and Ivan Yelin: that is, the classic cubiform battery had been created. At those days,

regarding the new battery the company wrote , that it had achieved installation at this factory " ... not known until that time neither in America, nor in Europe system of continuous refining of oil in consistently communicating tubes" (the Annual - 30 years of the company "Partnership of Nobel brothers", 1909).

In 1888, Shukhov developed fractional refining tube, which allowed receiving target oil products of given quality. In two years he would receive the patent N 9783 on this invention. In Baku these fractional refining tube would be established at factories of the "Nobel bro." company and of "Elrikh". At all refining factories, except for gasoline, the principle of countercurrent was used; stripping of oil distillates from mazut had been carried out with heated water steam. Owing to Shukhov's fractional refining tubes at all Nobel factories construction and use of cooling towers for cooling technological water during the hot summer times had been started.

It should be especially emphasized, that modern cracking-process by its hardware design and wide application is obliged to Shukhov, who on January 24, 1890, together with Sergey Petrovich Gavrillov officially registered absolutely new method of the continuous cracking-process under pressure.

During that time kerosene was the main product refined from crude oil: for example, out of 3 tons of Baku oil 1 ton of kerosene could be acquired, and the remaining 2 tons - made mazut. Shukhov's method also intended for extraction of additional kerosene from the oil residues as under action of high temperature and pressure more complex molecules of heavy (boiling in higher temperature) fractions entering into oil mazut, were split on more simple molecules entering into kerosene and gasoline.

Until V.G. Shukhov and S.P. Gavrillov metal tubes with direct fire heating had been applied at cracking: for the first time in the world, for this process they offered the system of pipes exposed to action of hot gases, besides pipes could be both straight line, and spirally curved. The patent (privilege) N 12926 for their invention Vladimir Shukhov and Sergey Gavrillov received in 1891, in which it was noted, that "at insufficiency of natural circulation for removal of coke residues in pipes, and equally, for the best transfer of heat the artificial circulation is entered"

Thus, V.G. Shukhov became the first inventor of the cracking process by outstripping the USA by more than 20 years, where only in 1913, analogous patent of an engineer William Barton appeared, which did not differ from Shukhov's patent (in 1913, W. Barton developed the thermal cracking process which made it possible, to transform high-molecular hydrocarbons to low-molecular). D.I. Mendeleyev had been one of the firsts, who evaluated the Shukhov's invention on merit. However at that times economic and technical terms there were not much need for gasoline, hence, there was no need to cracking process. At that time gasoline was unnecessary and even a harmful by-product, inevitable the refining of oil as yet there was no motor transport and air travel only the best minds of mankind had been dreaming of.

Ingenuous invention of Shukhov, outstripping the time for quarter of a century, was consigned to oblivion. Here it's pertinent to note, opinion of the main chemist of the "Nobel bro." company, Professor M.M. Tikhvinsky (1868-1921), who already then understood the high value of cracking-process, but did not see its practical application, as it (this process) "... requires the complex equipment and delicate supervision which is now impracticable".

*Tikhvinsky Mikhail Mikhailovich (1868-1921) - the*

famous chemist, technologist, Professor of Technological and Mining institutes, follower of V.I. Vernadsky. During revolution 1905-1907 he sympathised to Bolsheviks and participated in their Fighting technical group, under the direction of L.B. Krasin. He carried out all tasks on manufacturing of explosives; later, he has departed from revolutionary activity. On September, 8-13th 1907, as a part of the Russian delegation (from 28 persons, including Constantine Harichkov, Victor Herr, Ivan Kablukov, etc.) he took part in work of III International Oil Congress in Bucharest (Romania). He was the main chemist of Nobel Brothers Company in Petersburg and Baku. In 1914, in Baku for the first time in a world oil science he has invented a method of extraction of oil from wells by means of compressed air - gas-lift (in the USA this method began to apply only in 1924). In 1921, in Petrograd Tikhvinsky has been arrested in connection with provocative "business of Tagantsev" and was shot.

And also, the mining engineer S.K. Kvitko has developed the scheme of cracking-installation with the use of pressure (the patent # 21963; in 1912), for the first time, in Baku, the one year before W. Barton.

**Kvitko Semyon Kuzmich** (1855-1917) - the talented Russian mining engineer, the chemist-technologist. In 1879, he has ended the College of mines in Petersburg; on December, 22nd 1892 he was selected the chairman of the Baku Branch of the Imperial Russian Technical Society (BB IRTS). In April 1901, Kvitko was awarded the



*Semyon Kvitko*

order of St. Anna of 3 degree for fruitful work in special Baku technical committee. In 1911, he has offered installation on thermal creaking of oil hydrocarbons, mineral oil and the oil residue for the purpose of gasoline (benzene) receipt (the privilege № 21963 from June, 30th 1912). In the device of Kvitko's system, process occurs under pressure in a liquid phase, in continuously operating shell still battery with wide regeneration of heat which is carried away by departing products. In May 1924, in association "Azneft" the Committee for building of factory installation of the thermal creaking on Kvitko's project was created; and Baku chemist V.F. Herr has been elected a chairman of this committee. The first pilot plant on system of Kvitko for receipt of high-grade gasoline was constructed and started up in Baku in 1924-1926. Kvitko S.K. has played an outstanding role in development of the Russian oil business (he was one of the most active members of BB IRTS).

Here especially it would be desirable to emphasise the following: it is sometimes written in American oil literature, that cracking process has been invented by their compatriot Barton. But, as fairly noted already in 1969, by known specialist on oil history S.M. Lisichkin - that is nothing other than attempt to render service to strong American oil monopoly in strengthening the rights of industrial use of this process after them without financial expenses for acquiring of this right. Therefore, it is not casual that in 1924, when there was a court case between the two largest oil companies of the USA ("Standard Oil" and "Sinclair") on the right of use of the cracking process, the inevitable question of privilege appeared. Then one of these companies sent the commission of specialists to the USSR, to our well-known compatriot V.G. Shukhov, who proved, that privilege of invention of cracking process did not belong to Barton. The proof satisfied the Supreme Court of the USA, which confirmed, that

Barton's cracking-process was not other than, Vladimir Shukhov's and Sergey Gavrilov's method. That is the original history of creation of unique process of oil thermal cracking.

The reasonably interesting fact (or concurrence): simultaneously with the invention of Shukhov, also the first car with the gasoline engine had been designed, that is, the main and constant consumer of gasoline had been born. The practical application, the cars would receive later only in 1885-1886, when German engineers Daimler and Benz would construct the first car equipped with internal combustion engine. In the USA the manufacture of cars started in 1905 and in Russia - only in 1910. Millions of cars would appear only a quarter of a century later, and already then gasoline would be the main and necessary product of oil refining.

During the Soviet period Shukhov's invention would be used in practice: between the years 1929-1931 the cracking-process factory system, known under name "soviet cracking", was constructed in Baku. At this factory, equipped under the project of Vladimir Shukhov, Matvey Kapelyushnikov, and Fatullabey Rustambekov, for the first time in the USSR, reforming-process would be carried out.



*Matvey Kapelyushnikov*

**Kapelyushnikov Matvey Alkumovich** (1886-1959) - the known scientist-oil chemist, corresponding member of Academy of Sciences of the USSR (1939). Closely worked and cooperated with V.G. Shukhov and F.A. Rustambekov. The inventor of a turbo-drill (1922); the major works on oil cracking and an

increase of production rate of layers.

**Rustambekov Fatullabey** (1867-1946.) - an outstanding engineer-technologist. He graduated from St.-Petersburg Institute of Technology in 1893. Between the years of 1906-1919, worked as the general manager of "Naghiyev Musa" company, established in 1887. In 1923-1930 held a post of technical director of the largest Soviet association "Azneft"; in 1923, under his supervision successful tests of turbo-drill invented by M. Kapelyushnikov carried out. In 1929, was sent on a business trip to the USA. Between the years of 1934-1937 he was the main engineer of trust "Azneftproekt". In 1925, for his invaluable contribution to development of Soviet (Azerbaijan) oil business, was presented the Red Banner of Labour award; M. Kalinin expressed his personal gratitude to him. He had worked with V.G. Shukhov, for a long time until the death of the last. In 1934, published a series of articles and essays in "Azerbaijan oil industry" magazine, in which based on studying of local and foreign experiences, for the first time in a world oil practice declared: theoretical and practical bases of explorations of underwater oil pools, organizations of drilling works and construction of oil wells on the Caspian Sea. In these articles, he for the first time come out with the assumption of development of sea oil fields and listed 6 potentially perspective sites of a shelf on the Caspian sea. The correctness of his assumptions was confirmed in 1949, - with opening of well known for whole



*Fatullabey Rustambekov*

*world oil field - Oil Rocks (Neft Dashlari).*

The aviation gasoline received at the factory would have octane number 90-95 and a low temperature of hardening. In 1932, in Baku at cracking-factory system of Shukhov-Kapelyushnikov-Rustambekov, for the first time in the USSR, high temperature cracking process would be carried out (510°C and higher), and as a result higher aromatized gasoline's (up to 52%) for engines working in accelerated modes would be acquired.

Special attention Shukhov paid to problem of pumping of water and oil. As it is known, for regulation of the work of Vartington's American pumps, the simple device was used, which had been named compensator and which played a role of a flywheel in machine. Thus, there were no rules for rational calculation of these pumps. Shukhov, in his work "Pumps of direct action" (M, 1897), presented detailed research of a question on definition of an optimum parity between the sizes of steam part of pumps-compounds and showed the calculation of such pumps at work both with and without compensator. Proposed by Shukhov the theory of calculation, appeared to be so practical, that was included into study manuals of the country.

It is characteristic that such pumps made under Shukhov's design, appeared to be convenient for pumping of mazut, as well as heavy, very viscous oils by heating. For pumping of liquids from deep wells Shukhov created so-called the pumps with "cord" based on increase of a liquid by quickly running tape. These pumps had been produced serially, but despite the fact that in 1880's, the depths of Baku oil wells had been rather insignificant and had been corresponding to application of given pumps, these pumps did not receive expanded application. During that period, on Baku oil facilities, basically, bailing with barrels had been applied (a long narrow

bucket with the valve at the bottom).

It worth especially to emphasise the original designs of heaters of distilling cubes, mixers and water purifiers proposed and constructed by Shukhov. For example; the water-trumpet boilers invented by him (known as "Shukhov's boilers"): they are simple and original by design, very convenient for transportation due to their simplicity of assembly, cleaning and repair; are supplied with steam super heater of its systems. Shukhov's boilers received a wide application not only in Russia, but also abroad: the already known to us American inventor Barton in the 1920's constructed about 800 cracking-devices which repeated the idea of the steam boilers of Shukhov, but for oil, not for water.

In summary, it would be desirable to note once again, that among all outstanding ideas, inventions and constructions of Vladimir Shukhov (and they had been not only in the oil business) the greatest value possesses the cracking process of oil invented by him, which made a revolution in the oil business of Baku, and as a whole, of Russia.

Scientific and technical activity of this genius inventor, "Alfred Nobel" of Baku obtained deserved recognition: in 1929, Shukhov V.G. was elected the honorary member of the Academy of sciences of the USSR and awarded with the Lenin premium; and in 1932, he was conferred the rank of the Hero of Labour.

## ESSAY XI

### THE SCIENTIFIC FEAT OF YUSIF MAMEDALIYEV

In a science, like in a history, the certain stage of development requires its genius. Certain period of development requires people with adequate way of thinking.

*Peter KAPITSA  
(The Nobel Prize winner)*

On the 60th anniversary of the victory of mankind against fascism and the 100th anniversary of the scientist special session, devoted to the value of Y.H. Mamedaliyev's inventions in defeat of nazism took place in United Nations. The year of 2005 is declared by UNESCO the year of Yusif Mamedaliyev, an outstanding chemist, remarkable person, patriot and humanist who has invaluable contributed to protection of peace and progress.

The major scientific activity of the outstanding Azerbaijani chemist Yusif Heydar oğlu Mamedaliyev (1905-1961) coincided with a formidable military and hard post-war years. The development of oil science was intensively proceeding during the Great Patriotic War; during this period it was necessary to urgently divert the oil from industry to military needs. This led the oil facilities of the republic to be the major base of all the USSR; for provision in front with high-quality combustive-lubricating materials. Baku factories started to produce oil mainly for military production.

The known statesman, organizer of developing large oil and gas extraction in the regions of the USSR - Azerbaijan, Volga and Ural ("the second Baku") and Western Siberia

("the third Baku") N.K. Baybakov especially emphasized, "Baku was the main oil reservoir of the country, the basic source of supplying military equipment and the army with fuel. Its share accounted for 70-75 % of all oil extractions of the country, and for 85-90% of manufacture of aviation gasoline; it was providing the navy of the USSR with high-quality combustive-lubricating materials".

*Baybakov Nikolay Konstantinovich (1911, Baku - 2008, Moscow) was one of the largest leaders in the oil and gas industry of the former USSR, the representative of the Azerbaijan oil school. In 1928, he has entered the Baku Polytechnic Institute. From 1937, he was the chief engineer, and then a manager of "Leninest" trust in Baku. In 1938, he has been appointed the managing director of association "Vostokneftedobycha" (in Kuybishev). From 1940, Baybakov was the deputy of people's commissar of an oil industry.*



*Nikolay Baybakov*

*In the first year of War (1941), oil industry workers of Baku, at that time the main oil-extracting area of the USSR; have given 23.5 million tons of oil - an indicator unknown for all history of Baku. Since November 1944, Baybakov was the national commissar of an oil industry; from 1965 on 1985 years - the chairman of the State Planning Committee of the USSR. He was honorary academician of the Academy of sciences of the Russian Federation; the author of numerous scientific publications on the complex decision of problems on the oil and gas fields' exploitation. In 95th anniversary*



sary from the date of a birth (2006) he has been awarded by the Russian order "For services in Fatherland" of II degree and by the Azerbaijan order "Istiglal".

In those formidable years there emerged several patriotic scientists, whom did not tire form work in succeeding a victory in the face of war. Among the first of them, Mamedaliyev, who enriched national science with his works in chemistry and the refining of oil and natural gas. The president of the Academy of Sciences in the USSR V.L. Komarov wrote in September 1941: "There is no greater honour for a scientist, than to work in the strengthening of fighting power for the Red Army, in the days of conclusive battles." There were paramount problems put before the scientists and chemists of Azerbaijan. Synthesis of toluene increase in the development of aviagasolines, avialubricants and improvement of their qualities, acquiring and the manufacture of explosive and smoke making substances, anti-tank equipment and the supply with chemical products of the various enterprises.



Yusif Mamedaliyev

*Mamedaliyev Y.H. was born in 1905, in Ordubad-city (Nakhichevan, Azerbaijan) in a family of a gardener. He received his education at the only state school in Ordubad. In 1929, he was admitted to the chemistry faculty of Moscow State University (MSU), where he was taught by outstanding teachers and scientists of that time - N.D. Zelinsky, A.A. Balandin, B.A. Kazansky and A.N. Nesmeyanov. In 1931, he graduated from the university*

*with a specialty - organic catalysis. After MSU he worked as a chemist at Moscow chemical plant, and then he became head of faculty of organic chemistry at Azerbaijan's Agricultural Institute in Ganja. In March 1933, Mamedaliyev started to work as chemist-laboratory assistant in Azerbaijan's scientific research institute (AzSRI) on oil refining named after V. Kuybishev (nowadays - Institute of oil-chemical processes named after academician Y. Mamedaliyev). Here he would carry out his first independent work (chlorination of hydrocarbons). He died in 1961 in Baku.*

In 1936, in Baku's oil-publishing house Mamedaliyev published his first brochure "Natural gases of Azerbaijan and their chemical processing" in which he presented the scheme in detail and described the reactions of chemical processing gases, especially paying attention to the issues of chlorination of gaseous hydrocarbons. In three years time in Leningrad's, "Journal of applied chemistry," there appeared Mamedaliyev's and his trainee A.M. Kuliyeu's article about chlorination of methane, in which the method developed by him was described in detail.

Moving ahead, we should take into consideration that Baku constructed before the war, industrial- development installation for acquiring methane's chlorine derivatives complex on the basis of the research of Mamedaliyev rendered invaluable help to the front, by supplying fighting aircraft with one of their necessary products.

Following successful research with four-chloride carbons the laboratory supervised by Mamedaliyev, continued to develop in the direction of haloiding hydrocarbons. Thus, bromization was a logical continuation in the research on chlorination. Mamedaliyev with workers S.D. Mehtiyev, M.M. Huseynov etc became pioneers in this work as there was no information on bromization of oil gases, both in

national and in foreign literature - although there was a lot of contradicting and uncertain data.

At AzSR1, the beginning of the war under the supervision of Mamedaliyev the cycle of major research on the acquisition of toluene, used in explosive compositions had begun. By June 1941, the above-stated institute had in its possession 18ea of well equipped laboratories and test stations, 2ea of testing factories, subsidiary workshops and special facilities. From the first days of the war the institute started to solve the new issues caused by the needs of the national front.

A group of oil chemists extensively and intensively studied the way of benzene alkylation under the supervision of Mamedaliyev; already in 1942 this led to the development and application of a new process of synthesizing toluene from crude oil to the industry. It was an essential contribution for the development of the defense industry of the union, as toluene resources were considerably increased as needed in the creation of explosives.

Further, under the supervision of Mamedaliyev for a rather short time the acquiring of cumene - high-octane component of aviation gas, at industrial scale was organized. As a result of numerous research on catalytic alkylation of aromatic hydrocarbons with the purpose in creating highly effective additives to avia-fuels. As a result, the Baku factories considerably increased the manufacture of first-class quality gasoline for the Soviet Union's aviation and there was a prospect of a speedy creation of major products for the needs of defense. It is worth to note, that existing up to Mamedaliyev the processes of manufacture of avia-engine fuels did not meet the requirements of the front.

It was noted, in a comment review of known academician B.A. Kazansky relating to the new process: "Application of Y.H. Mamedaliyev and others bases on a serious practical

material, and concerns the important issue, of which value for motor fuel industry hardly can be overestimated, solves it originally and exclusively with simple economic means and thus deserves a positive evaluation and support at realisation".

During the war (in 1942) Mamedaliyev brilliantly defended his thesis for a doctorate degree, about which was cited in the newspaper "News" (03.06.1943). The essay of Tatyana Tess, published in the newspaper, "Dissertation of our days" began as so: "Sometime the works of our scientists written during formidable times, the dissertations defended in days of a Patriotic war, will be the subject of special studying.... Here is the doctoral thesis of Azerbaijani Y. Mamedaliyev. The work touches one of the major problems of modern chemistry, the problems of synthesis of toluene. Toluene - initial substance in synthesis of trinitrotoluol, which we know under the technical names trotyl, tol, tolyt. It is used for the equipment of artillery shells, air bombs, sea mines and many other munitions ... This work is, closely related to war with a bloody connection, - the work of the scientist, behind whom there has been a roar of shells, smoke, fire, strike to the enemy" (Subject of Mamedaliyev's dissertation - "Synthesis of toluene by alkylation and dealkylation of aromatic hydrocarbons").

Academy of Sciences of Azerbaijan SSR and also was appointed the director of the Institute of Oil of AS of Azerbaijan SSR. Mamedaliyev was the first academician-chemist in Azerbaijan (1945). In 1947, the scientist was appointed as chairman of Technical Council of the Ministry of Oil the industry in the USSR; and at the same year he was elected the President of Academy of Sciences of Azerbaijan SSR (up to 1950).

A reasonably interesting fact from scientific life in

Azerbaijan: on April 14th, 1944, the Moscow scientists led by V.L. Komarov arrived in Baku with the purpose of getting acquainted with the scientific and the technical potential of the republic and its scientists. After a long and resolute conversation with Mamedaliyev, who was attending for an interview, the chairman of the Soviet Academy of Sciences Komarov declared: "The republic having only one scientist like Yusuf Mamedaliyev worthies its Academy". (On March 27th, 1945, the Academy of Sciences in Azerbaijan SSR was established according to the provision of Sovnarkom of the USSR).

In 1945, Mamedaliyev's monograph "Alkylation reaction in manufacture of aviation fuels" was published. This mentioned the monograph results of research on catalytic alkyla-



*Yusif Mamedaliyev with his teacher Nikolay Zelinsky*

tion that had been collected and the practical possibilities of acquiring motor fuels from national raw material on the

basis of oil gases and aromatic hydrocarbons was shown.

The foreword for the book was written by outstanding scientists N.D. Zelinsky and A.A. Balandin, in which they emphasized the following: "Reactions of catalytic alkylation recently has received much value, especially in an oil-refining industry where they served for purposes of synthesis of additives to aviation fuel. Production of such gasoline received broad industrial development in the USA, and in our Union the issue of its industrial realisation is rather actual. Proposed for the attention of the Soviet reader, the monograph of talented Azerbaijani scientific Professor Y.H. Mamedaliyev represented the results of experimental research in the field of catalytic alkylation, carried out by him and his employees both in AzSRI and in Azerbaijan State University..."

The book is divided into two parts - alkylation by means of off-peak hydrocarbons, on the one hand to aromatic hydrocarbons, and on another - the paraffin's of isometric structure. The fact that at a given stage the author among numerous possible catalysts stopped on a sulfuric acid quite grounded with co-ordination of its manufacture on a large scale and its high catalytic activity. In each part of the book a detailed literary review is given. Also it is worth acknowledging that this part of the monograph was very valuable as until now data on such issues had never been collected, and remained disseminated in chemical literature. That is, in this respect the book of Y.H. Mamedaliyev filled the gap existing in the world's monographic literature ..."

*Balandin Aleksey Aleksandrovich (1898-1967) was the Russian chemist, the founder of the Soviet school in area of catalysis, academician of the USSR Academy of Sciences (from 1946). The follower of N.D. Zelinsky; the author of multiple catalysis theory according to which the catalytically active centre is a atomic group with a certain configuration*



Aleksey Balandin

both certain chemical and power properties. Balandin's theory proved by an experimental and rated mathematical material was "a new word" in the world literature on catalysis. From 1954, he headed the Academic council on a problem of "Scientific bases of selection of catalysts" at Branch of chemical sciences of the USSR AS. He had been prepared for printing the big review "Current state of multiple theory of heterogeneous catalysis", printed as a separate monograph in 1968

(Moscow, Publishing house "Science", 202 pp.). Also, this

monograph was printed in the International edition "Advances in Catalysis and Related Subjects" in 1969 (Adv. Catalysis, vol.19, 120 pp.).

At the end of 1945, Mamedaliyev became the winner of the State (Stalin) premium. During this period the oil newspaper "Vyshka" (Derrick) marked:

"Ask the glorified hero of Soviet aircraft Pokrishkin, ask the brave pilots of general Dzusov or fighters of general Osipenko:

-Who helped you to win domination in the air?

They will answer: Builders of planes and oilmen.

... Yakovlev, Mikulin and Mamedaliyev- they did one work: helped the Soviet pilot to fly above everyone, further than everyone and to be able to maneuver.

Always higher and higher! - This is a motto not only of the pilot; it is also the motto of advanced Soviet scientists. Now,

Y.H. Mamedaliyev developed at his new laboratory, even more effective processes of the improvement of quality of fuel for planes. He knows - his work is required also for peaceful socialist works, and those works for aviation on boundless spaces of the native land - are endless, and for the growth of our military power".

It is worth to note the especially important works of Mamedaliyev in the prevention of foaming of engine oils. In order to struggle against the phenomenon a special sort of additive to oils on the basis of siliconorganic connections was applied. The group of scientists, supervised by Mamedaliyev, synthesized similar connections by alkylation reaction. Research has shown, that such additives (alkylchloro silane), added to lubricating oils in quantities of 0.5-1.0%, almost completely stopped the foaming.

At the end of the 1940's and the beginning of the 1950's Mamedaliyev advanced foreign oil chemists in his numerous research: in world scientific literature for the first time alkylation of cycloparaffins with olefins in the presence of sulfuric acid was described after him and also the process of alkylation of halogene-benzene was offered.

The world's scientific community recognized Mamedaliyev's works. In 1946, the American magazine "Review of Petroleum Technology" (v.8, p.373), noted the big value of the research of the scientist: "In studying the theoretical aspect of alkylation reaction Y.H. Mamedaliyev's monograph "Alkylation reaction in manufacture of aviation fuels" worthies the maximum evaluation".

During wartime Mamedaliyev while designing gas facilities of Azerbaijan's oil industry together with his employees broadly used the materials of their research on the structure and properties of natural and artificial oil gases. Under his supervision methods of synthesis of methane's and ethane's

(four-chloride carbon, chloride methyl and dichloromethane) chlorine derivatives, and also a method of acquiring higher-octane additives for avia-gasoline on the basis of oil gases was developed.

A reasonably interesting fact: in the formidable years of war when the Soviet Army following victorious battles on the Volga and the Caucasus drove out the fascists to the West, Mamedaliyev's handicraft installation built near the Baku settlement of Kishly, developed a thousand tons of higher octane component, which enabled the Baku factories to considerably increase the manufacture of high quality gasoline for fighting aircrafts of the Southern front.

Here it is characteristic, given to Mamedaliyev at the end of 1943, by that time the head of Azneftkombinat S.A. Vezirov: "The Professor - Doctor of Chemical Sciences comrade Mamedaliyev, during the Great patriotic War developed and tested at half factory scale three important processes, based on the reactions of catalytic alkylation - dealkylation... Thus, fruitful, self-denying creative activity of the young scientist, the Professor - Doctor Mamedaliyev, had already rendered valuable help to Azneftkombinat in the work of maintenance of our Red Army with higher octane avia-gasoline's and in the future opened prospects for substantial growth of the development of important defense oil products". (For the maintaining of the front with aviation fuel Professor Y.H. Mamedaliyev was presented Lenin's Order in January, 1944).

*Vezirov Suleyman Azad ogly (1910-1973) was the largest oil industry worker of the USSR, the professional of oil and gas branch. The Hero of Socialist Labour (1944); the chief of association "Azneftkombinat" (in 1942-1946); the chief of association "Glavjuzhzapadneftedobycha" (in 1946-1949); the chief of association "Turkmenneft" (in 1949-1954); the Minister of an*



*Suleyman Vezirov*

*Oil industry of Azerbaijan Soviet Socialist Republic (Azerb. SSR), (in 1954-1958); the deputy of the Chairman, then Chairman of the Council of Ministers of the Azerb. SSR (in 1959-1973). The winner of the State Prize of the USSR for successful developing of Kum-Dag's deposit in Turkmenia; the honoured worker of a science and engineering technology of the Azerb. SSR.*

Heroic works of Azerbaijani oilmen and oil chemists were highly evaluated by acting parts of the Soviet Army. The Central and Baku committees of Azerbaijan's Communist Party received letters and telegrams from soldiers, officers, generals and admirals of the Soviet Army in which they expressed their profound gratitude to the people of Baku for their maintenance of military equipment, with oil, fuel and lubricants.

For example, general-lieutenant Yermachenko, Commander of the Air Forces of the Black Sea fleet wrote: "I request to accept sincere gratitude for the help in delivering aviation gasoline to the Air Forces of the Black Sea fleet, which prevented the breaks in work of fighting aviation". And member of the Military Council of the army, the general-major of tank battalions Kulinov marked in his letter: "... all Armed forces of our Motherland, including our Guards army, constantly feel highly appreciative of the truly heroic work of the Baku oilmen, daily directing to the front a continuous stream of transports with fuel". According to the acknowledgment

of an outstanding Soviet commander, marshal G.K. Zhukov "... Baku oilmen gave to the front and the country as much fuel as was necessary for the protection of our Motherland, for a victory over the enemy".



*Georgy Zhukov*

***Zhukov Georgy Konstantinovich (1896-1974) - the famous Soviet commander. He was born in Strekalovka village of Kaluga region. From 1918 he served in Soviet Army, in 1920 he graduated from the cavalry's courses and in 1930 he graduated from the courses of executive staff. In January-July of 1941, he was a commander of Joint Staff and second-in-command of people's commissar of the USSR's defence. During the World War II he was a member of high command's headquarter of the USSR and Commander-in-Chief of the group of Soviet forces in Germany. Marshal of the Soviet Union (1943). He was buried on the Red Square in Moscow. Zhukov was awarded with 34 Soviet rewards, including: 6 orders of Lenin, 3 orders of Red Banner, 2 orders of Suvorov (First degree); and also, he was awarded with 29 foreign orders and medals, including the highest award of Great Britain - the order of Bath (Grand Cross Breast Star) in June of 1945.***

Among numerous published researches of the scientist, it is worth to note especially the works on catalytic acquiring of jet fuel by decyclization of polytechnical naphthenes, on dehydrogenating and hydrogenation.

The scientific character of research works of Mamedaliyev received wide recognition abroad, for the victory of the

USSR and allies over fascism, Mamedaliyev's fuel for strategic rockets, for the first satellite of the Earth and as a result of Gagarin's flight to space, etc.

Thus, in 1955, on the IV International oil congress in Rome (on the 6th-15th of June) the scientist acted with two reports - on acquiring haloidstyrenes, and on acquiring oil for washing liquids. Both reports had tremendous success. Haloidstyrene, which includes chlorine or bromine, easily polymerize, these connections differ in chemical and thermal stability, and also with high dielectric characteristics. For the first time in the world Y. Mamedaliyev and S. Veliyev developed the simple two-phased process based on alkylation of chlorine and bromine benzol. Their method led to the output of a product, in advance, intended by Baku scientists. And oil-washing liquids (active washing and emulsionizing connections) were acquired by Mamedaliyev with sulphurating the wastes of the oil industry.

Therefore scientists of the largest cities in the Union unanimously gave a Nobel Prize, (which, as is known, has been awarded annually since 1901), to the "king of alkylation". There were no disagreements at the discussion of candidacy of Mamedaliyev for the Nobel Prize competition, at the session of Presidium of the Central Committee of the CPSU (December 1957). Except for venerable scientists the Secretary General of the Central Committee of the CPSU N. Khrushchev, chairman of CSS (KGB) of the USSR A. Shepilov and members of the party Presidium of the Central Committee also acted for candidacy of Azerbaijani-scientist. However, the anonymous letter, which was read by one of the participants, led to "NO" as a result of voting. The anonymous author informed that Mamedaliyev's discoveries had contained military secrets. It was an obvious lie as Mamedaliyev's articles already for a long time had been pub-

lished both in the USSR, and abroad. Most likely, this letter was custom, and collectively made by enemies of the Azerbaijani people.

It is worth to note one very grave fact: the agenda for such party sessions was in advance known to plenty of people at all levels of high party management, which sharply contradicted the charter of the Nobel committee on awarding of International Prizes. ...Mamedaliyev tried not to think about a missed Nobel Prize, as he had a perfect understanding of the reality, in which he had been living and working; already in 1960, the scientist delivered a report on catalysis, which had huge success in Paris at an International Congress.

It is worth to note numerous groups of trainees of Y.H. Mamedaliyev, talented chemists M.M. Huseynov, A.M. Kuliev, M.A. Mardanov, S.M. Aliyev, M.A. Mamedyarov, Sh.T. Ahmedov, R.A. Babakhanov, S. Veliyev, Z.S. Mamedov, S.A. Sultanov, D.E. Mishiye, L.S. Mustafayev and many others who continued and developed the ideas of their teacher in their research. In particular, they carried out classical works in synthesis and transformations of chloride carbons, reactions of chlorination of a mixture of off-peak and diethenoid hydrocarbons, and also reactions on catalytic chlorination of methane.

The active role of Azerbaijan's oil chemical school led by Mamedaliyev in alkylation, especially aromatic hydrocarbons, had been especially underlined on the 90th anniversary of N.D. Zelinsky. The largest scientists B.A. Kazansky, A.N. Nesmeyanov and A.F. Plate in their article about the role of Zelinsky in the development of oil-chemistry wrote: "While concluding consideration of catalytic transformations of the hydrocarbons opened and developed by Nikolay Dmitriyevich and his school, it is worth also to stop on one, rather important reaction ... We mean the reaction of alkylation...

the part of the development of the process of alkylation of benzol with the formation of ethylbenzene, isopropyl benzene (cumene) belongs to one of Nikolay Dmitriyevich's students - Y.H. Mamedaliyev. As a result of vast experimental work he managed to develop such accessible conditions for conducting this reaction, that now it is much easier to receive higher homologues of benzol..." ("Successes of Chemistry", M., 1951, vol. 20, issue 1, p.42)

In conclusion of Mamedaliyev, it would be desirable to quote a word, expressed by another outstanding Azerbaijani scientist and chemist, academician M.F. Naghiyev at a scientific session in December 1962, about Mamedaliyev as a scientist and the president of AS of Azerbaijan SSR: "King-size is well seen from the distance. Yusif Heydarovich possessed high authority, - that was, first of all, the merit of his own work, his scientific thinking. He possessed a clear mind and enriched oil-chemical science. His heritage is - ideas and thoughts, he left, interesting works, which he had started but could not finish. He became the president when there were 1200 workers at the Academy, and increased the number to more than 5000. This is the quantitative part of the issue. But qualitatively - his activity had been expressed in the direction of the Academy towards the development of the most important and progressive, new areas of a science - to the theory of semiconductors, a structure of substance, calculus mathematics and cybernetics, heating engineers, astrophysics and others, not mentioning the chemistry of oil".

*Naghiyev Murtuza Fatulla oghly (1908-1975) - the oil-chemist-technologist; the academician of Azerbaijan academy of sciences (from 1952). He graduated from the Azerbaijan Industrial Institute in 1935; from 1940 he taught at the same institute (from 1945 - the professor). In 1959-1965 he was the director of Institute of petrochemical processes of AS Azerb. SSR; in 1965-*

1975 he was the director of Institute of theoretical problems of chemical technology of AS Azerb. SSR. In 1957-1959 he was the vice-president of AS Azerb. SSR; the basic direction of his works was oil chemistry. He has determined a number of principles of application of the kinetic equations to calculations of reactionary units; in 1938-1948 he has created the methods of calculation of reactors of tube and mixing type with mobile contact mass; he has deduced the generalised equation of continuity of a multicomponent gas stream of reacting substances.



Murtuza Naghiyev

In 1939, he has developed main principles of the recirculation's theory which gives the chance to choose the optimum conditions of processes. In 1946, he was found the common decision of a kinetic problem of the creaking's reactions of multi-component hydrocarbons' mixtures spent on a surface of the solid catalyst in flowing systems. The hero of Socialist Labour (1969); basic his works were on synthesis of petrols.

The scientific activity of an outstanding scientist-chemist was evaluated at his true worth: in April 1958, Mamedaliyev Y.H. was again, for the second time elected the president of the AS of Azerbaijan SSR (up to the end of his life), and in the June of the same year - the Member-correspondent of the AS of the USSR on a specialty: technical chemistry.

## ESSAY XII

### OIL ROCKS IS PHENOMENON OF THE CASPIAN SEA

No great things have been created without great labour.

Johann W. GOETHE

The oil-field discovery in 1949 of an unique sea deposit Oil Rocks (Neft Daxlari) was an outstanding event in development of Azerbaijan oil business: for rather short term in the open sea, on distance up to 100km from coast the large sea crafts equipped with first-class (for that time) domestic engineering were created. During this period Oil Rocks (OR) were the largest of the Sea oil field in the world, both on capacity of a deposit, and on volume of extracted oil.

It is significant, that today, when at the bottom of ocean were already drilled hundred thousand of oil wells, and many countries of Western Europe and America "satisfy" their power famine by oil and gas extracted in Northern Sea, at coast of Canada and Brazil, in the Mexican gulf etc., foreign experts coming in Azerbaijan, again interest with OR - an unique city on piles constructed on the Caspian Sea about 60 years ago.

In our opinion, the interest to this first in the world city constructed on the sea is not casual. The fact, for all countries of the world engaged in development of a continental shelf on oil and gas, OR were something like that outer space station, that will arise in the future in open spaces, becoming a basic base for the development of the Universe.

The name of OR has historical meaning: even long before



the discovery of this deposit the scientists have noticed on the Caspian Sea the black rocks, covered by an oil film: this zone of sea area water was named as "Oil Rocks". Area of OR have begun to study already from 1859 - there is a lot of works of the outstanding researcher of Caucasus of the academician G.W. Abikh; and after him - works of the known scientists-geologists and oilmen S.A. Kovalevsky, F.A. Rustambekov, A.K. Aliyev, E.N. Alikhanov, B.K. Babazadeh, V.S. Melik-Pashayev, F.I. Samedov, S.A. Orujov, Yu.A. Safarov, A.B. Suleymanov, Kh.B. Yusufzadeh and many others.

*Abikh German Wilhelm (1806-1886) - outstanding geologist and traveler. From 1853 - a member of the St.-Petersburg academy. Abikh has devoted itself to extensive and continuous researches of Caucasus and Transcaucasia, and also Persia. In 1859-1861, he has twice visited water area of the Caspian Sea - the areas of Baku and Absheron archipelagoes. He has given the description of Oil Rocks; for the first time he has made the outline of an arrangement of underwater rocks in this region; he has specified their communication with underwater range, connecting the Absheron peninsula with an island Cheleken and he has noted there the gassing of hydrocarbons. In 1863, Abikh has made the first geological map of Absheron peninsula in scale of 1:42000, which long time was the basis for realization of geologic-search works on oil and gas on the peninsula. In 1877, Abikh has moved in Vienna, for processing the assembled vast material and edition of capital work "Geologische Forschungen in den Kaukasischen Landern"; He had time to the death to publish the 4 volumes. Also, merit attention the postmortem edition of Abikh's letters and notes, containing the alive colorful description of Caucasus, and published in Vienna by his widow under the name "Aus Kaukasischen Landern Reisebriefe", I-II v., Vienna, 1895.*

Especially it is necessary to note the articles of the mining engineer F.A. Rustambekov published from 1934 in a magazine of "Azerbaijan oil industry". In these articles, for the first time he has stated an idea on development of the sea oilfields and has listed 6 potential-perspective sites of a shelf on the Caspian Sea. As the future has shown, the correctness of his ideas was confirmed in 1949 - by epoch-making discovery, famous on a whole world, sea oilfield of OR.

Here, it is necessary to remember that one of the first initiators of offshore oil production was mining engineer V.K. Zglenitsky, who still in 3-th of October, 1896 made a formal request to Baku Mining Department to allow him the drilling of wells on an artificial mainland in Bibi-Heybat bay. This formal request was completed with original, for that period, project according to which it was proposed to build the installation with special waterproof rostrum at a height of 12 feet (up to 4 meters) above sea level and with draining of produced oil into barges. In case of oil-gusher it was stipulated for special barge with carrying capacity up to 200 thousands tons of oil, which will secure the safety oil disposal to onshore. The Caspian Mining Management has turned down his proposal, but has found that ground of the Caspian Sea close to Absheron was oil-bearing and it might be as well to check up both the oil-bearing capacity of seabed and by experience clearly to recognize the technical feasibility of oil production and economic conditions of such operation's method...

The first practical work on study of geological structures of water area of OR was carried out in 1946 by oil expedition of an Azerbaijan Academy of Sciences, as a result of which the huge stocks of oil were found out.

It is necessary to emphasize, that located in 42 km from Absheron peninsula this zone of the Caspian Sea long since



*The first living conditions of the oil workers on famous Black rocks on the Caspian Sea*

used sad glory at the sailors, similarly to what has got to itself today the Bermudan triangle. On old pilot charts this zone of the Caspian Sea, characteristic treacherous banks and sharp reefs, as if a signal of danger was designated by an inscription "Black rocks". The most experienced captains avoided this place in bad weather, having named it by a "cemetery of the ships". And, one of tragic histories of Black rocks by a fluke became the beginning of the biography of a unique sea deposit.

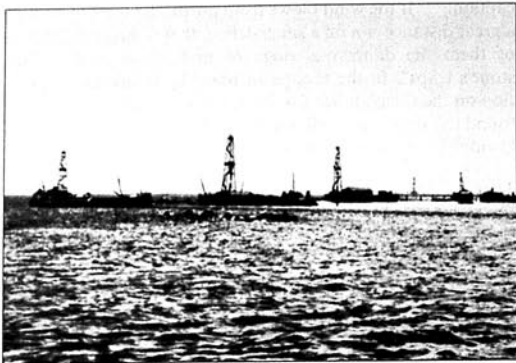
The known geologist Ali Aliyev, many years learning a problem of the sea oil, in the beginning of 1946 looking through a ship's magazine of an old Caspian schooner "Maria" sunken many years before, during a storm at Black rocks, has paid attention to record in a magazine made by the

captain: "...If the wind blows from north, the seamen even at a great distance can on a smell define, that is direct at the rate of them the dangerous ridge of underwater and surface stone's traps". In the reports of naval hydrographic expedition on the Caspian Sea for 1913, the searching geologist has found the similar records about Black rocks. In 1914 with the beginning of the First World War, the works of expedition were stopped.

Talking with many captains and navigators fine knowing the Caspian Sea, Aliyev has learned that they always were pursued with a smell of oil, during a storm in a zone of Black rock. It has resulted, that the geologist arrived at conclusion about necessity to organize oil-prospecting expedition to Black rocks. However, to begin industrial development of a



*1952. The first kilometres of the oil piers*



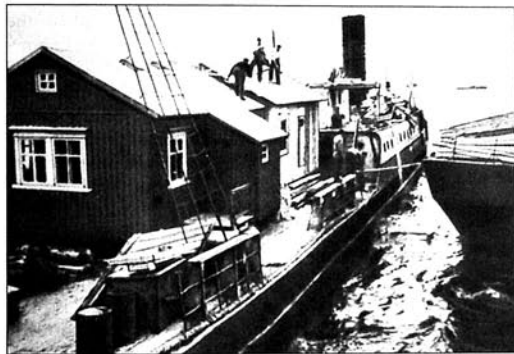
*Oilfield "Oil Rocks" was began on the area of 7 damned ships*

new sea deposit was not so that simply - the reasons of the opponents were thorough: to create an oilfield facility it is necessary to throw thousand tons of every possible material, to build the underwater platforms for drilling wells, to connect them with pile work. That is, without quay, without a berthing it is impossible to think about it. Against this idea the hydro builders appeared also, referring on experience of Ilych bay's developing.

Here, we especially underline, that the receiving of sea-oil at Ilych bay (now - Bail limani) from first in the world oil well #71 constructed in 1924 on timber piles, was a powerful spur to exploring of oil and gas fields on the different parts of the Caspian Sea. Later, in the USSR in 1932-1933, there were constructed another two platforms when it was clear that the oil-drainage line oversteps the limits of Bibi-Heybat bay cov-

ered up with earth in 1932. First platform constructed at a range of 270 meters from East enclosure of bay's fill on the sea depth up to 6 meters had a platform's area of 948 m<sup>2</sup> and length of 55 meters. First American timber piles were constructed in the Gulf of Mexico only in 1937 - for drilling of the trial bores of 1500 meters away from coast (onshore), and at the Gulf's depth up to 4 meters.

Despite of available difficulties, in 14 of November, 1948 the sea towboat "Pobeda" (Victory) has moored to the rocky groups of islets having bad glory both among the sailors, and among the local fishermen. The towboat's captain was one of experienced post-war Caspian captains Azhdar Sadikhov. Also, there were - the geologists: geologist-scientist A. Aliyev, the expert on drilling works Yu. Safarov and chief of association "Azneft'erazvedka" created in 1947, S. Orujov (in 1950-



*The first living conditions of the oil workers on famous Black rocks of the Caspian Sea (1952-1953).*

1952, twice the Stalin Prize laureate Yusif Safarov will work in association "Azmoreft" as a deputy of a general director on drilling; in 1972, Sabit Orujov will be appointed to the post of the minister of the USSR natural gas industry) - on the board of towboat. This team has successfully landed on an islet and even, they managed to construct the first drilling installation and small house for a drilling crew (with an area of 14 square meters!).



*Mikhail Kaverochkin*

First workings to drilling the first exploratory well on OR have begun in June of 1949; for this purpose (i.e. for creation a drilling base) used the overage ship "Chvanov", dragged off in a zone of OR and submerged in the given point. On 24 of August, 1949 the brigade of the future Hero of Socialist Labor - Michael Kaverochkin has begun drilling the first well given in 7 of November of the same year long-awaited oil. It was the world triumph: the well had depth about 1000 meters, and its daily production rate

made up of 100 tons of flowing oil.

Later, for construction of drilling base for the second well there have led to and half have flooded other 7 old ships, almost unsuitable to navigation, among which was also legendary Nobel's steamship "Zoroaster". So, it was born the artificial "Island of seven ships", where after of half-year it was already extracted oil. Here we shall emphasize action of the dialectics' law, according to which world or all kinds of

the reality (nature, society) are not aggregate of constant things, and it is an aggregate of the varied occurrences, "processes", as "all flows", on expression of Herodotus, all changes. The study of any sort of the occurrences and subjects cannot be made outside of their general communication with each other, irrespective of their existence in time and space. Any development consists of in change of the forms and in constant contrast between the old and the new form arising from old form. So, in this case: the unique in one's time ships ("Chvanov", "Zoroaster", "Cesarevich Nicolai" etc.), overage, have given life to new, not less unique event (deposit), shaken in one's time all scientific and technical world. By the way, the vessel "Zoroaster" has served longer than the rest ships, constructed by Nobel and it was a miracle of engineering of 80 years of XIX century.

"Zoroaster" - first in the world a bulk-oil steamship was built by the order of Ludwig Nobel in Sweden, at a factory of Motala in 1877. Ludwig has named his steamship by the name of ancient Persian prophet Zaratushra (in Greek transcription - Zoroaster). The vessel had the steel case of length in 56m, width - 8,2m and with draft 2,7m. The heating of a steamship was carried out by the petroleum residue. "Zoroaster" was a two-screw, bulk vessel with 19 iron tanks and carrying capacity of 15 thousand poods (246 tons). In St. Petersburg, the ship was delivered at one's own pace, and then on Mariin's system (the basic sizes of "Zoroaster" corresponded to the sizes of sluices of Mariin's system) tanks were delivered separately because of vessel's draft. In Baku, especially for "Zoroaster" there were made over the berth and the coastal structures and after vessel's arrival in city, the kerosene's extraction pump was installed on it.

*The direct participant of those years, writer Josef Osipov in his book "Treasure of black rocks" (1989) interestingly*

*describes those events:*

"... In one of hot days of the Caspian summer "Pobeda" has moored to quay in a distant corner of the Baku port, where peacefully were based on becoming obsolete steamships and tankers. From time to time, here it was resulted on a tow any vessel constructed of half-century ago, and put with the same aged invalids deleted from the list of a merchant marine fleet... The captain of "Pobeda" Azhdar Sadikhov still from afar has noticed, where was based on "Lenkoranets". It was a meeting with old familiar for Sadikhov. His grandfather - sailor of the Caspian fleet - floated on "Lenkoranets". At that time this vessel with displacement of 2000 tons made roads under other name. There was out typed the "Cesarevich Nicolai" on its board. Meeting the grandfather who has come from Astrakhan or Enzeli, Sadikhov climbed on a ladder on the shipboard. At that time for him there was no a vessel more beautifully than "Cesarevich". The grandfather conducted his pet for a hand on a stern, in a tiny cabin, and treated with Shiraz dates or Astrakhan water-melon. In the opened bull's-eye were visible of the seagulls, high lifting arms of cranes on a berth, and it seemed to Sadikhov, that a steamship moored somewhere in far port, and he is already the experienced seaman who has seen more in his lifetime... Now overboard of "Pobeda" the rusty vessel rocked on a wave, and the sea inspector standing on the captain's bridge near to Sadikhov, has worriedly said: "I am afraid, we shall not bring this trough - it will be fall on a road...". "No, the old friend will not let down me" Sadikhov answered and smiled. And, it was kept on waves; rusty hull did not go down on the way to Oil Rocks. That day "Lenkoranets" was submerged near of rocky ridge. It was led here, to put on underwater stones. The welder went down in hold, made the large hole with gas-cutting and has returned

on a deck. The water has flooded in an artificial shell-hole. It was visible, as disappear, being immersed in the sea, figures surviving on the board. 1 meter... 1.5 meters... "Lenkoranets" has touched a ground, and water around of it became dull. "Go into more convenient" - said Sadikhov. A vessel has covered on a ground protected a rock with board from a wave. Then, another six, the same old vessels were led and were submerged on the shoal too. There after a rocky ridge was named as an island of Seven ships".

*The second well, drilled by a brigade of another Hero of Socialist Labor Kurban Abasov, approximately with same daily flow as well as first, was handed over in operation in the first six months of 1950. And in February of 1951, first tanker with oil from oilfield of OR has risen under unloading at berth of oil-loading terminal Dubendi... Underwater oil pipeline from OR, on which now oil is delivered to an offshore, was constructed only in 1981.*



*Kurban Abasov*

It is significant that American Geological Society still in December of 1946, in Chicago has composed and approved the long-term (calculated on 15 years) program on study of seabed's geology and has projected to carry out in nearest 5 years the investigations with following exploitations of sea oilfields in the Gulf of Mexico. However, because of some unbiased and subjective financial reasons from 1949 till 1953 years the exploring and exploitation of the sea oilfields in the Gulf were not realized. Only in 1954, in the USA it was constructed the oil derrick for drilling of 6 slanted wells with a shift of rotor and crown block.

Today OR is more than 200 stationary platforms, and the extent of streets and lanes of this city on the sea reaches up to 350 km. For past years on this deposit it was extracted more than 160 millions tons of oil and 13 milliard cubic meters of associated petroleum gas. More than 380 production wells work here, each of which gives on the average up to 5 tons of oil per day. Certainly, in comparison with wells of a modern permanent offshore platform "Chirag", each of which gave per the first month's of fountain's production up to 2000 tons of oil per day, it is a little. But we always should remember that exactly OR, more than half a century was a pioneer of powerful development of oil business on the sea.

Exactly, on OR - all cycle of the sea works for the first time was put into practice: from searches of oil and gas till delivery of ready production, from experiments in the field of the sea engineering till its mass development and application. It is possible boldly to assert, that oilfield of OR has played a role of Academy for oil industry workers of Azerbaijan and all former Soviet Union, as during the conducting of prospecting and operational works the whole school of training for the scientific staff was formed. In practice the newest ideas and development of the scientists were carried out, and oil industry workers got professional experience and skills in more complicated sea conditions. The petroleum experts working on OR, later were sent to work on the oilfields of "Kazakhneft", "Turkmenneft", "Dagneft", "Tatneft", "Bashneft" and on many others.

For example; on OR, for the first time in the USSR was approved a method of drilling from one basis of the several deviating holes. Further, this method of cluster drilling was widely used on other oilfields of the USSR. And new trestle platform's method of development of OR oilfield till now is considered as first in the world and there are no analogues.

The self-denying work conquerors of OR was appreciated by the Soviet government: in 1951 the large group Azerbaijan oil industry workers was awarded by the State premium of the USSR of the first degree.

Not without interest fact: when in 1960, the first secretary of CC CPSU Nikita S. Khrushchev has visited the OR, he operatively has solved two serious problems of this legendary oilfield: 1) has given the order to deliver the watches from onshore to offshore by helicopters; during this period it were MI-4, and later MI-8 (before of the people, products, the every possible goods delivered from onshore only by sea way; and 2) has disposed to build 5-9 floor's houses on the fill dams (foundations) for oil industry workers. Before his visit there were built the 1-2 floor's houses on piles. Thus, the important problem of habitation for oil industry workers-watchmen was solved: in the first operating time on OR the oil industry workers lived in cabins of the old ships flooded near the islets.

In summary, it would be desirable to note, that rather recently (on November, 2007) on this unique oilfield the new platform # 2387, intended for drilling of 12 wells was handed over in operation. Height of a two-block's platform is 45 meters, the weight is 542 tons and it was placed into position at a sea depth of 245 meters. The operation life of blocks assembled at the Baku factory of the deep-water bases is stipulated for 50 years. It is planned the drilling of 12 new wells at mean depth of 1800 meters from this platform.

Further, on December 25, 2007 it was commissioned the 20-inchlong gas pipeline with pipe range of 66.6 km and carrying capacity of 5.5 millions cubic meters per day connecting an oilfields of OR and Bakhar. This gas pipeline is intended for transportation of natural gas extracted from an oilfield Guneshli, to onshore.

Thus, the life and operation on sea oilfield of OR successfully proceeds...



*Yusif Safarov*



*Sabit Orujov*

## EPILOGUE

### THE CONTRIBUTION OF AZERBAIJAN INTO THE WORLD'S OIL INDUSTRY

Time is the best expert of the scientific works...

*Louie PASTER*

Since ancient times, Azerbaijan has been known for its rich oil fields. The oil of Baku had been in use for some economic purposes by people settled in the Absheron peninsula even in the times before Christ; this is confirmed by archaeological findings and numerous archives and literature sources.

For the first time in the world, oil in large quantities started to be extracted in Azerbaijan (on the Absheron peninsula) much earlier than in the countries of America, Europe and Asia. The main reason is that the oil of Baku had been forming in shallow layers and surged to the earth surface in the form of creeks. In 1594, the famous well master Allahyar Mamedali Nur oghlu had built a multi level oil well at a depth of more than 35 meters in Balakhani, which yielded a large quantity of oil.

The rise of industrial oil refining takes its first roots from the Absheron back in the years of the XIX century. Earlier, Samuel Gmelin, the academician from the Saint-Petersburg Academy of Sciences who visited Baku in 1771 confirmed that the white oil in Surakhani had been refined using a special tool - "via cub".

Mohammed Bekran, the Arabian historian used to say that oil refining in the Absheron had been known even earli-

er, e.g. at the beginning of the XIII century and Ioann Lerkh, an employee of the Russian Embassy in Persia extensively described the refining process of that epoch in Baku in 1733.

It is worth remembering in this case that Nikolay Voskoboynikov and Javad Melikov constructed their plants in 1837 and 1863 subsequently and were the organizing pioneers of oil refining production in Baku using new technology. In 1870, there were 47 oil refineries in Baku producing up to 500 thousand poods of kerosene per year (1 pood is equal to 16.38 kg). The first oil refineries in the US (Pittsburgh) were built by Samuel Kier in 1855.

Great services in the development of the oil business on a worldwide scale were rendered by famous scientists such as Dmitry Mendeleyev, Vladimir Shukhov, Semyon Kvitko, Fatullabey Rustambekov, Yusif Mamedaliyev, Murtuza Naghiyev, Eyub Taghiyev, Yusif Safarov, Sabit Orujov and many others.

For example, D. Mendeleyev who visited Baku on several occasions in 1863, 1880, 1884 and 1886 (twice) initiated many proposals to improve oil production. The method of uninterrupted oil refining created by Mendeleyev in 1881 was used for the first time in worldwide oil practices by the scientist himself in 1882 at the Baku plant of the Nobel Brothers. The oil refining industry of the US only started to apply this method in 1899.

For the first time in the world, V. Shukhov together with S. Gavrilov invented the tubular equipment for thermal cracking of uninterrupted motion by getting it patent #12926 (1891). This means that Shukhov and Gavrilov were 22 years ahead of William Barton, the American engineer in creating the cracking process.

The Baku mining engineer S. Kvitko, invented a new method of thermal dissolution of oil residues, but its indus-

trial realization came to light only in 1925. In 1912, Kvitko was given the patent #21963 for inventing the process called "Generating petrol using high temperature splitting of mazut under pressure without it". It means he was again a year ahead of the American Barton. Even before the First World War (1914), Kvitko's invention suggested to use the Maritime Ministry for refining the shared oil from publicly owned fields. The needed equipment had been partially ordered from abroad, but the unfolding war prevented the implementation of this plan.

It is interesting to note that already in 1910, the mining engineer I.N. Glushkov, had elaborated "The Manual for Oil Wells Drilling". For the first time in Baku it was used to teach the basics of drilling for students of two Baku technical colleges. In 1913, Glushkov published the monograph entitled "Exploitation of boreholes. Extraction of Liquid Fuels: oil and brines". The first American book of references of Sumen about oil extraction methods was published only in 1921; and, the first ever descriptive explanation of these methods was published in the book by another American Yuren only in 1924.

For the first time in oil practices, Yu. Mamedaliyev invented a method of producing the very valued high octane components for aviation kerosene from the basis of oil gases as well as a new method of the toluene generation from oil as raw material which had significantly increased its quantity to produce more explosive substances. It means that Mamedaliyev known as the inventor of Victory fuel had made an invaluable contribution to the defeating of fascism during Second World War.

Using the example of thermal cracking, academician Murtuza Naghiyev launched the theoretical basis of intensification of the chemical process via recirculation for the first



time in the oil science: he prepared the equation which defines dependence between recirculation coefficient and petrol generation rate.

Eyub Taghiyev, a professor was rewarded with the Stalin Prize three times for his important scientific inventions in the field of the oil business: in 1942 - for inventing the method of turbine drilling; in 1947 - for directional side-drilling and in 1952 - for simultaneous drilling. For the first time in oil drilling practices, the powerful multi-stage direct-drive turbo-drill which could compete with the rotor drilling was invented in 1936-1940 under the leadership of P.P. Shumilov, E.I. Taghiyev and others. The inventions of Taghiyev are used in the whole oil world - from North Sea till Kuwait. The bust of E.I. Taghiyev from black marble was placed at the Central park of Calcutta (India); on one-and-half metres pedestal of this bust was stamped with gold letters: "The Father of Indian Oil".

Yusif Safarov, an oil scientist was twice rewarded with the Stalin Prize for his magnificent results in the oil business. In 2004 in Houston (USA), the prominent scientist Yu.A. Safarov was posthumous awarded the order of "Ocean Star" for the exploring and exploitation of world-famous sea oil-field Oil Rocks in 1948-1952.

It is necessary to point out that oil consumption was now used worldwide and had significant economic importance after the second half of XIX century due to tapping the richest reserves of the quality oil in Azerbaijan. For the first time in the world, during 1846-1847, Baku oil specialists extracted oil using the mechanical drilling method and later, a new technology of its refining into kerosene and other oil products.

Drilling of the first ever well in the world began in Bibi-Heybat 13 years before the first drilling in Pennsylvania

(1859) and Kuban (1864). In this regard, the Russian historian A. Brilinskiy wrote in 1915: "In Pennsylvania, Colonel Drake drilled the first oil well on August 27th, 1859. This day should be considered not only as the day of the formation of the American oil business, but also as the moment which attracted nationwide interest to this industry". Subsequently, (as is what usually happens) many historians "with sound thinking" also wrote about the pioneering Pennsylvania well drilling without having checked the facts.

Documents stored in the archives of our Republic deny the version of US domination in well drilling. The historian who underlined this fact was the Azerbaijani historian Sardar Balayev, saying in 1968-1969 that the first initiator of mechanical oil well drilling had been Vasily Semyonov, a member of the Council of the Main Administration of Trans Caucasus. In accordance with the proposal of Semyonov in 1846, the first well in the world drilled to a depth of 21 m with positive results was drilled in Bibi-Heybat. The work was led by Major Alekseyev, director of the Baku oil fields. The documents dated 1847 and signed by the Grand Duke Mikhail Vorontsov - Governor in Caucasus - are reflecting the official confirmation of the drilling completion of the first ever oil well on the Caspian shores. In turn, we should note that Edwin Drake was not the Colonel, but was working as a conductor on the railroads for a short period of time.

Transition to well drilling had led to the drastic rise of oil extraction. An average depth of Absheron wells up to 1840 could not exceed 5 sazhen (1 sazhen is equal to 2.13 meters), but the deepest point had

been 12 - 14 sazhen. The highest rated wells in Balakhani yielded 75 - 90 poods of oil per day. It is interesting that the first wells drilled using the new techniques were not significantly changed in terms of their depth even in 1872 the aver-

age depth of highly rated wells did not exceed 22 sazhen. Thus, they had yielded much more oil than the old ones; and some wells had even given fountains of oil.

Intensive development of the Baku oil business and attraction of foreign capital into the oil industry of Azerbaijan definitely led to the fact that Baku became the oil extraction and oil refining center of the Russian Empire in 1870-1880. Meanwhile, the Baku Branch of the Imperial Russian Technical Society (the BB of the IRTS) founded in March 1879 became the center of scientific research for oil in the Caucasus.

Writings of the scientists from the Baku oil region were printed in specialized Baku periodicals: in the first edition of "The Works of the BB of the IRTS" journal was printed in 1886; the first issue of newspaper-journal "Neftyanoye Delo" (Oil business) was published in January 1886. "Neftyanoye Delo" published by the Council of the Baku Oil Industrial Congress was renamed to "the Azerbaijani Oil Industry" journal in May 1920, which is still being printed. Later on, both Baku journals started to write about the problems and events related not only to Baku issues, but also to all oil business in Russia and worldwide. In the USA, the first scientific literature about oil only appeared in 1921-1924.

Up to 1899, Baku had gained first place by ensuring more than half of the overall world oil extraction leaving far behind such countries like the USA, Argentine, Peru etc in the field of oil extraction.

The grandiose event in the development of the world's oil industry became the tapping in 1949 of the unique maritime field called Neftyaniy Kamni (Oil Rocks) and the creation in the open sea of large oil fields 100 km away from shoreline during the shortest period of time.

Pioneers in the drilling of the first wells were the oil spe-

cialists of Baku. Baku residents were also the first to get oil, kerosene and other oil products transported by tankers via seas or tank-wagons via railroads (1877-1883). The world's first kerosene pipeline in Baku - Batum with an overall distance of 829 versts (1 versta equals to 1066 meters) was built to pump the Baku fuel (April, 1897 - July, 1907).

It should be noted here that declaring to have the largest kerosene pipeline in the world with the capacity of 60 million poods the worldwide mass media in 1907 compared this "world miracle" with the

Eiffel Tower in France or Trans Siberia highway in Russia. After all, this pipeline helped Russia (later, the USSR) in competing successfully in the American oil industry.

Initiators using the cluster side directed drilling onshore and offshore, as well as artificial impact on explored old and newly tapped layers, the parallel exploitation of several horizons of the same well, construction of the hydraulic lever for oil extraction in the seabed and many other technical innovations was down to the Baku oil specialists - workers, engineers and scientists of Azerbaijan whose achievements favored tapping and exploring new oil and gas reserves not only in the Republic, but also in other regions of the former USSR and abroad.

#### **A short list of events which took place for the first time in the Oil World**

##### *In oil extraction and transportation*

**1803.** For the first time in the world, Baku resident - Hajji Kasymbek Mansurbekov started offshore oil extraction in Bibi-Heybat bay from two wells 18 and 30 meters away from the shoreline. The first offshore oil field ceased existence in

1825 when a huge storm ravaged all wells in the Caspian.

**1846.** In Bibi-Heybat (Baku) the first ever well at a depth of 21 m for oil exploration was drilled under the direction of Vasily Semyonov, a member of the Main Administration of Trans Caucasus. It means that the oil drilling proved successful for the first time in the world. These works were fulfilled under the leadership of Major Alekseyev - the director of Baku oil fields.

**1847.** On July 8th-14th, the Grand Duke Mikhail Vorontsov, Governor in the Caucasus officially confirmed the drilling completion of the first ever oil well on the shores of the Caspian Sea (Bibi-Heybat) with positive result.

**1877.** The first ever oil loading steam ship "Zoroastr", which was built in the city of Motala (Sweden) by the order of Ludwig Nobel, had a steel body and its heating ran on oil residues. "Zoroastr" was twin-screw tank truck with 19 metal reservoirs; it had designed to carry nearly 15 thousand poods (246 tons) of freight.

**1881.** For the first time in the world, the "Nobel Brothers Co." started to transport oil and oil products in tank-wagons via railroads (every such wagon featured the label "The Nobel Brothers Company").

**1886.** In June, an oil loading steam ship "Svet" (Light) delivered Baku kerosene from Batum to London for the first time in the world. This ship had been built at the plant of Motala, where earlier Nobel's "Zoroastr" had been commissioned.

**1897.** The first ever twin motor propelled tanker "Assan Dadashev" sailed on the Caspian Sea.

**1897 - 1907.** The years of construction of the world's largest - Baku-Batum kerosene pipeline with an overall length of 829 versts which was owned by the Trans Caucasus Railroads and cost 50 million rubles to construct.

**1899 - 1901.** The Baku Oil Industry oil extraction holds

first place in the world. It yields 11.5 million tons of oil per year, while the US ensures 9.1 million tons per year.

**1901.** Presentation of the first International Nobel prize established by Alfred Nobel. In accordance with the statement of Eric Bergengren, the Swedish historian (1962) who had an access to the archives of the Nobel family, the decision of Alfred made about seizing his share of the capital from the Baku oil fields equaling to more than 12% of the prize money which initiated the speedy formation of the International prize.

**1903 - 1904.** Construction of the first ever large diesel tankers and motor ships "Vandal" and "Sarmat" under the leadership of Emmanuel Nobel. The world's first motor ship "Vandal" (1903) had a length of 74.5 meters; its ship loading capacity was 750 tons and its speed was not more than 7.4 knots (1 knot equals 1.852 km per hour); Non-reversible three-cylinder diesel engines operated by direct current generators.

**1909.** For the first time the works for filling Bibi-Eybat Bay were initiated to explore petroliferous horizons situated under the Caspian seabed. These works were completed in 1932 under the leadership of an engineer Pavel Potosky.

**1910.** Ivan Glushkov, a member of the BB of the IRTS had an elaborated "Manual for Drilling of Oil Wells" in Baku for the first time in the world's oil practice. In accordance with this manual, the students of Baku colleges used to learn the drilling basics. After 3 years, he had published the monograph "Exploitation of boreholes. Extraction of Liquid Fuels: oil and brines".

**1923.** Matvey Kapelyushnikov, a Baku engineer, elaborated and tested single-stage turbo drilling with reduction gear for the first time in the world.

**1924.** 1. The first ever well (# 71) built on timber piles of an island type onshore named after Ilich yielded the industri-

al oil.

2. The first ever oil well at a depth of almost 600 meters was drilled in Surakhani using turbo drill of Matwey Kapelyushnikov.

**1933 - 1934.** For the first time in the world, the engineers - Khubentsov brothers proposed the construction of a floating platform in the form of submersible timber pontoon; the first exploration oil well at a depth of 365 meters had been drilled using that platform. The first floating drilling rig in the Caspian Sea started functioning from September 1934.

**1936.** 1. For the first time in the world, a group of Soviet engineers (Peter Shumilov, Eyub Taghiyev and others) created a multi-stage direct-drive turbo drill.

2. For the first time in the world geological practices of offshore oil fields development, an engineer A.M. Pobedin drafted the structural map of the Caspian Sea in the region of the Mardakvani settlement and Absheron strait for offshore structure drilling.

**1940.** For the first time in the world, the electrodrill was constructed by Ostrovsky, Alexandrov and others in the oil field called Gala.

**1941.** In the Bayil settlement, for the first time in the world, the side drilling at a depth of 2000 meters is being used by the turbine method.

**1948.** The strong oil fountain had taken place - first in Europe and in the USSR super deep oil well (# 1308) drilled by the master Ali Yulla on October 2 in Surakhani with the depth of 3800 meters.

**1949.** For the first time in the world's oil industry, the development of the unique offshore field called Neftyanije Kamni (Oil Rocks) in the Absheron shelf and the construction of offshore steel topsides started on August 24th. On 7th of November on this oilfield, the first well was completed:

oil-gusher was received after drilling to the depth of 1000 m with daily debit of 100 tons of crude oil.

**1958.** The Soviet drilling facility for simultaneous drilling with all sets of equipment was presented at the World Exhibition held in Brussels. A group of authors of this faculty under the leadership of Professor Eyub Taghiyev were awarded the Gold medals.

**1971.** The first billion (one billion) tones of oil was extracted on March 28th since the beginning of the oil fields development in Azerbaijan.

**1976.** In December, deep pumping rods made from a new brand of steel which had significantly dominated local and international standards by its durability and reliability had been successfully tested in oil fields of the USSR ("Azneft", "Bashneft", "Udmurtneft" and "Permneft"). The authors of the development were a group of Baku scientists under the leadership of Rahim Shukyurov.

**1994.** On the 20th of September, the first International Oil Contract on "Azeri-Chirag-Guneshli" - the Contract of the Century was signed by Heydar Aliyev, President of Azerbaijan and ratified by the Parliament of the Republic on December 2nd and entered into force from the 12th of December. The overall value of the contract was estimated at 13 billion USD.

**2005.** In May, the Presidents of Azerbaijan, Turkey, Georgia and Kazakhstan signalled the start of Baku-Tbilisi-Jeyhan oil pipeline filling at the Sangachal Oil Terminal in Baku.

*In the field of oil refining*

**1837.** The first ever oil refinery of Nikolay Voskobonikov started to operate in the Absheron and in the world in Balakhani.

**1875.** For the first time in the history of the world's oil industry, Victor Ragozin, a famous oil industrialist started to produce lubricants and in 1878, Baku lubricants were exported by him thus conquering a solid place in the worldwide market.

**1876.** First in the history of oil business (industry) Vladimir Shukhov has invented the steam-atomizing burner for an oil's incineration (patent # 1880).

**1883.** For the first time in the world, the shell still battery for uninterrupted oil refining constructed by V.G. Shukhov and I.I. Yelin was installed at the Baku plant of the Nobel brothers.

**1885.** For the first time in the history of the oil business, the engineer G.V. Alekseyev designed and constructed in Baku (at the plant of S.M. Shibayev) shell industrial equipment for generating petrol and kerosene via cracking (disintegration) of oily tar.

**1891.** For the first time in the world, V. Shukhov and S. Gavrilov invented the tubular facility of thermal cracking in uninterrupted motion (patent # 12926).

**1900.** The International Oil Congress rewarded with the Gold medal to Vladimir Markovnikov for extensive studies of the Caucasian and Absheron oils which led to the discovery of a new type of hydrocarbons - the naphthenes.

**1901.** In Germany, the printing house called "Friedrich Viweg u Sohn" published the book of Baku oil-chemist R.A. Vishin entitled "The Naphthenes (cyclic polymethylenes of oil) and its positioning in the ranks of other cyclic hydrocarbons" written in German which represented the first in the world full systematic and scientific writing on the naphthenes.

**1905.** For the first time in the world oil practice, the compressor facility was used in Balakhani.

**1912.** Semyon Kvitko, the Mining engineer of Baku

invented a new method of thermal splitting of oil residues. He was given the patent # 21963 for his invention called "Petrol generation via high temperature splitting of mazut under pressure and without it".

**1914.** For the first time in the world oil science, Professor M.M. Tikhvinsky in Baku invented the method of extracting oil from wells via pressurized gas - gas-lifting.

**1915.** For the first time in the world, Professor Nikolay Zelinsky determined that besides metal oxides (titanium, aluminium and zinc), it is possible to use fluorid and marl as catalysts in oil cracking.

**1920.** The Baku Polytechnic Institute named after M. Azizbekov was established on November 14th. This higher education institution later renamed to the Azerbaijani Institute of Oil and Chemistry, and currently known as the Azerbaijani State Oil Academy became the first such Institute in Europe and Asia which started to educate engineers for all fields of the oil industry.

**1929 - 1934.** Vladimir Shukhov, Matvey Kapelyushnikov and Fatullabey Rustambekov invented and constructed the tubular cracking equipment. The processes fulfilled via this equipment entered into the world's history of the oil business and is known as "the Soviet cracking". This played an important role in the development and accumulation of experience in the field of disintegration of oil.

**1934.** The publication of articles of Fatullabey Rustambekov where he analysed local and foreign experiences were published in the journal called "Azerbaijanskoye Neftyanoye Khozyastvo" (Azerbaijan Oil Industry). For the first time in the world, he formed the theoretical and practical basis of exploration of offshore oil resources and the construction of offshore oil wells in the Caspian Sea.

**1936.** In January, the industrial equipment for the pro-

duction of ethyl alcohol from oil gases was commissioned in Baku. This equipment invented by Baku oil and chemistry specialists (Marc Dalin and others) became the first industrial equipment of such kind in the world.

1939. For the first time in world of oil science, Murtuza Naghiyev published research works which shaped the theoretical basics of intensification of the chemical process via recirculation at the example of thermal cracking.

1942. Yusif Mamedaliyev invented an absolutely new method of production of important high octane components for aviation petrol. Under his leadership, a new method of synthesis of toluene from crude oil was designed and applied in the industry. This method significantly increased the quantities of toluene for production of explosive substances.

1949. Opening of the first in the world Scientific-research and design Institute called "Gipromorneftegaz" in Baku, which started to design the projects for the offshore hydro-technical facilities (platforms).

1977. For the first time in the world, Professor Bakhadur Zeynalov invented the process of generating the synthetic naphthenes acids by direct oxidation of oil naphthenes hydrocarbons.

2002. For the first time in the world oil practice, Professor Alimamed Shabanov used the chemical sensors and spin-labeled organic compounds to define watering of oil reservoir.

2005. On the occasion of the 100th anniversary of academician Y.H. Mamedaliyev, UNESCO made the decision to declare the year of 2005 - the year of Yusif Mamedaliyev, the prominent oil and chemistry specialist, inventor of the Victory's fuel which gave invaluable contribution to the defeat of fascism during the Second World War.

## A LIVING CHRONOLOGY ABOUT THE BLACK GOLD OF OUR COUNTRY

**Comment-review on the book-appendix "Brief chronology of history of the Azerbaijan oil business" written by Doctor of Chemical Sciences, Professor Miryusif Mirbabayev**

Many books about the oil business of the republic have been written both in the Soviet, and post Soviet period. Also it is significant, that, they were rewritten with the same facts without checking from one source (book) to another and, without any additions. The documents written by contemporaries of those years were not read, or the scientific literature of pre-revolutionary years were not looked through. The viewing of pre-revolutionary sources is especially important, when we write about the period up to 1917, or 1920.

In the editions of that time, "Proceedings of the Imperial Russian Technical Society (IRTS)", "Works of Baku Division of IRTS" or the newspaper-magazine "Oil Business" it is possible to find enormous quantities of data on the oil business in Baku and the whole of Azerbaijan. The discrepancies are, as cited in history in 1883 there was a presence of an English writer Carl Marvin who travelled the Caucasus and to the Absherson. It is believed that he wrote some books about the oil business of the region. However if you take a close look at any pre-revolutionary source (for example, "The Great Encyclopedia" in 22 volumes under the editorship of S. Yuzhakov, 1896, v.12, p.622) it is possible to see, that he was not Carl Marvin as it is duplicated in our literature, he was Charles Marvin as it is specified by the author in his book.

The work written by Mir-Babayev M.F. "A Brief chronology..." is the most authentic and truthful piece of work which

according to literature specified in the end of the book is based on archival documentary data.

It is possible to give merit to the author for having named the work "A Brief chronology... ", the book in our opinion is full enough, giving a wide and objective representation about the origin and formation of the oil business in Azerbaijan.

In the beginning of the chronology it gives a review of the Azerbaijan oil business up to 1920, which reflects most of the basic moments of the oil business on the Absheron. This finally led to an occurrence of an oil chemical science in Baku, and the Baku Division of IRTS (founded in March of 1879) became the Center of scientific researches on oil on the whole Caucasus.

The published chronological material about the origins and development of the oil business in Baku, Azerbaijan has in our opinion, fully reflected the purpose put by the author. In summary, it would be desirable to emphasize, that it is advisable to publish this work in the Azerbaijan language for the mass readers of our country.

*F.J. Mamedova*  
*Correspondent-Member of Azerbaijan NAS,*  
*Doctor of Historical Sciences, Professor*

## APPENDIX

**Future scientific achievements are inconceivable without the knowledge of the past ones.**

*Author*

### *Brief chronology of the history of Azerbaijan oil business*

#### *IV century B.C.*

Greek historian Plutarch (50-120 A.D.) highlights, that soldiers of Alexander the Great used oil from Absheron peninsula for lighting purposes; and they transported it in wineskins or in earthenware crockery.

#### *VIII century*

Arabian historian Istahric (Istahri-Abu Isak) testifies, that Baku people used ground impregnated with oil for heating because of absence of wood (I.M. Gubkin "Studies about Crude Oil", M.-L., 1937, p.18).

#### *IX century*

Arabian traveler Baladzori (Al-Belazuri Ahmed) describes in "The Conquest of the countries" that political and economic life on Absheron had been long connected with oil. (Published in English "The origins of the Islamic state", by P.K. Hitti and F.C. Murgotten, v.1-2, N.Y.-L., 1916-1924).

#### *X century*

1. Arabian historian Masudi-Abdul-Husein testifies to existence of black and white oil sources on Absheron.

2. Arabian traveler Abu-Dulaf visits and describes Absheron's oil sources.

#### *XIII century*

Arabic historian Mohammed Bekran visits Absheron and informs about oil production wells dug in Balakhani.

1273

The Venetian traveler Marco Polo (1254-1324) - the first European to visit Caucasus - confirms oil exports from Baku to countries of Near East.

1594

A stone dated 1594 and signed by Allahyar Mahammad Nurogly is found in an oil well 35m deep in Baku settlement Balakhani.

1636

Adam Oleary Elshleger(1603-1671), a German diplomat and traveler, gave description of Baku oil wells.

1637

Baku oil is marked as a 'terrible weapon by ignition' in a "List of gun stocks' of Moscow state

1647

Turkish traveler Evliya Chelebi examines and thoroughly describes Baku oil fields while in Baku. According to his data, Baku oil brought 7000 tumans of annual income to Shah's treasury and was exported to Persia, Central Asia, Turkey and India.

1683

Egelbert Kempfer, Secretary of the Swedish embassy in Persia, naturalist and traveler, visited Baku and describes oil sources on Absheron.

1723

Peter I (1672-1725) issues special decrees about the order

of oil extraction; in a letter to major-general Michael Matyushkin, who governed Baku, he demanded sending "one thousand poods of white oil or as much as possible, and to look for increase in production". Persian campaign (1722-1723) of Peter I resulted in Baku and Derbent (on the East coast of Caspian) being annexed to Russia.

1733

John Lerkh, an employee of Russian embassy in Persia, physician, visited Baku and described Absheron oil fields confirming that oil extraction started since times immemorial in Baku.

1739

Academician I.V. Veytbreht publishes the treatise "About the oil", which contains much data about Absheron oil.

1741

Director of English-Russian trading company Ioannas Hanway investigated condition of Baku oilfields. In 1754 he published "Historical essay about English trade in Caspian Sea" in London.

1771

Academician Samuil Gmelin (1745-1774) visits Baku and confirms that white oil was sublimated for production of kerosene in Surakhani and describes the technique of well's oil production.

1781

Count Marko Voynovich (1750-1807), the chief of the Caspian expedition, finds the signs of oil and gas on the bottom of the Caspian Sea near the island Zhiloy (Chilov). In



1781-1782 Voynovich M.I. charted a detailed map of Eastern part of the Caspian Sea.

**1796**

Marshal von Frederick Bibershtein (1768-1826) notes that "the Absheron peninsula contains an inexhaustible stock of oil ...", especially in the province of Ghilan.

**1803**

Haji Kasimbey Mansurbekov, for the first time in the world, begins sea oil extraction in Bibi-Heybat bay from two wells in 18m and 30m away from coast line. First offshore oil extraction was abandoned when strong storm destroyed the wells.

**1806**

All oil sources of Absheron, Guba and Salyan belonging to Baku khanate are requisitioned and declared state assets of Russia.

**1808**

Official licensing of oil production and oil trading in Russia started.

**1823**

A stone with an inscription: "The well was reconstructed 200 years ago" was found in Balakhani, in oil well known as Khalafi.

**1825**

Traveler Edward Eihwald makes detailed descriptions of the quality of oil, oil wells and "eternal" fires in the Caucasus and Absheron. Later, in Stuttgart (1834) he publishes the

book "Reise auf dem Kaspischen Meer und in den Kaukasus, unternommen in der Jahren 1825-26". ("Journey to the Caspian Sea and the Caucasus undertaken in 1825-26")

**1833**

By the invitation of army administration of the Black Sea Cossack army, Yusuf Amirbek ogli and Nabi Safi ogli, well-masters from Balakhani, leave for Yekaterinodar (Taman peninsula, Russia) to search for oil and to drill oil wells. By the decree of Tsar they were awarded with Silver medals "For their works and diligence, rendered at discovery of oil and the construction of wells".

**1834**

Director of the Baku oilfields Nikolay Voskoboynikov (1801-1860) invents special distiller for production of kerosene from white and black oils.

**1837**

Nikolay Voskoboynikov's oil refinery starts to operate in Balakhani becoming the first oil refinery in the world (the first similar factory in the USA was constructed by Samuel Cayer in 1855).

**1840**

The steamship's communication between Baku and Astrakhan (for transportation of kerosene in metal drums, with capacity up to 20 poods each), is opened.

**1846**

The first well with 21m deep for exploration of oil is drilled in Baku, in Bibi-Heybat under the order of a member of Council of the Central administrative board of Transcau-

casus territory Vasily Semyonov. For the first time oil exploration drilling in the world was carried out with a positive result. The work was done under the supervision of major Alekseev, Baku oil fields' director.

**1847**

8 - 14th of July, the governor-general of Caucasus, Count Michael Vorontsov in his documents officially confirms the fact of the completion of the first-ever in the world industrial oil well drilled on the coast of the Caspian Sea (Bibi-Heybat) [the statements collected by Caucasian Archaeographical Commission, 1885, v.10, document.No 1143, p. 145].

**1851**

The examples of Russian (Azerbaijani) oil types with numbers: 32 - Black Oil from Shemakha province of Baku administrative unit, from Balakhani, Binagadi and Bibi-Heybat; and 33 - White Oil from Surakhani was first exhibited at the International exhibition in London, in "Chemical products" section on the 1st of May. The Russian delegation to the exhibition was headed by Caucasian governor-general, Count M.S. Vorontsov.

**1855**

Academician Karl Bar (1792-1876) describes "an eruption of oil and gas" from the bottom of the Caspian Sea while in Baku and islands of Absheron's archipelago.; noting, that white, and black oil comes out together with gas (he made one of the best descriptions of Caspian Sea "Kaspische Studien").

**1858**

Joint-stock company "Caucasus and Mercury" - the

largest navigation company in the Caspian Sea was founded on May 21. Baku branch of this company started to operate in 1864.

**1858-1859**

Vasily Kokorev (1817-1889), Peter Gubonin (1828-1892) and German baron N.E. Tornau construct the first factory in Surakhani, near the temple of fire-worshippers, for production of kerosene from kir. In 1861 the first batch of kerosin was manufactured at this factory.

**1859**

1. Pharmacist from Tiflis, German N.I. Vitte constructed the second factory for manufacturing paraffin on island Pirallahi.

2. The beginning of construction of Baku seaport.

**1859-1861**

Famous geologist, Academician Herman Wilhelm Abikh (1806-1886) visits Baku and Absheron archipelago, makes thorough description of Oil Rocks (Neftyanije Kamni). He suggests connection between rocks of Absheron archipelago with that of Cheleken iseland.

**1860**

V.E. Eikhler, chemist from Moscow University, works at Kokorev's factory under the instruction of D.I. Mendeleyev and researches scientific methods of oil refining. Later, Mendeleyev named Eikhler "the veteran of Baku oil industry".

**1863**

1. Javad Melikov from Baku designs and constructs an oil refinery for production of kerosene from crude oil in

Baku.

2. Dmitry Mendeleev (1834-1907) visits Baku (in September) to work at Kokorev's factory. Later Mendeleev makes more trips to Baku to study oil characteristics: in May 1880, 1884 and again, in May and August 1886.

3. Academician Abikh H.W. studies area of Oil Rocks and makes first geological map of Absheron in scale of 1:42000. Later, in 1895, in Vienna Abikh's works on minerals of Caucasus and Absheron "Aus Kaukasischen Landern Reisebriefe", volumes I -II were published, posthumously.

**1865**

At Moscow exhibition of manufactured products "Caspian Trading Society" company received Silver Medal for a new lighting material "photonaphtil", produced in Baku oil refinery in Surakhani.

**1866**

The first oil tank for storage, measurement and supply of oil was constructed in the area of lake Boyuk-Shor (near Baku).

**1867**

Mechanic K. Veizer used oil residue as fuel for the first time in Baku: he burnt it on a fire-grate.

**1870**

1. At the All-Russia manufactured goods exhibition in St.-Petersburg, the Baku refinery of V. Kokorev and P. Gubonin in Surakhani was noted with award "For an exhibition of 1870" - for preparation of lighting oils of rather high quality from the Caucasian oil, by extensive manufacture at a factory".

2. In Paris, chemist Sent-Cleve Devil leads one of the first serious researches of the physical and chemical nature Baku oils: has defined its elemental and fractional composition, heat conductivity and coefficient of expansion.

**1870-1880**

Vladimir Markovnikov (1837/8-1904) researches and discovers a new class of hydrocarbons - naphthenes; Markovnikov was awarded with Prize named after Professor Pavel Ilyenkov in 1880. Later, in 1900 Markovnikov was awarded with Gold medal for a complex research of the Caucasian and Absheron oils, by International Petroleum Congress.

**1872**

1. In February, "The decree about oilfield development and excise from photogenic manufacture", which put an end to licensing system in oil industry of Azerbaijan and Russia is issued.

2. Oil and trading company "Haji Zeynalabdin Taghiyev" is founded.

3. Baku holds first auctions on sale of oil-containing land plots and fields to individuals in December.

**1873**

1. The beginning of mass drilling of oil wells and abandonment of old wells.

2. In June, in Balakhani the first powerful oil gusher Vermishevsky strikes, giving 90 million poods of oil within three months.

3. Robert Nobel's (the eldest of Nobel brothers) first visit on Absheron peninsula.

4. The Astrakhan merchants - brothers Nikolay and

Dmitry Artemyevs organize sea transportation of oil from Baku to Astrakhan with bulk schooners for the first time.

5. The beginning of construction of oil refining district in Baku, the Black City.

#### 1874

The first joint-stock company in the Russian oil industry 'The Baku Oil Society' was established in Baku by Vasily Kokorev and Peter Gubonin.

#### 1875

1. The beginning of active work of Nobel brothers: Robert (1829-1896), Ludwig (1831-1888) and Alfred (1833-1896) in Azerbaijani oil business.

2. The beginning of industrial development of oil-fields in Baku settlements Sabunchi, Zabrat and Romany.

3. Oil industrialist Victor Ragozin for the first time in the world starts production of lubricant oils. In 1878, the Baku lubricant oil is demonstrated abroad by him and quickly gains markets.

4. "H.Z. Taghiev's trading firm" becomes the first company to organize large-scale production of gasoline in their factory built in Bayil. (Nobel Brothers starts to sell gasoline in 1880).

#### 1876

1. Professor of Department of Chemistry at St. Petersburg Mining Institute, Konon Lisenko (1836-1903) arrives in Baku for detailed study of the causes of oil crisis of 1875. Later, in 1878 in St. Petersburg he published his monograph "Oil production - analyses based on original data" - one of the first original books on overall oil industry not only in Russia, but also in the whole world.

2. The first use of deep pumps in Baku.

3. First in the history of oil business (industry) Vladimir Shukhov has invented the steam-atomizing burner for an oil's incineration (patent # 1880).

#### 1877

1. Under Ludwig Nobel's order the first oil tanker-steamship "Zoroaster" with steel outer layer was constructed in Motala-city (Sweden); the steamship was running on oil residue. "Zoroastr" had a metal hull of 56m long, 8.2m in width and its displacement was 2.7m; it was twin-screw tank truck with 19 metal reservoirs and it was designed to carry nearly 15 thousand poods (246 tons) of freight.

2. The construction of an oil-pipeline between the oilfields in Sabunchi and the factories of Black City starts.

3. Excise tax on production of kerosene from crude oil was abolished.

4. Ludwig Nobel publishes an article "Overview of Baku petroleum industry and ideas about its future", where he proposes general plan for the development of oil industry in Russia.

5. D.I. Mendeleev's book "The oil industry in North-American State of Pennsylvania and in Caucasus" is published in St. Petersburg.

6. The beginning of use of Baku lubricant oils in the Europe due to their better quality and cheapness. The first railway company to use Baku lubricant oils was the French company of the Western France Railways.

7. In Baku, a branch of engineer Alexander Bari's construction company was opened (its main offices were in Moscow). Vladimir Shukhov, a 25-years old promising engineer became chief-engineer of this branch.

**1878**

1. The first oil gusher in Bibi-Heybat. Later, little-known oil fields of H.Z. Taghiyev and K.Ya. Zubalov located there became large enterprises.

2. The engineers A.V. Bari and V.G. Shukhov have designed and built the first oil pipeline in Russia: Balakhani - Black City, which was 9 km long and 3 inches (about 77 mm) in diameter. The pipeline was built for the company of Nobel brothers.

3. Oil industrial and trading firm "Caspian Partnership" is established by L. de Bouer (Debuier), S. Baghirov and A. Madatov.

**1879**

1. On March 24, the Baku Branch of the Imperial Russian Technical Society (BB IRTS), was established. It played a key role in advancement of Baku oil industry. The first chairman of BB IRTS became a mining engineer Pavel Semyannikov. BB IRTS consisted of 122 members. (Fine building of BB IRTS is still intact in Baku on Nizami street, 115).

2. Second joint-stock company "Oil production company of Nobel Brothers" (or shortly - Nobel Brothers Co.) with capital assets of 3 million rubles is established.

3. Second oil pipeline Balakhani - Black City, 12 km long and 3 inches (about 77 mm) in diameter comes into service. Till 1884 the Balakhani oilfields had 5ea of an oil pipelines with total capacity of over 200 thousand poods of oil per day (all oil pipelines were constructed under supervision of engineers - A.V. Barry and V.G. Shukhov).

4. By the order of Baku Oil Society, tanker "Surakhani" with capacity of more than 300 thousand poods of kerosene is built at shipyard Crichton Yard (in Sweden).

**1880**

1. Chemist and technologist, discoverer and researcher of pyrolysis process, Alexander Letny (1848-1883) arrives in Baku. In 1880-1882 he projects and builds the first large factory for manufacture of benzol and anthracene from oil residue by pyrolysis near Baku.

2. On 1-st of May a governmental decree on giving foreign citizen's access to oil fields in Baku area is issued.

3. On May 29-30 Dmitry Mendeleev together with his son Vladimir visits H.Z. Taghiyev's oil fields and take part in the opening of oil fountain, named in honor of Vladimir Mendeleev.

**1881**

1. H.Z. Taghiyev's daily political-literary newspaper "Caspian" starts being published (editor is Alimardanbey Topchibashev, a famous public figure and politician of Azerbaijan). The newspaper regularly discusses an oil business in Baku area.

2. F.F. Beylshteyn (1838-1906) and A.A. Kurbatov (1851-1903) define that in the Baku oil naphthenic hydrocarbons, which do not interact with bromine, prevail. After two years, this pioneering research was published in journal of Russian Physical and Chemical Society

3. Nobel Brothers Co., for the first time in the world, starts to transport oil and oil products in labeled railway tanks.

**1882**

1. Continuous oil refining process, discovered by Dmitry Mendeleev starts at refineries of Nobel Brothers Co.

2. At the Moscow industrial and art exhibition, the Nobel Brothers Co. is awarded with the highest award - with the right to use image of the State Emblem of Russia on its prod-

ucts. The award announcement read: "the company is awarded for production of high quality kerosene and crude distillates for lubricant oils at industrial scale and most importantly, for the organization of storage and transportation of oil products...".

3. At the above-mentioned Moscow exhibition, Baku oilman Sidor Shibayev received a Gold Medal "for very high quality of lubricant oil, and also for the organization of the first factory of vitriolic oil and the first glass factory in Baku".

#### **1882-1883**

"Villa Petrolea" with a magnificent park (nowadays, the park is known as Nizami Park) is opened on border of Black and White cities by Nobel Brothers Co. for its engineers and technical management staff in Baku. The park was designed by famous European specialist-gardener E. Bekle, who designed and developed many parks and gardens in Poland.

#### **1883**

1. The English traveler and writer Charles Marvin (1854-1890) visits Baku oil fields; in 1883-1886 he writes books "Region of eternal fire: Petroleum region of the Caspian" and "Baku is the petroleum of Europe" about the development of oil business on Absheron and in the Caucasus.

2. On May, 16th Rothschild brothers (Alfonse and Edmond) found the company "Caspian - Black Sea oil-industrial and trading society" in Baku. Chief engineer in this company was David Landau - the father of the future Nobel Prize winner in physics (1962), Lev Landau. (L.D. Landau was born on January 22 in 1908 in the Baku settlement of Balakhani).

3. Michael Ostrovsky, Russia's Minister of State properties, and his brother, a well-known playwright Alexander Ostrovsky arrived in Baku (in September) to discuss problems of oil industry in Baku area.

4. Movsumbey Khanlarov (1857-1921) defends his Doctoral thesis at Strasbourg University in Germany. Becoming the first Azerbaijan Doctor of Chemistry, he comes back to Baku and on the recommendations from D.I. Mendeleyev, N.A. Menshutkin and D.P. Konovalov starts to work in BB IRTS.

5. The shell still battery for continuous distillation, based on Mendeleyev's method, designed by V. G. Shukhov and I.I. Yelin starts operations at Baku refinery of Nobel Brothers (in the US Mendeleyev's method was first used in 1899).

#### **1884**

1. Establishment of a special organization of businessmen "Council of Baku oilmen" in Baku, headed by Ludwig Nobel until 1888. D.I. Mendeleyev took part in the first session of the organization.

2. The foundation of oil industrial partnership "Shibayev Sidor".

3. Baku engineer-mechanic O.K. Lents designs a machine for cable (tool) drilling in which the (balance) beam is replaced with a drum.

#### **1885**

1. German chemist Carl Engler (1842-1925) visits Baku with the purpose of studying of the nature and origin of Absheron oil. Later, in 1888 he publishes his theory of organic origins of oil, which becomes a basis for all subsequent similar theories, as opposed to theories of mineral formation of oil (Mendeleyev and others).

2. Engineer G.V. Alekseev, for the first time in the world, designs and constructs a permanent industrial unit in Baku for production of gasoline and kerosene by cracking oil tar (at S.M. Shibayev's factory).

3. A dissertation "Oil production and the current status of drilling on the Apsheron peninsula" by an engineer A. Vasilyev was published in the Russian "Mining Journal".

### **1886**

1. The first edition of periodical "Works of BB IRTS" which covered problems of Baku and the whole Russian oil industry is published.

2. On January 11, Haji Zeynalabdin Taghiyev (1838-1924) speaks at a session of BB IRTS on "How to overcome oil industrial crisis?" in which he described most efficient export of kerosene from Baku. The report was very timely and useful, so it was published and distributed among all members of BB IRTS and Baku industrialists.

3. In June oil tanker, steamship "Svet" (Light) delivers Baku kerosene from Batum to London (this vessel was built at a factory in Motala, in Sweden where earlier Nobel's Zoroaster was built).

4. Dmitry Mendeleev makes a speech "About the measures promoting the further development of Baku oil industry" at a session of BB IRTS

5. Mendeleev's book "Baku oil industry in 1886" published, in which results of his researches on oil from 1863 to 1886 are summarized.

### **1887**

1. Opening of oil industrial and trading firms "Russian standard" and "Naghiyev Musa"; latter, in the firm of "Naghiyev Musa", Fatullabey Rustambekov (1867-1946) a

famous engineer-technologist, member of BB IRTS, worked as a general manager from 1906 to 1919. Later, in 1923, F. Rustambekov is appointed as technical director of the largest Soviet oil industry association "Azneft".

2. In "Mining Journal" (v.1, p.18) Charles Marvin's booklet "The Forthcoming production line of Russian oil" is published. He underlines that H.Z. Taghiyev was one of the first who received gasoline from Baku oil.

### **1888**

1. Russian emperor Alexander III (1845-1894) with his family visits Baku on 8-9th of October. He visits the factory of Nobel Brothers Co. in Black City; oilfields of Rothschild's Caspian-Black-Sea society and Shamsi Asadullayev's oilfields in Balakhani and Sabunchi.

2. Vladimir Shukhov discovers distillation tube, which allowed receiving target oil products with the target quality. In two years he receives patent # 9783 for this invention. In Baku the distillation tubes were put into use at refineries of the companies Nobel Brothers and Elrikh.

### **1889**

1. Russian Nobel Prize named after Ludwig Nobel and a Gold medal with his profile is introduced in St. Peterburg and awarded for the best research on metallurgy and in the oil industry. The prize established by IRTS, made up 1200 gold rubles, and cost of a medal was 1500 gold rubles. Ludwig Nobel's Prize was awarded three times - in 1896, 1898 and 1905.

2. Oilman S.M. Shibayev constructs the first integrated oil refinery in Baku using the design made by Shukhov and Inchik (with very little changes this factory worked for more than 40 years).

**1890**

1. Baku engineer K.G. Simchenko develops a project of a turbo-drill (the rotational down-hole hydraulic motor for rotary drilling). He receives patent for the invention after 5 years.

2. For the first time in the world, Vladimir Shukhov and Sergey Gavrilov invent the tubular installation of the thermal cracking with continuous action (the patent # 12926 in 1891).

3. Marcus Samuel-junior (1853-1927), founder of powerful transport-trading company "Shell Transport and Trading Co." visits Baku for the first time.

**1891**

1. On the 4th of May during the meeting of BB IRTS Victor Ragozin delivers a report "The methods of oil treatment in connection with oil crisis". Later, some suggestions in this report will be taken as a basis for oil distillate's processing with the use of benzene steams.

2. In June, Baku Technical Committee - a public institution with advisory functions is created. It was the first institution of this kind in the Russian empire.

**1892**

1. Engineer-chemist Konstantin Harichkov (1865-1921) arrives in Baku with the purpose of studying composition and chemical properties of Baku oil. Harichkov is the author of more than 100 original scientific works in chemistry and in oil chemistry.

2. The commission under the chairmanship of an engineer Tsimmerman for working-out of the methods of the best oil utilization was created by BB IRTS. As a result - the commission has decided to require that the oilmen use the method of deep oil decomposition.

3. On 22nd of December, the mining engineer from Baku Semyon Kvitko (1855-1917) is elected as a Chairman of BB IRTS.

**1893**

1. Opening of oil industrial companies "Asadullayev Shamsi" and "Russian-Caucasian oil society".

2. Cartel of Baku kerosene producers (the Union of Baku Kerosene Producers) is formed in St. Petersburg for exporting. In 1897, due to internal conflicts the cartel is disintegrated.

3. By this time in Baku oil area there are 69 oil refineries, of which 13 have from 31 up to 100 employees, and 3 factories - more than 100 employees. The biggest refineries belonged to S.M. Shibayev (580 employees), A.D. Rothschild (227 employees) and H.Z. Taghiyev (126 employees).

4. The first oil gusher of I.A. Akhverdov, Baku oilman was in Grozny. It marks the beginning of development of oil industry in Grozny oil-bearing area.

5. Mining engineer A.M. Konshin upon his return from the USA publishes a book "Description of development of oil fields in Northern America and comparative conditions of oil production in the Caucasus" with appendix of 10 statistical tables and 12 sheets of geological maps and technical drawings. Significant superiority of American organizations in transportation of oil products was stressed in the book.

**1894**

1. The beginning of edition of a weekly journal "Baku provincial bulletin", which covered among other issues oil industry in Baku. The magazine published the story of Russian Nobel Prizes (named in honor of Ludwig Nobel and



Emmanuel Nobel).

2. Formation of an oil company "Naftalan" in Yelizavetpol region; the company extracted about 15-17 thousand poods of medical treatment oil annually (after 1920 Yelizavetpol was renamed as Ganja).

3. S.D. Yefimov at his refinery starts to receive cheap lubricant oils from alkaline waste in oil distillation. Later, he began to receive from alkaline waste "the soap oil" (named "Bakusin") which was exported to Germany for producing cheap soaps.

### *1895*

I.A. Akhverdov builds and starts up the first large kerosene factory in Grozny. It was the beginning of industrial oil refining in Grozny oil-bearing region.

### *1896*

1. Aleksey Stepanov (1866-1937), engineer-technologist, student and assistant of K.I. Lisenko, became the first winner of Russian Nobel (Ludwig's) Prize for his research of "The basis of the theory of lamps' combustion".

2. Establishment of oil industrial and trading companies "I.A. Akhverdov" and "Caucasus".

3. At the All-Russia exhibition in Nizhny Novgorod Nobel Brothers Co. is again awarded with the State Emblem of Russian Empire.

4. England, Turkey and Greece become the largest consumer of Baku kerosene after Russia.

5. On October the 3rd, mining engineer V. K. Zglenitsky (one of the first initiators of oil production from a seabed) applied to the Baku Mining Department for the license about carrying out drilling works in Bibi-Heybat bay; but the Caucasian Mining Department turned down his application.

### *1897*

1. From the total oil production of 478 million within the borders of Russia, 458 million poods were produced in the Baku oil area only.

2. Founders of English oil industrial company - J. Vishaw, E. Hubbard and others bought up oilfields of H.Z. Taghiyev.

3. For the first time in the world, a twin-screw oil tanker "Assan Dadashev" started to navigate in the Caspian Sea.

4. The beginning of oil railtanks' use for oil exports from Baku.

5. In Encyclopedia of F. A. Brockhaus and I. A. Efron (ST. Pt., v. XX A, p.941-942) in section "Oil" Dmitry Mendeleev underlines significant contribution of Haji Zeynalabdin Taghiyev to development of the Russian (Baku) petroleum industry.

6. Test of a compressor method (offered by V.G. Shukhov) in oil production in Baku.

7. Baku engineer V.N. Delov has designed an electro-drill.

### *1897-1907*

Construction of the world's largest kerosene pipeline between Baku and Batum with total length of 829 versts is completed. The pipeline belonged to Tran-Caucasus railway. The construction cost of this pipeline was about 50 million rubles. Main author of the project was Professor of St. Petersburg institute of technology N.L. Schukin (1848-1924).

### *1898*

1. The Rothschild brothers (Alfonse and Edmond) established a Trading-Transportation Society "Mazut" in Baku; by 1912, the Rothschilds' Mazut had 13 oil tankers in the Caspian Sea, plus tows and other auxiliary ships.

2. Doctor Vsevolod Baskakov became the second winner of Ludwig Nobel Prize for his work "Oil heating of apartment houses without an oil burner".

3. In summer, American oil industry engineers (from Rockefeller's trust "Standard Oil") investigated Shemakha district near Baku and predicted industrial reserves of oil there. Later (in 1912), famous geologist N. Lebedev confirmed results of the Americans: he called attention to abounding outputs of oil near the river Pirsaat between Shemakhy city and railway station of Hajjigabul.

4. Russia became top oil producer in the world (95% of imperial oil production is given by Azerbaijani oilfields).

#### **1899**

1. From 10 January, newspaper-journal "Neftyanoe Delo" (Oil Business) is published twice a month by Council of Congress of the Baku Oilmen. In May 1920, it is renamed into journal Azerbaijan Oil Industry, which is published till now.

2. The largest oil company in Baku Nobel Brothers extracts 93.2 million poods of oil which makes up 17.7 % of all-Russian and 8,6 % of world oil production.

3. The first stage of works on electrification of Baku oil fields is finished.

4. Baku ship-owners gave orders for the construction of 6 iron tank barges in Scotland at a total cost of 800 thousand rubles. The barges were received in Baku for the beginning of navigation year in 1900, for transportation of oil and oil products from Bibi-Heybat to Black Sea.

#### **1899-1901**

Baku takes the first place in the world in terms of total oil production, supplying 11.5 million tons of oil per year, while

the USA supplies 9.1 million tons.

#### **1900**

1. Nobel Brothers company and Rothschilds' Association of Mazut decide to coordinate their commercial activities in the markets in order to establish control over sale of oil products and create "Nobmazut". E. Nobel and A. Rothschild unite their efforts in export of Baku kerosene to foreign markets.

2. Oil company "Alexander Benkendorf" with a start-up capital of 4 million rubles is established.

3. On 17 March, State Councillor A. Benkendorf receives patent #10563 for his declared invention "Bore for an air-to-water drilling" from Department of trade and manufacturing of the Ministry of Finance.

4. Exports of oil products from Baku (lighting and lubricant oils, crude oil, the oil residue and other products) to Russia and abroad makes up 441.6 million poods.

5. English oil company "Bibiheybat Petroleum Co Ltd." with start-up capital of 460 thousand pounds sterling is established in Baku; Vagstaff is appointed as Managing Director of this company (he was also Operations Manager at S.M. Shibayev's company).

6. On 28 October, at a general meeting of BB IRTS Istomin V.K. presented a report "On Fires in Baku Oilfields". Considering the urgency of the topic, the meeting established a special Commission of BB IRTS (Semyon Kvitko, Alexander Mancho and others were in the new Commission) for solving this problem.

7. In November, mining engineer Nikolay Lebedev opened Geological Bureau in Baku, with the purpose of rendering assistance at research and study of oil fields, consultations in field operations, recommendations for procurement

of manufactured goods, and also on the spud points selection in drilling.

8. In Baku, in five oil areas (Balakhani, Sabunchi, Romani, Bibi-Heybat and Binagadi) 600.7 million poods of oil were extracted.

9. In Baku, I.S. Dembot and L.Ya. Lilienshtern founded "Absheron Oil Society" (with start up capital of 2.7 million rubles) for developing oil fields in Balakhani, which belonged to A.M. Benkendorf's Trading House.

10. English joint-stock company "Balakhani Syndicate Limited" (with start-up capital of 100 thousand pounds sterling) for developing oil fields in Balakhani was established.

11. Railway, which connected Bilajari (settlement in Baku), with Petrovsk (now is Mahachkala) was built; with this, Baku received a direct connection into all-Russia market.

### 1901

1. First awards of International Nobel Prize, founded by Alfred Nobel (youngest of the Nobel brothers). The first winners were: in the field of physics - Wilhelm Roentgen from Germany, in chemistry - Jacob van Hoff from Holland, in physiology and medicine - Emil Bering from Germany, in literature - Sully Prudhomme from France and for strengthening of peace - Jean Henri Dunant from Switzerland.

2. In Germany, in German language, book of Baku chemist-technologist R.A. Vishin "Naphthenes (cyclic poly-methylenes of oil) and their position among other cyclic hydrocarbons" was published. The book represented the first full systematized scientific work on naphthenes. R.A. Vishin - was the head of paraffin branch in Nobel Brothers Co.

3. In Paris, during 1st International Oil Congress Vladimir Markovnikov presented a report about Russian oils, where

he gave comparative details on chemical composition of Baku, Grozny, Galicia and Pennsylvania oils.

4. On 24 March, General meeting of members of BB IRTS decided to establish a mechanical laboratory in the building of the Branch (there already was a large chemical laboratory in the building) and allocated 8 thousand rubles to this cause.

5. In April, mining engineer S.K. Kvitko was awarded with the Order of Fair Anna of 3rd grade for his fruitful 7 years of work in Baku Technical Committee.

6. Beginning of Baku-the Wolf's Gate kerosene pipeline's construction; it was taken

into consideration, that in the Wolf's Gate 240 thousand poods of kerosene would be offloaded. All pipes were made in a metallurgical works in Mariupol (Russia).

7. Establishment of Special Commission under Chairmanship of Minister of Agriculture and State Properties of Russia A.S. Yermolov, with participation of representatives from the Ministry of Finance, Internal Affairs, Marine Transport and State Control to study problems and opportunities for developing oil industry in Caucasus and in particular, in Baku.

8. First gas well was drilled in Surakhani. Later, gas from Surakhani field would be transported to other fields in Absheron.

### 1902

1. For the first time, industrial classification and methods for purification of Caucasian (Absheron) crude oils is developed by Konstantin Harichkov, Nikolay Zelinsky (1861-1953), Alexander Butlerov (1828-1886) and Movsumbey Khanlarov.

2. Harichkov publishes his fundamental work "About composition and technical properties of oils from Russian

oilfields" in Baku. In same year, he takes part in the V International Congress on Applied Chemistry in Berlin, where the 4th section was completely devoted to oil chemistry and oil business.

3. In August Nobel Brothers Co. for the first time delivered Baku kerosene to Afghanistan through fortification of Kerki, which is about 200 versts from station Charjou. Next year there was decision of the Russian's Ministry of Finance about sanctioning export of lighting petroleum oils through Kerki customs to Afghanistan and abolished excise payments for such exports.

4. In August, Baku engineer P. Lazarev submitted project proposal on the use cheap oils in blast furnaces instead of high-priced coke. The realization of this project yielded huge benefits to Caucasian region, because there are unlimited mining and oil-bearing formations in this region.

### 1903

1. Geologist Dmitry Golubyatnikov (1866-1933) began regular studies of Absheron and predicted presence of oil in industrial volumes in Surakhani. He is the author of more than 60 scientific works on geological studies of Azerbaijan oilfields.

2. The leader of Nobel Brothers Co. - Emmanuel Nobel - on 29 January, in Berlin was elected as the Chairman of Supervisory Council of German-Russian Society for imports of Baku oil ("Deutsche-Russische Naphta-Import Gesellschaft"). Fixed capital of this Society was about 6.5 million marks.

3. Konstantin Harichkov's monograph "Cold fractionating of oil" was published in Baku.

4. For the first time, kerosene was delivered with bulk iron barges from Baku to St.-Petersburg by waterway - along

r.Volga, partially by lakes and along r.Neva.

5. Total exports of Russian (Baku) kerosene to the Persian Azerbaijan (to Ardebil-city) made nearly 200 thousand poods. Export point was in Astara.

6. Among the Russian (Baku) lubricant oils which are traded in England by two companies (Nobel Brothers and Association of Kerosene Manufacturers), the brand "Bakuin" is by far the famous.

### 1903-1904

The construction of first-ever large diesel tankers: motorships Vandal and Sarmat under the direction of Emmanuel Nobel (son of Ludwig Nobel) takes place. First ever domestic motor-ship Vandal (1903) with length - 74,5 m; carrying capacity - 750 tons and speed not more than 7,4 knots (1 knot is equal to 1 mile per hour or 1.852 km per hour); Vandal had non-reversible three-cylinder diesel engines running with the help of DC motors.

### 1904

1. Russian Nobel Prize, in honor of Emmanuel Nobel (1859-1932) was established in Baku. The Prize was awarded for the best works or inventions in the field of oil industry. The size of the Prize, established by BB of IRTS, made 1000 gold rubles. "Emmanuel's" Prize was awarded three times - in 1909, 1911 and 1914. (Prize of E.L. Nobel was founded to honor the 25th Anniversary of Nobel Brothers Co., established in May 1879).

2. Chemist Lev Gurvich (1871-1926) arrived in Baku to study the technology of oil refining. From 1905 onwards, Lev Gurvich is the permanent head of Baku chemical laboratory of Nobel Brothers Co. Later (during 1910-1917), the talented scientist would also head the Central Chemical Laboratory

of Nobel bro. in St.-Petersburg, simultaneously heading the Baku chemical laboratory of Nobel Brothers.

3. During XIX annual Congress of the Baku oil industrialists, in addition to regular issues, the issue of replacing crude oil used in oil fields with the oil residue was included in the Agenda.

4. From 150 of oil refineries in Russia, 72 refineries are in Baku. Total oil exports from Baku in this year was 492 million poods.

5. On 24 August, in Surakhani from a well #72204/455, drilled by percussion method, from the depth of 211m a powerful gusher of light high-octane oil was received. This event commemorated beginning of developments in lucrative Surakhani oilfields.

6. In this year, oil production (in million poods) geography in Russia was as follows: Absheron (Baku province) - 621.53; district of Grozny (Terskaya area) - 40.00; Dagestan province - 1.88; Trans-Caspian area (island Cheleken) - 0.60; Fergana area - 0.48; the Cuban area - 0.14 and others.

### 1905

1. For the first time in the world, compressors were utilized in oil production in Balakhani near Baku.

2. In February, joint-stock company "Naftalan Oil" was established to develop oilfields in Baku province and in other territories of the Russian empire. The company would also deal with oil refining and trading of oil products. Total fixed capital of the company was 2 million 400 thousand rubles. Chairman of the company was a Baku oil engineer Farrukhbay Vezirov.

3. Third (last) award of Ludwig Nobel's Prize took place in May. Famous engineer Alexander Nikiforov was awarded for his work "Method of production of benzene and its

homologues from Russian crude oil".

### 1906

1. The Baku oilchemist, editor-in-chief of journal "Works of BB IRTS" Victor F. Herr (1875-1940), for the first time, investigated composition of oils from Surakhani and Bibi-Heybat fields and found abundant presence of benzene and its homologues in these crudes. In the Soviet period (till 1940) professor V.F. Herr will work with talented oilchemist Yusif Mamedaliyev.

2. In Berlin, European Kerosene Union ("Europäische Petroleum Uniongesellschaft") was established with initial capital of 20 million marks. The Union's main goal was to mitigate monopolistic

influence of Standard Oil in the European markets. The Union was formed by Deutsche Bank, Nobel Brothers Co. and Parisian bank of Rothschild.

3. In October, one billionth pood of crude oil was produced in Baku oilfields of Nobel Brothers Co.

### 1907

1. For the first time, Nobel Brothers Co. organized delivery of Russian (Baku) kerosene for the Warsaw-Vienna railway at a price of 1 ruble and 55 kopecks per pood.

2. On 3rd International Oil Congress in Bucharest (8 - 13 of September), V.F. Herr and A.T. Predit presented report on Baku oils, in which they demonstrated that Surakhani oil according to chemical composition is identical to light fractions of Balakhani oil, and mainly contains naphthenic and aromatic hydrocarbons.

3. On this Congress (3rd), K.V. Harichkov presented his report "Classification and Origins of Oil", in which he stressed increasingly important role of chemistry and geolo-

gy in natural sciences.

4. In Surakhani, gusher of black oil was received from the depth of 545 m. Well flow rate was 200 thousand poods per day. Following this event, rapid development of Surakhani oilfields started.

### 1908

1. For the first time, natural vaseline (white and yellow) was received from Cheleken crude oil at Baku factories of Nobel Brothers Co.

2. On 2nd September, at Kolomna shipbuilding works in Nizhny Novgorod, as per order of Nobel Brothers Co., giant oil tanker, steamship Kirgiz was constructed. The construction cost 190 thousand rubles and the oil tanker was capable of carrying about 600 thousand poods (about 9830 tons) of oil products.

3. "Binagadi Oil Industrial and Trading Society" was established with total charter capital of 1 million rubles. Later, in 1914 the capital would be increased up to 4 million rubles.

4. Famous scientist D.V. Golubyatnikov, was the first petroleum geologist to predict commercial reserves of oil in Bibi-Heybat and described similarities of this oilfield with Surakhani oilfield. In the same year, he predicted possibility of commercial oil reserves in Gala, Gurgani, Zyk, Garachukhur, Lokbatan and Mardakan.

5. The "First Russian mining artel" was opened in Baku, the main purposes of which were the oil production and oil processing in Baku oil region, then selling of this oil and oil products by the personal labour of artel's shareholders. Initially, artel began to work at Binagadi where it bought the dale; and oil production happened from 6 - 9 metres deep draw-wells.

### 1909

1. Oil chemist, head of chemical laboratory of BB IRTS Victor F. Herr was the first winner of Nobel (Emmanuel Nobel) Prize. Herr received the prize for his works on production of dibasic acids (succinic, adipic, glutaric, acetic) by nitric acid's oxidization of narrow oil fractions.

2. For the first time in the world, artificial islands were created for industrial development of oil wells in Bibi-Heybat bay. Oil bearing horizons of Bibi-Heybat field were under the Caspian Sea waters. Works would be completed in 1932, under supervision of talented engineer Pavel Pototsky (1879-1932).

3. On 10 June, on his 50th birthday, head of Nobel Brothers Co., Emmanuel Nobel was awarded by Emperor Nikolay II with the title of Full Member of State Advisors' Council. Emmanuel Nobel deserved this award for his generous donations to advance sciences and popular schooling in Russia.

4. The creation of Anglo-Persian petroleum company (from 1954 - British Petroleum / BP).

### 1910

1. In Balakhani oilfield of Nobel Brothers Co., for the first time in the world, new installation for oil-bailing - the device of Leinweber was installed and started operations in the beginning of August.

2. Nobel Brothers Co. owns 13 factories in Baku, of which 6 are for oil refining (for production of gasoline, kerosene, solar oil, lubricant oils, paraffin, etc.) and 7 are for auxiliary productions (production of soda and sulfuric acid for clearing of oil products, regeneration of acid sludge and alkali liquor, chemical-technologic laboratory, gas and mechanical factories).

3. Member of BB IRTS, mining engineer Ivan Glushkov (1873-1916) for the first time in the world, wrote a book titled "The guide for drilling of oil wells." Students of two Baku colleges (technical and mechanical machinebuilding) learned about drilling operations from this book. Later (in 1913), I.N. Glushkov would publish a monograph "Exploitation of wells. Production of liquid fossils: oils and brines". (First American book on methods of oil production would be printed only in 1921).

#### 1911

1. In January, in Baku, joint-stock company "St. Petersburg-Caucasian Oil Industrial and Trading Society" was established. I.S. Dembot, V.I. Kolobov, V.D. Yeritsov, S.I. Ginzburg and I.P. Popov were elected as board members of this company.

2. For the first time in Russia (in Baku, in Surakhani), Baku oilman von-Gabber implemented rotary drilling, which was less costly and more efficient.

3. The second Emmanuel Nobel Prize was awarded Professor of Moscow University A.M. Nastyukov and his assistant K.L. Malyarov for their work "About production and properties of liquid products by using the method of condensation of non-saturated hydrocarbons of oil with formalin".

4. Nikolay Zelinsky investigated thermo-chemical transformation of oil under the pressure, demonstrated that Surakhani gasoline at a temperature of 300C in the presence of catalyst (nickel) turns into a product with high concentration of aromatic hydrocarbons.

5. Victor Herr's original articles "Emanation of octonaphthene from Surakhani crude oil" and "Research on Taman crude oil" were published in the journal Works of BD

IRTS (issues 1-4).

6. Mining engineer S.K. Kvitko developed the scheme of cracking-installation with the use of pressure (the patent # 21963; in 1912), for the first time, in Baku.

#### 1913

1. Joint-stock oil company of "Murtuza Mukhtarov" was established in Baku with charter capital of 4 million rubles (in three years time, this company would be acquired by Azov-Don Commercial Bank).

2. "Father" of Petroleum Geology, Ivan Gubkin (1871-1939) starts his studies into Absheron oil fields's geology.

3. Monograph of Lev Gurvich "Scientific principles of oil refining" was published in Germany. First Russian edition of this book would be printed in Baku in 1921. Later, this classical work has been published numerous times and still serves as a valuable textbook for oil-chemists and technologists.

4. Total oil production in Russian Empire was 9 million tons for the year. 82 % of the total production came from Baku oilfields.

#### 1914

1. The third, last Emmanuel Nobel Prize was awarded to Baku mining engineer S.G. Isaakov for his work "The oil-bailing drum operated exclusively manually, and adaptation to it against the sludge pump's dragging off on an oil-bailing pulley".

2. According to the data of Council of Baku Oil Industrialists's Congress, the share of three monopolistic groups (Nobel Brothers, Oil and Shell) is about 69,5 % in the export of oil products from Baku. The mentioned industrial groups had more than 60 % of total oil production, 2/3 of kerosene production and accounted for all of the sales of

lubricant oils in Russian Empire.

3. Professor M.M. Tikhvinsky invented gas-lift method: a method of oil extraction from wells by using compressed gas. This method is more efficient than air-lift method, which uses compressed air. Tikhvinsky method of gas-lift was first applied in Baku oilfields of Nobel Brothers (in the USA, this method was first applied only in 1924).

### *1915*

1. In connection with the requirements of war-time, at three Baku factories (joint-stock company of Oil-gas, company of Alexander Benkendorf and at Military-industrial Committee) production of toluene (explosive for artillery shells) was organized.

2. For the first 15 days of oil production on Cheleken isle made 149 thousand poods, of which the share of Cheleken Oil Industrial Society was 83 thousand poods; the share of Nobel Brothers Co. was 51 thousand poods and I. Hajinsky-Cheleken company's share was 15 thousand poods. [Isabek Hajinsky (1861-1919) was a successful Baku oilman and owned oilfields in Absheron, Northern Caucasus and Turkmenia].

3. On 24 June, at the session of the Baku Military-industrial Committee, Victor Herr presented his report on receipt of toluene from Baku crude oils. "A.M. Benkendorf" company decided to start construction of a factory with monthly production of 3000 poods of toluene, and Military Department of Russia quickly approved this initiative.

4. In October, in Baku, Society of Drilling Contractors and Mechanical Workshops "Rapid", with a charter capital of 1 million rubles was established (it became the third largest drilling contractor, after Societies of "Murtuza Mukhtarov" and "Molot").

5. Professor N.D. Zelinsky and engineer-technologist S.A. Vishetravsky arrived in Baku (in December) and made reports at a meeting of BD IRTS, titled: "About toluene" and "About practical receipt of benzene and toluene from oil and coal".

6. For the first time in the world, Nikolay Zelinsky has established and informed about at a session of BD IRTS, that as catalysts in cracking process, besides the metal oxides (of titan, of aluminum and zinc) it was also possible to use floridin and Bakhchisaray gel (clay). This report became fundamental in the development of catalytic cracking; Zelinsky made his discovery 20 years before American Gudri rediscovered the same cracking process.

### *1915-1916*

In oilfields in Romani, the first deep pumps are lowered and for the first time method of gas-lift was tested.

### *1916*

1. On 15 May, in Baku, Chairman of Society of Engineers of the Baku area, Professor M.M. Tikhvinsky presented the report on aromatization of oil; in which he indicated the most suitable raw material and favorable temperature for the process and has in detail described the design of devices for decomposition of oil (the generator and retort's furnace), calculated factory outputs of a product and specified the best production methods of aromatic hydrocarbons, first of all toluene and benzene from oil.

2. In the beginning of June, in Baku, Russian-Persian Oil Industrial company "Rupento" was established for development of Persian oil fields. The Company had a start-up capital of 5 million roubles. H.Z. Taghiev, Musa Naghiyev, Sh. Asadullayev, prince Dadiani, Murtuza Mukhtarov and



others were the founders of company. Mohammed Jafar Mirza was appointed as Commissioner from the Persian government.

### 1917

1. By the beginning of year, 60 oil industrial enterprises of Russia with total fixed capital of 317,6 million rubles were under the control of Russian-Asian, Azov-Don and Petrograd International banks. [Azov-Don Commercial Bank (Chairman of Board was B.A. Kamenka) was engaged mainly in financing trade operations, but among its debtors were many other companies, engaged in production and refining of oil, operating both in Northern Caucasus, and in Absheron].

2. In the beginning of January, in Baku, new Oil Society "Baku-Astrakhan Oil Industrial and Transport Society" with start-up capital of 4 million rubles was created. Founders of the society were I.H. Ozerov and J.V. Vishau.

3. Before October revolution, the largest foreign investors in Russian oil industry were English companies, which invested more than 85 million USD in Russian oil industry. In Baku oilfields, the "Royal Dutch Shell Co." invested over 20 million USD; beyond this, the company had several oilfields in Grozny and Maikop. The French capital (basically, Rothschild's) in Russian oil industry was 25 million USD and the Belgian capital was in Russian oil was about 21 million USD.

### 1920

1. On 28 April, front lines of the 11th Red Army of Soviet Russia entered Baku. This commemorated beginning of 70-year rule of Soviets in Baku oil region. On 24 May, Azerbaijan Revolutionary Committee issued a Decree on

nationalization of oil industry in Azerbaijan. 272 private oil industrial units were abolished or nationalized in Absheron area.

2. On 14 November, Baku Polytechnic Institute (BPI), named after Meshedi Azizbeyov was established (decree on this was signed by Chairman of Azerbaijan Revolutionary Committee - Nariman Narimanov). Professor N.A. Dubrovsky was appointed as the first Rector of BPI and engineer S.A. Vekilov was elected as the secretary of the Academic Council. This school of higher education (subsequently - Azerbaijan Institute of Oil and Chemistry, or AzINEFTEHIM, and nowadays - Azerbaijan State Oil Academy) - was the first institute of higher learning in Europe and Asia training scientists and engineers for all branches of oil industry.

3. World-renowned scientist-chemist Lev Gurvich was elected as Professor of both Baku Polytechnic Institute and Azerbaijan State University (established in 1919). He was the founder of Baku scientific school of chemists-technologists in oil refining (N.I. Chernozhukov, O.G. Pipik, L.A. Gukhman, B.B. Kaminer, V.L. Gurvich, D.O. Goldberg, I.P. Lukashevich, S.E. Crane, I.G. Fux, T.I. Sachevko, I.A. Orujeva, F.I. Samedova, A.M. Kuliyev, Ya.I. Eminbeyli, and others).

### 1921

The largest Soviet oil industrial association "Azneft" (placed in Baku) signed contract with Rockefeller's trust "Standard Oil", according to which technical equipment and food stuffs from the USA were received in exchange for oil products and products of a handicraft work made in Baku. In same year, "Azneft" opened representative offices in London, Paris, Berlin and New York.

**1923**

1. For the first time at Baku machine-building factories thermal processing of boring chisels was used.
2. Baku engineer Matvey Kapelyushnikov (1886-1959), for the first time in the world, developed and successfully tested one-stage turbo-drill with a reducer.
3. At Moscow Mining Academy (established in 1918), Committee on oil exploration in Baku and Grozny areas was formed.
4. In April, new oilfield Bay of Ilych was opened (from 1991, the name was changed to Bail Limani).
5. Oil engineer Fatullabey Rustambekov (1867-1946) was appointed as technical director of "Azneft". In 1893 he graduated from St. Petersburg Institute of Technology; from 1906 till 1919 he was the General Manager of oil company "Musa Naghiyev".

**1924**

1. The first-ever offshore oil well in the world, well #71 built on wooden piles on artificial island in Bay of Ilyich (Bail Limani), started to produce commercial oil volumes from offshore field.
2. The first oil well was drilled with turbo-drill of Matvey Kapelyushnikov to the depth of about 600m in Surakhani.
3. Dmitry Golubyatnikov published his work "Calculation of oil reserves in the fields of Absheron peninsula".
4. An outstanding scientist, the "father" of Hydrogen Bomb, Igor Kurchatov (1903-1960) began first steps in his great scientific career at the faculty of physics in Baku Polytechnic Institute. As P.T. Astashenkov noted, "in Baku I.V. Kurchatov finally found his calling".

5. The work of Fatullabey Rustambekov, "Proposals of Azneft on technical rationalization of oil production within Five Year Program (1923/24-1927/28)" was published. In his work, for the first time, Rustambekov described new well designs, new methods of completion, innovations in oil transportation and oil storage, and also for the first time discussed possible ways of organizing gas industry.

6. In May, Committee for the construction of industrial unit for thermal cracking (according to the project of S.K. Kvitko) was created in "Azneft". The unit would consist of one still kettle of sapling action with nonrecurring filling. Engineer-chemist, 1st laureate of Baku Nobel Prize (1909) Victor Herr was elected as a Chairman of this Committee.

**1925**

1. Baku engineer, Professor M.M. Skvortsov for the first time in the world, designed adaptation for automatic submission of a chisel - "the automatic driller", which was first tested in Surakhani.
2. In Baku, for the first time in the world, trial tests of installations for cracking-processes, which are produced on the basis of the patent of Baku engineer Simeon Kvitko, take place. (S.K. Kvitko received the patent for these installations in 1912, one year before an American engineer Barton. The Marine Department intended to use the invention of Kvitko even before World War I, but start of the war prevented the realization of this project).
3. On 29 May, Presidium of the Central Executive Committee of USSR awarded well-known oil engineer F.A. Rustambekov with Order of Labor Red Banner for his huge contribution to the development of Russian/Soviet oil industry (M. Kalinin personally congratulated Rustambekov).

**1926**

In July, first in USSR electric railway connected Baku with city's oil suburbs of Balakhani, Surakhani and Sabunchi.

**1927**

1. In Baku, new technology is introduced in drilling: extended electric units with exact adjustment to rotation number.

2. In Baku Polytechnic Institute named after M. Azizbekov (established on 14 November 1920), Department of Electrical Engineering for Oil Industry was formed. Professor M.M. Skvortsov, who used to be the director of the institute for science and education, headed the department.

3. State Industrial Association "Azneft" renewed drilling activities in Turkmenia; more intensive development by Baku workers has begun in Nebit-dag (Nefte-dag) after oil gushers of 1931-1933, which confirmed industrial value of the reserves in the area.

**1928**

Air-lift method (V.G. Shukhov's invention) is used in production of nearly one third of all oil produced in Baku area. Essence of air-lift method is that compressed air is pumped into oil layer and due to pressure of air, oil moved to surface out of the well.

**1929**

1. On 22 October, Azerbaijan Scientific Research Institute on Oil Refining named after V.V. Kuybishev (from 1959, it was renamed to the Institute of Petrochemical Processes), was established. The Institute provided critical support to defence industry during the war years of 1941-

1945. Process of catalytic cracking with small-dispersed catalyst, developed at this Institute would be introduced in six oil areas of USSR, and also in Romania and Poland.

2. Famous inventor, scientist-engineer Vladimir Shukhov (1853-1939) is selected as Honorary member of Academy of Sciences of USSR. Other outstanding scientists: chemist Nikolay Zelinsky (1861-1953) and geologist Ivan Gubkin (1871-1939) are selected full members of AS of the USSR.

3. Famous chemist Konstantin Krasusky (1867-1937) is appointed to head Department of Organic Chemistry at Baku Polytechnic Institute. K.A. Krasusky made huge contribution to the development of oil chemistry in Azerbaijan. In 1911, he formulated a rule (which carries his name) on break of epoxy cycle in organic compounds.

4. For the first time in USSR, new method of oil-field investigation (electrical logging) is introduced in Surakhani oilfields, which significantly advanced domestic oil industry.

**1929-1934**

Vladimir Shukhov, Matvey Kapelyushnikov and Fatullabey Rustambekov invented and constructed in Baku the tubular cracking-installation. The process, used in this installation, is known under the name of "Soviet cracking" and played positive role in development and accumulation of experience on deep decomposition of oil.

**1930**

1. Electrical logging and devices to measure direction of drilling were first applied in Baku oil fields.

2. French geophysicist from Schlumberger also introduced a method of electro-exploration in the oilfields of Surakhani.

3. By Resolution of Presidium of USSR dated 29 May, Baku Polytechnic Institute was joined with SoyuzNeft and reorganized into Azerbaijan Petroleum Institute (API). Later, on the basis of API, extra-mural education departments were created in Baku, Kirovabad (now Ganja) and other main centers of oil production in Soviet Union (Grozny, Ufa, Ishimbay).

4. Book by Rector of API, Alexander Nikishin, titled "Black Gold. Catch up and Surpass", where oil-related developments on Absheron Peninsula and heroism of Azerbaijani oilmen in rehabilitating Azerbaijani oil industry in the beginning of XX century were thoroughly examined, was published in Baku.

5. Opening of the Baku oil industrial academy as a branch of All-Union industrial academy named after I.Stalin. The first group (54 men) of officials came from working class was graduated from this Baku academy for "Azneft".

### 1931

1. Azerbaijan Scientific-Research and Design Institute for oil machine building was established. The Institute played important role in developing technologies to produce oil by both gusher and mechanized methods, in producing equipment and machines for well workover operations and also for increased oil recovery.

2. According to the project of Vladimir Shukhov, Matvey Kapelyushnikov and Fatullabey Rustambekov, based on original technological scheme, a cracking factory was constructed in Baku; at this factory reforming process was carried out for the first time in USSR. Aviation fuel received at this factory had an octane number of 90-95 and low temperature of freezing.

3. Factory named after A. Japaridze, for the purification and dew axing of bright stock from Surakhani's paraffin oil - a high-quality component in aviation and automobile oils - was built.

4. In May, an oil pipeline from Lokbatan in Baku area to Batumi in Georgia was constructed.

5. Publishing house of Azerbaijan Petroleum Institute published two books of professor from this institute V.I. Tikhomirov: "The physical chemistry for students-oil technologists" and "The colloid chemistry for oil workers". These were the first textbooks on these fields in the USSR.

### 1932

1. High-temperature cracking process (510°C and above) was carried out at a cracking-factory of Shukhov-Kapelyushnikov-Rustambekov in Baku, for the first time in the USSR. High-aromatized gasoline (up to 52 %) for the motors working in accelerated regimes was received as a result.

2. From 15 till 24 of March, the 1st All-Union Conference on operation of oil wells took place in Baku. It had 7 sections: on gusher method; on secondary methods production; on air lift production method; on general problems of rationalization; on the strengthening and cementing of wells; on standardization and classification; and also, on problems of health and safety.

3. It was extracted the 22.2 million tons of crude oil in the USSR; the share of "Azneft" was 12.2 million tons (55%).

### 1932-1933

For the first time in the USSR, in Baku for development of offshore oil fields in Ilyich Bay (now - Bayil Limani), two wooden platforms on wooden piles were built. 13 meter long, 30 cm-diameter wooden piles were used to form jackets.

**1933**

On the shore of Ilyich Bay, the first in the USSR slanted well was drilled by rotary method.

**1933-1934**

For the first time in the world, Baku engineers, Khubentsovs brothers offered a design of the floating basis in the form of a flooded wooden pontoon; from this basis the first exploration well to the depth of 365m was drilled. Thus, by September of 1934, the first floating drilling installation in the Caspian Sea started operations.

**1934**

1. On island Artyom (Pirallah), construction of the metal bases, as per design offered by N.S. Timofeyev and K.M. Mikhaylov, on drill-flooded piles for drilling sea wells begun.

2. Journal "Azerbaijan's oil industry" (formerly known as "Oil business", published since January 1899) starts publishing series of articles by engineer F.A. Rustambekov, in which he based on domestic and foreign experience, for the first time in the world developed methods for exploring sub-sea oil and gas fields and also offered methods for developing offshore fields.

3. Due to industrialization of the USSR, the Azerbaijani Petroleum Institute is renamed to Azerbaijan Industrial Institute, named after M. Azizbekov.

4. First All-Union Scientific and Technical Conference on production and use of lubricant oils took place in Baku. During the conference, advances in the production and use of lubricant oils during 1920-1930 were investigated.

5. In April, the 1st Congress of All-Union Society on Mastering Oil Equipment was opened in Baku. There were 8

sections within the Congress: organizational and planning; production and technical education; mass technical advocacy; production-technical printing and property rights; deep well and ultra deep well drilling; scheduling and automation; oil transportation and oil storages; rationalization and loss control.

6. In July, "Azneferazvedka" (Azerbaijan Oil Exploration) Production Union started implementation of electrical shooting on the shore of the Caspian Sea between the promontories of Ambulak and Shoulan; this work would later be used in construction of deep offshore wells in the area.

7. On 20 November, the All-Union Conference on Minimum Technical Requirements in Oil Production, organized by Central Committee of Oil Workers Union of the USSR was opened in Baku.

**1935**

On 01 July, Production association "Azneft" (Azeri Oil) was divided into 4 individual self-contained All-Union oil-producing units: "Azizbekovneft", "Leninneft", "Orjonikidzeneft" and "Stalinneft" as proposed by the Council for Labor and Defence.

**1935-1936**

For the first time in the USSR, oil engineer Firudin Akhundov (1915-1996) received copyright certificates (patents) for his inventions: 1) electro-drill; 2) various lifts in production from low-discharge oil wells. (F.M. Akhundov - is the author of more than 300 inventions and patents in the oil business of Azerbaijan).

**1936**

1. For the first time in the world, by group of Soviet

engineers (Peter Shumilov, Eyub Taghiyev and others) multistage direct-drive turbo-drill was created. (Eyub Taghiyev for his outstanding contribution in the development of oil industry had been awarded with Stalin Prize three times. Famous Soviet writer and playwright A.P. Shtein wrote about him: "...highly educated and highly intellectual Azerbaijani engineer". Nowadays, there were established two premiums named after Taghiyev E.I. for students-drillmen in the Russian State University of Oil and Gas named after I.M. Gubkin.

2. In January, during the visit of Azerbaijani delegation in the Kremlin, the Soviet leadership was informed that plant for production of ethyl-alcohol from oil gases started operations in Baku. This installation, designed and built by Baku oil chemists, (M.A. Dalin and others) was the first plant of such kind in the world.

3. Academician Ivan Gubkin was elected as Chairman of Azerbaijani branch of Academy of Sciences of USSR. Later, in 1945 on the basis of this organization Academy of Sciences of Azerbaijan SSR would be created.

4. For the first time in the world geological practice for the development of offshore oilfields, the structural map of the Caspian seabed, for the area between settlement of Mardakan and Absheron strait, was made by engineer A.M. Pobedin for offshore seabed drilling.

### **1937**

1. Textbook of Academician Ivan Gubkin, "Teaching of Oil" was published. It was the first fundamental textbook of such kind in the USSR for students of Petroleum institutes and colleges.

2. In Baku, it was created the Surakhani Special Experimental Bureau of Drilling joined the Baku and Moscow engi-

neers. The main purpose of this bureau was - to develop the fundamentally new designs of drill and the technologies of downhole turbine motor drilling. 26-years old Eyub Taghiyev was appointed as a manager of this bureau.

### **1938**

The factory on purification of oil distillates with use of furfural as a solvent (based on the research by Izzet Orujeva, Dora Goldberg and others on selective purification and dewaxing of oil fractions from Baku oils) was built for the first time in the world in Baku.

### **1939**

1. The beginning of industrial inculcation of multistage direct-drive turbo-drill constructed by P.P. Shumilov, E.I. Taghiyev and others.

2. For the first time in the USSR (in Baku), oil chemist Murtuza Naghiyev (1908-1975) published findings of his original research, where in case of thermal cracking, laying theoretical foundations of intensification of chemical processes with use of recirculation. (M.F. Naghiyev derived an equation, establishing dependence between factor of recirculation and output of produced gasoline).

3. In May, for the first time in the USSR, the engineers S.A. Orujov and A.N. Matis introduced method of aeration for start of deep compressor wells in Surakhani.

### **1940**

1. For the first time in the world, a well with an electro-drill of a design by Ostrovsky, Alexandrov and others was successfully drilled.

2. Oil engineer Suleyman Vezirov (1910-1973) is appointed as head of "Azneftkombinat" - leading produc-

tion association in the USSR (75% of Soviet oil industry had been connected with this association). S.A. Vezirov was the first Azeri who headed "Azneftkombinat" during the World War II.

#### *1941*

1. For the first time in the world, an inclined (slanted) well to the depth of 2000m was drilled with turbodrill method on Bayil (near Baku).

2. Drilling of the deepest (3200 - 3400m) well in the USSR began in Hovsani oilfield.

3. The highest level of oil production in Azerbaijan (23,5 million tons per annum) was reached. Azerbaijani oil production accounted for 71,4% of total oil production in the USSR.

#### *1941-1945*

During World War II, Baku oil industry workers produced 70 million tons of oil; during this period 1118 Baku oilmen were awarded with orders and medals of the USSR, including Order of Lenin - 39 persons, Order of Labor Red Banner - 704 persons and Order of Sign of Honor - 104 persons.

#### *1942*

1. Under direction of oil-chemist Yusif Mamedaliyev (1905-1961) methods of synthesis of chlorinated methane and ethane were developed. On the basis of oil gases, according to Mamedaliyev's method, most valuable high-octane components for aviation fuel started to be produced. Under his management, a new method of toluene's synthesis from oil raw material was developed and introduced in industry, which has considerably increased quantity of toluene for pro-

duction of explosives. (Explosives were at very high demand in the USSR during war years).

2. For the first time, method of mononitrotoluene's production from aromatic hydrocarbons of Baku oils were developed and put into industrial use at a factory named after S. Budyonny (later - Neftegaz) in Baku. Authors of the method were S.D. Mekhtiyev, V.S. Gutirya, A.A. Kudinov and A.A. Degtyarova.

#### *1943*

1. In Baku (in Kishli), the largest machine-building factory was constructed for production of oil and drilling equipment according to best contemporary technology.

2. In Baku, in publishing house "Azgostoptekhizdat", the book of oil-chemists - Yusif Mamedaliyev and Murtuza Naghiyev, titled "Modern Status of Chemistry and Technology of Aviation Fuels" was published.

#### *1945*

1. Azerbaijan SSR Academy of Sciences was established. Academy consisted of four branches, two of which had to do with oil industry: branch of geological-chemical sciences and oil; and branch of physics, technical sciences and oil. On 31 March, Mir-Asadulla Mir-Gasimov was elected as the first President of Azerbaijani Academy of Sciences.

2. For the first time, high-speed method of manufacturing of tubular collapsible constructions for the sea jackets was offered. This method, which allows to effectively fix up the basis under drilling unit in any weather, was developed by talented engineers Sabit Orujov (1912-1981) and Yusif Safarov (1907-1963).

3. Monograph of Yusif Mamedaliyev, titled "Reaction of Alkylation in Production of Aviation Fuels" was pub-

lished. The book contains results of original research in the field of catalytic alkylation, and also demonstrates practical opportunity for producing motor fuels from raw material on the basis of oil gases and aromatic hydrocarbons.

**1946**

1. The first large-block base for the LAM system (Laboratory of Aero Methods of the Academy of Sciences of the USSR) was constructed in Gurgani oilfield area.

2. For the first time, oil expedition of Azerbaijani Academy of Sciences began practical studies of geological structures of Oil Rocks (Neft Dashlari) deposits. These studies resulted in discovery of huge oil reserves.

3. Azerbaijani scientists (M.A. Dalin, P.I. Markosov, S.M. Markevich and T.V. Prokofyeva) were awarded with State Prize of III Degree for the development and inculcation of alkylation process of benzene with olefins for the purposes of producing high octane fuels. This process was quickly implemented in several enterprises of the USSR in industrial scale.

**1947**

1. Construction of metal piers under supervision of engineers B.A. Raginsky, N.S. Timofeyev and others in the Caspian oilfield Izberg-Izberbash (Dagestan) started. The height of piers above sea level was 5-7m, and width of fit for traffic part was 3-4m. Later, similar and more advanced piers were constructed on offshore's oilfields - Gurgani, Banka Darwin, Zhiloy (Chilov), Neft Dashlari (Oil Rocks) and Gum Adasi.

2. Yusif Mamedaliyev is appointed as Chairman of Technical Council of the Ministry of an Oil Industry of the USSR. In same year, he is elected as the President of

Azerbaijani Academy of Sciences.

**1948**

The deepest in Europe and in the USSR oil well - well #1308 with depth of 3800m drilled by drilling master Aliulla in Surakhani oil field, gave a strong gusher on October, 02.

**1949**

1. On 24 August, for the first time in history, large-scale industrial development started in the open sea, on the Caspian field of Neft Dashlari (Oil Rocks). On 7th of November on this field, the first well was completed: oil-gusher was received after drilling to the depth of 1000m with daily debit of 100 tons of crude oil. Neft Dashlari (Oil Rocks) is sometimes called "Island of seven ships," because for the creation of artificial island to drill first well, 7 ships were flooded; one of which was well-known Zoroastr, constructed in 1877 (in Sweden, Motala-city) under Ludwig Nobel's order. (Zoroastr - the first-ever oil tanker belonged to Nobel Brothers Co.).

2. First Research and Engineering Design Institute "Gipromorneftegas" was established. The Institute began design of hydraulic engineering constructions in the open sea.

3. According to Decree of the Council of Ministers of USSR from 31 October on "Development of sea oil production in the Caspian Sea", the largest offshore upstream company "Azmorneft" was created.

4. Suleyman Vezirov becomes founder of oil industry in Turkmenia and heads Industrial association "Turkmenneft". Later, in 1954 S.A. Vezirov will be the first Minister of Oil Industry of Azerbaijan SSR. (He was the only oilman to be rewarded with the 5 Orders of Lenin).

5. For the first time in the USSR, test-industrial installa-



tion of catalytic cracking with circulating fine-dispersed catalyst was created in Baku. Already after one year, it was recommended to design the first industrial installation of catalytic cracking using crude oil as raw material, with powder-like catalyst.

**1950**

Banka Darwin oilfield was put on stream on the island of Artyom (nowadays - Pirallahi). Till 2003, 16 million tons of oil had been produced from this oilfield.

**1951**

1. In February, for the first time transport of oil by tankers from Oil Rocks (Neft Dashlari) on the Caspian Sea to oil terminal at Dubendi near Baku was organized.

2. Within the Ministry of Oil industry of the USSR, a specialized central administrative board - "Glavburneft" - was created to oversee all drilling operations in the country. Eyyub Taghiyev was appointed as the First deputy Director of "Glavburneft".

**1953**

New Baku Oil Refinery was constructed and started operations. At this refinery catalytic cracking processes were further advanced. With the establishment of this refinery, Azerbaijan's petrochemical industry intensively developed and Sumgait city (so-called - Komsomolsk na Kaspïi - built in 1949) near Baku became Petrochemical Industry hub of Azerbaijan.

**1954**

Commercial development of gas-oil field of Garadagh started and triggered development of domestic natural gas

industry in Azerbaijan.

**1955**

1. Oil scientist E.I. Taghiyev (1912-1967) heads group of experts sent to India for exploring industrial reserves of oil. During 1958-1959, the expedition discovered several oil fields and industrial oil production started in India. Taghiyev was appointed as Chief Adviser to the Indian government.

2. In lowland area near river Kur(a), oilfield Kyurovdag was discovered.

3. The deepest well in the USSR was drilled in Azerbaijan: with total depth of about 5000m.

4. At IV International Oil Congress in Rome (during 6-15 June) Academician Yusif Mamedaliyev presented two reports: on production of haloidstyrenes; and on production of detergents from crude oil.

**1955-1958**

Several intra-republican main gas pipelines were built in Azerbaijan.

**1956**

Mishovdag oil and Galmaz gas-oil fields were discovered in Azerbaijan.

**1956-1958**

For the first time in the USSR, several books were published in Azerbaijan on offshore field development. These books were written by Azerbaijan scientists I.P. Guliyev and Yu.A. Safarov.

**1957**

1. On 09 January, underwater pipeline Artyom (Pirallahi)

Island - Absheron with total length of 5.5 km was laid.

2. From 27 May till 03 June, in Baku, the All-Union Conference on Processing of hydrocarbons for production of synthesis of filaments and plastics took place.

3. On 20 June, construction of gas pipeline Garadagh - Sumgait with total length of 54 km was completed.

### 1958

1. In January, All-Union scientific journal "Oil and Gas" starts to be published in Baku.

2. Beginning of commercial development of large Zira gas-oil field.

3. Firudin Akhundov is appointed as Director of Azerbaijan Scientific-Research Institute of Electro-Technical Industry, created in the same year. After 11 years, this institute became a leading scientific institute of the electro-technical industry of the USSR, where electrical oil equipment were designed and produced at factories in Baku, Minsk, Tallinn, Khmel'nitsk and other cities of the USSR.

4. In Beijing, a book by Academician Murtuza Naghiyev "Chemistry, technology and calculation of processes of synthesis of motor fuels" in 2 volumes was published in Chinese language. In the same year he was elected as a member of Permanent International Committee of World Oil Congresses from the USSR (he served there until 1962) and also as member of High Examination Board of the Ministry of Higher education of the USSR.

5. At a World Exhibition (in Brussels) Soviet drilling installation for two-barreling drilling completed with all necessary equipment was presented. This installation was designed and built under the leadership of Professor Eyub Taghiyev and at the Exhibition this group of scientists was awarded with Gold medal.

### 1958-1959

In Baku, for the purposes of development of offshore oil fields, a team from a design institute "Gipromorneftegas" prepared project of floating installation (first in the USSR) for exploration drilling. The floating drilling unit would later be built at "Kaspneftflot" ship-repair yard.

### 1959

According to a Decree of Central Committee of CPSU from 12 February and Council of Ministers of the USSR from 14 March, Azerbaijan Industrial Institute was transformed into Azerbaijan Institute of Oil and Chemistry named after M. Azizbekov (AzINEFTEHIM). From 1991, the institute was renamed into Azerbaijan State Oil Academy.

### 1960

1. Construction of main Tran-Caucasian gas pipeline was completed; the Azerbaijani gas started to flow to capitals of neighboring republics.

2. First Secretary of CC CPSU Nikita Khrushchev (1894-1971) visited Oil Rocks (Neft Dashlari) and solved two main problems of this legendary oilfield: a) gave instructions to transfer crews from shore to offshore installation by helicopters and b) gave orders to build 5-9 storied houses on fill dams (foundations) for oil workers of the field.

### 1960 - 1970

For the first time in Baku, Baku oil chemists Valahb Aliyev and Musa Rustamov successfully carried out researches into two-level catalytic cracking of black oil (fuel oil) and waxy oils, with the purpose of solving a problem of rational refining of oil and oil residue.

**1961**

1. Group of Azerbaijani scientists and engineers (V.F. Negreyev, I.P. Guliyev, A.A. Farhadov, R.G. Hajiyeva, A.G. Khanlarova, S.A. Mehmandarov, M.S. Trifel, B.A. Zamanov, F.I. Samedov, M.I. Mamedov and others) were awarded with Lenin Prize for efficient development of offshore oil fields. (The Lenin Prize - the highest award in former USSR was established in 1925 and it was awarded once in 2 years on V.I. Lenin's birthday).

2. Monograph of oil chemist Haji Ashumov "Azerbaijan Crude Oils" was published in Baku, where the results of the research into refining characteristics of Azerbaijan crude oils were presented. After 5 years, under supervision of H.H. Ashumov fundamental work "Card Index of Azerbaijan Crude Oils" would be published.

**1962**

Talented physicist from Baku, Lev Landau (1908-1968) received Nobel Prize for his research on properties of helium at very low temperatures. (L.D. Landau was born on 22 January in Balakhani settlement near Baku, in the family of David Landau, chief engineer of Rothschilds' Caspian-Black Sea Society).

**1963**

1. In April, E.I. Taghiyev and geologist E.A. Bakirov were sent to Brazil to render assistance in creation of national oil industry. Recommendations developed by them on improvement of operations in oil fields and development of deep drilling were accepted by Brazilian experts and approved by the general Albino Silva, the President of Company "PetroBraz".

2. Famous scientist E.I. Taghiyev was recommended by

Presidium of the USSR Academy of Sciences and approved by Permanent Council of World Oil Congress as Permanent Representative of Soviet Union in the World Oil Congress.

3. Nikolay Baybakov (was born in Baku settlement of Sabunchi in 1911; in 1932 he graduated from Azerbaijan Oil Institute with degree in Commerce; was died in Moscow in 2008) is appointed as Chairman of State Committee of the USSR on Chemistry, and in 1964, as Chairman of State Committee for Oil Refining at State Central Planning Committee of the USSR.

4. In August, large group of Soviet petroleum geologists under supervision of Chief of Department at "Azneft", Aliyev M. began search for oil and gas in Cuba.

**1964**

1. Oil Production and Oil Refining Ministries of Azerbaijan SSR are established.

2. For the first time, the process of carbamide dewaxing of fuels and the oils, offered by Institute of Petrochemical Processes named after Yusif Mamedaliyev was applied in some oil regions of the USSR..

3. On 10 July in Baku, huge unit of catalytic cracking at New Baku Oil Refinery, named after V. Lenin, was constructed and commissioned.

4. On 10 December, on the Caspian Sea, unique 18-kilometer long subsea gas pipeline from Jiloy (Chilov) island to Absheron Peninsula was laid and commissioned.

**1965**

1. Famous oil engineer Alovzat Garayev (1914-1988) was appointed as Chief of Technical and Economic Department at the Ministry of Oil Production Industry (Minneftprom) of the USSR. From 1965 till 1976 he was a

member of the Board of "Minneftprom" of the USSR. Garayev was the second Azerbaijani, after Sabit Orujov who worked in the management of "Minneftprom" of the USSR.

2. For the first time in the USSR, in July at AS of Azerbaijan SSR, special Institute of Chemistry of Additives was established to study manufacturing of multifunctional additives of complex action for engine oils received from Baku oils. Famous scientist oil-chemist Ali Guliyev (1912-1989) became the first Director of this Institute. From 1993 this Institute carries his name. Later, several industrial plants would be constructed in Baku, Sumgait, Leningrad, Ufa and Kiev as per technologies developed by this Institute.

3. Construction and commissioning of self-propelled crane vessel Koroghlu, with displacement of 10 thousand tons is completed. (This crane with lifting capability of 250 tons enables rapid and efficient installation of modular platforms in sea depth of up to 100m; this crane vessel considerably accelerated exploration and development works in deep-water areas of the Caspian Sea).

#### *1966*

1. In May, new gas-oil field Kyursanghi was discovered.

2. For the first time a new technology, installations on selective purification of oils with furfural, was implemented in oil refining in Azerbaijan. In 1970, in this facility, for the first time disk condensers were used instead of extraction columns (this innovation considerably improved quality of produced engine oils).

3. For the first time in the USSR, in Baku, scientists of "VNIPolefingas" (from 1991 - "AzGosNIPInefegas") developed thermal method of influence on oil layers.

4. On the basis of Department of High-molecular Compounds of Institute of Petrochemical Processes (IPCP)

named after Mamedaliyev, Sumgait branch of the Institute of Petrochemical Processes was created. Main research direction of the new Institute was development of methods of synthesis of various surfactant species on the basis of oil hydrocarbons and their separate fractions.

5. In August, first in the USSR floating drilling platform Apsheon, designed by Baku institute "Gipromorneftegas", started drilling in Sangachal Deniz structure, located 8 km from shore.

6. From September till July of 1967, oil scientist Yu. Mamedov led research work in department of oil and chemistry of Kansas University. Later, in October at Symposium of oil industry workers in Dallas (state of Texas) Mamedov was elected as member of the Society of American Oil Industry Workers.

7. Monograph of famous petroleum geologist Fuad Samedov (1926-1969) "An oil groundwater hydrology of Absheron archipelago" was published in Baku.

#### *1968*

1. On 18 January, the V Congress of Scientific and Technical Society (STS) of oil and gas industry of the USSR started its work in Baku. This organization (STS) took its origins from Imperial Russian Technical Society (which was founded in 1866) and continued its predecessor's progressive traditions.

2. Talented oil engineer Asad Rustambekov (1911-1982), son of Fatullabey Rustambekov, was appointed as Deputy Director of "AzNIIburneft" (Azerbaijan Scientific Research Institute on oil drilling) for Central Asian region. He would play a key role in development of Soviet oil business in Azerbaijan, Bashkortostan and Central Asia.

3. Oilfield Absheron Bank came onstream on Artem

(nowadays - Pirallahi) Island.

**1968-1969**

AzINEFTEHIM's collaborator, talented chemist Fuad Agayev (1941-2008) has taught the oil business on French to Algerian youth in the Bumerdes Oil Educational Centre. The rector of this centre Sherifee, arriving in Baku (1969), has high evaluated the F.Kh. Agayev's teaching during his meeting with AzINEFTEHIM's leadership. The second Agayev's trip to Bumerdes took place in 1978-1982.

**1968-1975**

Discovery and development of new offshore oil and gas-condensate fields started in the Azerbaijani sector of the Caspian Sea: Bahar field (1968), Sangachal-Duvanny Deniz field (1969) and Bulla Deniz (1975).

**1969**

Group of scientists from AzINEFTEHIM (A.A. Abdullayev, A.D. Amirov, I.A. Nabiyeu, T.M. Aliyev, A.D. Lemberansky and others) are awarded with State Prize of the USSR for creation and wide industrial application of system of computer-aided facilities in Azerbaijani oil fields.

**1970**

1. Offshore oil production reached new maximum- 12.9 million tons. (Share of offshore oil in total oil production in Azerbaijan exceeded 62 %).

2. Valentin Shashin (1916-1977) from Baku is appointed as Minister of Oil Industry of the USSR. V.D. Shashin played huge role in successful development of West-Siberian oil industry.

**1971**

On 28 March, 1st billionth ton of oil was produced from oilfields in Azerbaijan, since the beginning of industrial oil production in Azerbaijan.

**1972**

1. Correspondent-member of Azerbaijani Academy of Sciences, Sabit Orujov (1912-1981) is appointed as Minister of Gas Industry of the USSR. He made invaluable contribution to development of Soviet oil and gas industry. Nowadays, the most successful students of Russian State University of Oil and Gas named after I.M. Gubkin receive scholarships named after S.A. Orujov. The first-rate gas production union "Urengoygas-extraction" in the USSR was named by S.A. Orujov.

2. In Sumgait, process of platforming of petrol fraction from Baku oil, which made production of benzene possible - the major raw material in petrochemical industry - was introduced at a factory for the first time.

**1974**

Famous engineer-technologist Shamil Jafarov (1929-1990) was appointed as General Manager of one of the first research-and-production associations in Azerbaijan - "Bakneftemash". The Association was comprised of "OKBneftemash" and machine-building factory named after F. Dzerzhinsky in Surakhani.

**1975**

An outstanding scientist, Academician of Azerbaijani Academy of Sciences Azad Mirzajanzadeh (1928-2006) was awarded with the Prize named after I.M. Gubkin from Presidium of STS of Oil Industry of USSR for his work

"Application of non-Newtonian systems in oil production". In 5 years time A.Kh. Mirzajanzadeh would be the winner of State Prize of Azerbaijan SSR for series of works on mechanics of technological processes in oil and gas production.

**1976**

In December, on oil industrial units of the USSR (Azneft, Bashneft, Udmurtneft and Permneft) tests of depth-pump bars from new marks of steels, which on durability and reliability considerably surpass domestic and foreign bars was successfully tested in production. Since then, and until now - Perm machine-building factory produces such bars. Authors of this invention are scientists of Azerbaijan Polytechnic Institute led by Rahim Shukyurov (author's certificates of the USSR c/w numbers 685710, 685711 and 777081).

**1977**

1. For the first time, in the open sea, a deep-water (84 meters) stationary platform was installed.
2. Scientist-chemist Bahadur Zeynalov (1917-1995) was appointed as main expert and the coordinator of State Committee of the USSR on Science and Technology on problems of synthetic naphthenic acids (SNA) production. The process of SNA production with direct oxidation of naphthenic hydrocarbons developed by him was patented in the USA, England, DDR, Romania and Japan.

**1978**

The First International Soviet Union's Oil and Gas industry exhibition was opened on June 17, in Baku. This exhibition was attended by over 2000 guests from more than 40 countries of the world. The exhibition was opened by the speech of Alexey Kosygin, Chairman of the USSR Council of

Ministers.

**1979-1989**

Offshore, on the Caspian Sea, in water depths of about 200 meters, 4 new multi-pay oilfields were opened: Guneshli (1979), Chirag (1985), Azeri (1988) and Kapaz (1989). Combined reserves of the fields were estimated at 700 million tons of oil and 200 billion cubic meters of gas.

**1980**

1. Doctor of Chemical Sciences, Professor Alimamed Shabanov lectures on application of crown-ethers in oil production and in oil refining at Maryland, South-Californian and Brigham - Young (Provo city) universities of the USA.

2. New ship of structure-test drilling - Special ship No1 named after A. Amirov, built by French company "Seret" was put into operation. For the first time equipment for flex drilling and water survey were placed on the same ship. The ship's delivery on the Caspian Sea in Baku and the drilling of oil wells from the ship were realized under the leadership of experienced oil engineer Fyodor Pokhil.

3. It was published the book of academician Akhad Yakubov (1908-1979) with title "The mud vulkanism of the Soviet Union and its connection with oil- and gas-bearing"; in which there were presented the scientist's extensive researches on mud volcanos of Azerbaijan, Turkmenia, Georgia, Kerch and Taman peninsulas, Kuban and Sakhalin island.

**1981**

1. For the first time, drilling in water depth of 200m from a semisubmersible drilling rig was carried out.
2. AzINEFTEKHIM trains professionals within 31 dis-

cipline areas: the institute trained over 15000 students, including more than 1200 students from 55 foreign countries. The oldest school of higher learning of the USSR in Petroleum closely cooperates with oil Institutes and Universities in Moscow, Grozny, Ufa, Tumen, Ivano-Frankovsk, Ukhta, Dnepropetrovsk and others.

**1981-1984**

Group of Soviet specialists, sent to Socialist Republic of Vietnam for search of oil and gas reserves, led by famous oil engineer Jalal Mamedov, discovered several large oil fields (White tiger, Dragon, Wolf and others) on the shelf in the South of Vietnam.

**1982**

On 24 September, leader of Soviet Union Leonid Brezhnev (1906-1982) arrived in Baku for celebrations dedicated to awarding Azerbaijan SSR with Award of Lenin. On 25 September, he visited a unique mobile platform - drilling installation Shelf-2, designed to drill wells to the depth of up to 6000m in water depths of up to 200m. (Previous his visits to Azerbaijan took place in 1970 and 1978.)

**1983**

H.H. Ashumov's monograph "Azerbaijani crude Oils" was published in Azerbaijani language in Baku. In this monograph, the author generalized and systematized composition and properties of Azerbaijani crude oils and oil products.

**1984**

Baku chemist Shamil Vezirov (1942-2001), son of Suleyman Vezirov, was appointed as expert of the United Nations Organization in Northern Korea, where he worked

in the International team to establish a catalytic cracking industrial complex and at the same time build a factory on polyvinyl chloride production in Khamkhin-city.

**1985**

In Baku, deep-water jackets factory was built. Initiator of the construction was the member of Political Bureau of Central Committee of CPSU Heydar Aliyev. At that time Azerbaijan produced 2/3 of oil equipment and machinery used in the USSR.

**1987**

Famous oil scientist, geologist Farman Salmanov (1928-2007) is appointed as a First deputy Minister of Geology of the USSR. Salmanov had been engaged in development of oil industry in Tumen area and in all North of Russia for more than 30 years.

**1988**

Editor-in-chief of journal "Azerbaijan Oil Industry", oil scientist Mir-Said Rza is appointed as member of experts commission on problems of oil and gas in the High Examination Board at Council of Ministers of the USSR (he held this position up to 1991, when the USSR was collapsed).

**1989**

1. Unique diving boat "Academician Tofik Ismaylov" equipped with the advanced equipment for technical and navigating purposes, underwater diving immersions of up to 300 m and with system of dynamic positioning started operations within "Kaspmorneftflot" (Caspian Sea Oil Fleet).

2. Vaghit Alekperov (was born in Baku in 1950; he graduated from AzINEFTEHIM) - has appointed as a vice-minis-

ter of the oil industry of the USSR. In 1991, he is a president of first-rate Russian oil company "LUKoil" (this name was formed from first letters of the largest oilfields in the Soviet oil industry - Langepas, Uray and Kogalim).

#### **1990**

Monograph of Yury Zaytsev from Baku "Theory and Practice of Gas-lift" was published. He was awarded with Diploma of the State Committee of the USSR on National Education for this work. Currently, he supervises development of gas field equipment at Industrial Associations Orenburggasprom and Astrakhangasprom.

#### **1991**

During 13 - 17 June, the First International Conference on Problems of the Caspian Sea was held in Baku. Main purpose of the Conference was reduction of oil pollution on the Caspian Sea during exploratory and development drilling. World's leading ecologists and oil chemists from the USA, Canada, Great Britain, Russia, Turkey, Iran and other countries took part in the Conference.

#### **1992**

1. On 07 September, agreement was signed in Baku between the Government of Azerbaijan and oil company BP Exploration on preparation of projects to develop offshore oilfield Chirag and offshore structure Shah-Deniz. Lady Margaret Thatcher witnessed the signing ceremony.

2. Book of Baku scientists F.I. Samedova and M.F. Mirbabayev "High-molecular heteroatom compounds from Azerbaijan oils" was published. The book presented results of original research with use of physical-chemical and spectral methods of the analysis in high-molecular compounds

evolved from specific Azerbaijani oils and oil residue.

#### **1993**

1. In September, between Russian oil company LUKoil and State Oil Company of Azerbaijan Republic (SOCAR) - Frame Agreement was signed on Cooperation in the sphere of joint development of oilfields in Azerbaijan and Russia. The Agreement also envisaged coordination of activities in a number of areas, where LUKoil and SOCAR had interests.

2. In October, Agreement was signed between oil companies SOCAR and Chevron (USA) joint exploration in the Southern Caspian Sea. The Agreement envisaged continuing negotiations regarding deep-water block Absheron. It was believed that Absheron was the largest known promising structure on the Caspian Sea.

#### **1994**

1. On 24-28 May the First International Caspian Oil and Gas Exhibition and Conference, incorporating Refining and Petrochemicals took place in Baku. Starting from 1994, the event takes place every year.

2. On 20 September, President of Azerbaijan Heydar Aliyev chaired the signing ceremony of Azerbaijan's first oil PSA, for the development of Azeri-Chirag-Guneshli (ACG) fields. This Production Sharing Agreement (PSA) is known as the Contract of Century and was ratified by Milli Mejlis (Azerbaijani Parliament) on 02 December and came into force on 12 December. Total capital investments in the project were estimated at 13 billion USD. After one year, for the purposes of ACG project implementation an operating entity, Azerbaijan International Operating Company (AIOC), was created. Terri Adams from UK became the first AIOC President. AIOC was a consortium of 11 major international



oil companies: BP (UK), Amoco (US), LUKoil (Russia), Pennzoil (now Devon of US), UNOCAL (US), Statoil (Norway), McDermott (US), TPAO (Turkey), Delta Nimir (now Amerada Hess of US), Ramco (US) and SOCAR (Azerbaijan).

**1995**

1. On 09 October, at a steering committee meeting of AIOC, northern and western oil export pipeline routes were approved. Length of an oil pipeline along the Northern route (Baku - Grozny - Tikhoretsk - Novorossiysk) is 1411 km, of which 200 km is in the territory of Azerbaijan. According to the project design, 2 pump stations will be built in Azerbaijan and in Russia, with capacity of 80 thousand barrels each. Construction of the western route oil pipeline from Baku to Supsa, with total length of 926 km was planned to begin in March of 1997.

2. On 10 November, 2nd PSA of Azerbaijan was signed between SOCAR and Pennzoil (US), LUKoil (Russia), Agip (Italy), LUKAgip (Russia / Italy) on exploration and development of prospective structure Garabakh was signed. Capital investments in the project are estimated at 1.7 billion USD. Oil reserves of the block are estimated between 52 million - 85 million tons; gas reserves are estimated at 30 billion cubic meters. (This structure was seismically revealed in 1959).

**1996**

1. On 04 June, 3rd PSA of Azerbaijan was signed in Baku between SOCAR and BP, Statoil, LUKAgip, Elf Aquitaine (later Total-Fina Elf, and now TOTAL of France), OIEC (now NICO of Iran) and TPAO for the exploration and development of Shah Deniz field. Capital invest-

ments in the project are estimated at 4 billion USD; total reserves of the field are estimated at 500 billion cubic meters of gas and 100 million tons of condensate.

2. On 14 December, 4th PSA of Azerbaijan was signed between SOCAR and Amoco, UNOCAL, Itochu (Japan), Delta Nimir (Saudi Arabia) for exploration and development of offshore prospective structures Dan Ulduzu and Ashrafi. Estimated oil reserves: Dan Ulduzu - 55 million tons, Ashrafi - 90 million tons. Capital investments in the project are estimated at 2 billion USD. This consortium of companies was named Northern Absheron Operating Company (NAOC) which was dissolved in 1999.

**1997**

1. On 13 January, in Paris, in the presence of Presidents of France and Azerbaijan - Jacques Chirac and Heydar Aliyev - 5th PSA of Azerbaijan was signed between SOCAR and French companies Elf Aquitaine and Total, for exploration and development of offshore prospective structures Lenkaran and Talish. Estimated oil reserves in the structure are as follows: for Lenkaran - 20-30 million tons; for Talish - 15-20 million tons. Capital investments in the project are estimated at 2 billion USD.

2. On 04 June, in Moscow 6th oil contract of Azerbaijan was signed between SOCAR and LUKoil for exploration and development of Yalama block in offshore Caspian. Reserves of the block are estimated to be 800 million barrels of oil and 50 billion cubic meters of gas. Capital investments in the project are estimated to be around 4 billion USD.

3. On 01 August, in Washington, in the presence of Azerbaijani President Heydar Aliyev and Vice-president of the USA Albert Gore, 7th, 8th and 9th oil contracts of Azerbaijan were signed between SOCAR and Chevron, Exxon and Mobil. The PSA's envisage exploration and devel-

opment of 3 offshore blocks: Absheron, Oguz and Nakhichevan. Capital investments are estimated to be: under contract #7 (Absheron) - 3.5 billion USD; under contracts #8 and #9. (Oguz and Nakhichevan) - about 2 billion USD each.

4. KCA-Deutag - one of the largest International platform drilling contractors in the world - started drilling operations on Chirag-1 in Azerbaijan, on the Caspian Sea. KCA-Deutag was the first international drilling contractor to start drilling operations on the Caspian Sea.

5. On 26 September, in Rome, in the presence of Azerbaijani President Heydar Aliyev 10th oil contract of Azerbaijan was signed between SOCAR and Agip, Mitsui (Japan), TPAO, Repsol for exploration and development of offshore structure Kyurdashi. Capital investments in the project are estimated at 2.5 billion USD.

6. On 12 November, first oil from a well with flow rate of 1000 tons per day on platform Chirag-1 was received. 24 wells in total are to be drilled from this platform.

7. Construction of oil terminal in Sangachal was completed. The oil terminal has capacity to receive and store up to 115 thousand barrels of oil.

#### **1998**

1. On 06 April, Pirallahi offshore drilling unit of SOCAR was established with the purpose of intensifying offshore drilling operations in the fields adjacent to Pirallahi Island (it is the largest island of Absheron archipelago). Till 2003, this drilling unit would drill 46 wells.

2. On 02 June, in Gulistan Palace, in Baku, Azerbaijan's 11th oil contract was signed between SOCAR and Union Texas, Chinese National Oil Companies and others for exploration and development of Gobustan structure. Capital investments in the project are estimated at 900 million USD.

3. On 21 July, in Great Britain, Azerbaijan's 12th PSA was signed between SOCAR and BP for exploration and development of prospective structure Inam. Capital investments in the project are estimated at 3.5 billion USD. (The structure was discovered in 1953, with the use of seismic methods).

4. On 21 July, in London, in the presence of Prime Minister of Great Britain Tony Blair and President of Azerbaijan Heydar Aliyev, Azerbaijan's 13th and 14th oil contracts were signed between SOCAR and BP/Statoil, ExxonMobil for Araz-Alov-Sharg offshore structure, and between SOCAR and ENCANA and TPAO for Muradxanlı structure, respectively.

5. On 5-8 October, the III International Petrochemical Conference, dedicated to memories of academicians M.F. Naghiyev and V.S. Aliyev took place in Baku. Petroleum scientists from many countries (the USA, Russia, Turkey, Iran, Ukraine, Bashkortostan, Kazakhstan and others) presented results of their research.

6. In December, construction of Baku - Supsa oil export pipeline with total length of 827 km was completed. After one year's time, throughput capacity of the pipeline would reach 105 thousand barrels per day or 5 million tons per annum.

7. Professor Nil Khairiddinov from Baku published book called "Geo-technological Features of Development of Oilfields of the South-West of Bashkortostan". The book contains results of his research into increasing oil recovery from aging large oil and gas fields in Bashkortostan, in Russia.

8. In December, 15th oil contract of Azerbaijan was signed between SOCAR, Frontera Resources Corporation and Chinese National Oil Company for exploration and development of onshore structure Kyursangi-Garabaghli. The con-

tract area is located 100 km south-west from Baku. Capital investments in this project are estimated at 1 billion USD.

9. On 25 December, 16th oil contract of Azerbaijan between SOCAR and 4 Japanese companies was signed for exploration and development of Ateshgah structure in off-shore Azerbaijan. Capital investments in the project were estimated at around 2.5 billion USD.

10. Professor Farid Dadashov (one of the founders of Baku School of oil geologists) was elected as President of the Azerbaijan Society of the Petroleum Geologists. The Society is a local branch of the International Association of Petroleum Geologists.

#### **1999**

1. On 21 April, in Washington, during Azerbaijani President Heydar Aliyev's official visit to the USA, Azerbaijanians 17th, 18th and 19th oil contracts between SOCAR and American companies were signed: two contracts were signed between SOCAR and ExxonMobil for exploration and development of offshore structures Zafar-Mashal and Lerik; another contract was signed between SOCAR and Moncrief Oil for exploration and development of onshore Padar structure.

2. In June, Istiglal semi-submersible drilling rig completed drilling of 1st exploration well in Shah-Deniz. Drilling of the 2nd and the 3rd exploration wells would be completed in April of 2000 and in November of 2001, accordingly.

3. On 21-24 September, the V Baku International Congress - Energy, Ecology and Economy took place. More than 220 reports in 4 sections: Environmental problems of the Caspian Sea; Environmental problems of pipelines of Northern and Western directions; Energy-saving and climate change; Renewable energy sources; and Recommendations under legislative and normative documents. (Previous

Symposiums and Conferences took place in Baku in 1991, 1993, 1995 and 1997).

4. In November, during OSCE Summit in Istanbul - Azerbaijan, Georgia and Turkey signed Intergovernmental Agreements in support of the Main Export Pipeline of Baku-Tbilisi-Jeyhan (BTJ).

5. On 22 December, oil tanker Birch with 1 million barrels of Azerbaijani crude oil from Baku-Supsa pipeline, shipped by TotalFina, left Supsa oil terminal for Lavera (France).

#### **2000**

1. In February, based on the results of 2nd exploration well in Shah-Deniz (SDX2), reserves of the field were upgraded to 700 billion cubic meters of gas, of which 400 billion cubic meters are recoverable.

2. On 12 September, 20th PSA of Azerbaijan was signed between Moncrief Oil and SOCAR for development of onshore block Kalamaddin-Mishovdag. The contract became effective on 22 November, the same year. Capital investments in the project are estimated at around 1 billion USD.

#### **2001**

1. On 09 January, 21st PSA of Azerbaijan was signed between LUKoil and SOCAR for rehabilitation and further development of Zikh-Hovsani fields. The contract was signed during first official state visit of Russian President, Vladimir Putin to Azerbaijan. Capital investments in the project are estimated at around 250 million USD.

2. For the first time in the world, new method for the prevention of hydrate-formation of natural gas was developed by Professor Alimamed Shabanov.

#### **2002**

1. In March, "Kaspmorneftegazstroy" became the first oil industry unit in Azerbaijan to receive International certifi-

cate of quality management.

2. In March, Dubai-based company Middle East Petrol started to operate oil terminal at Dubendi. The company made significant investments in port infrastructure and considerably expanded its transit capacity. Dyubendi terminal was built in 1970 and is located at a distance of 47 km to the north of Baku, on Absheron peninsula.

3. In August, textbook by Professor of Azerbaijan Technical University Rahim Shukyurov on "Physical Metallurgy" was published for the first time in Azerbaijani language. In this book he thoroughly presents his long-term research on development of new high-strength low-alloy steels for oil, oil-field and mining equipment.

4. On 29 September, with a solemn ceremony, construction of a Turkish portion of Main Export Pipeline BTJ (BTC) started. According to project schedule, within 32 months the Caspian (Azerbaijani) oil should go through Georgian and Turkish territories to the Western markets.

5. In September, Doctor of Geological-Mineralogical Sciences, Academician of the Russian Academy of Natural Sciences Iskender Jafarof (graduated with honors from Azerbaijan institute of Oil and Chemistry named after M. Azizbekov in 1971) is appointed as Senior Vice-president of Siberia-Ural oil, gas and chemical company. Prior to this appointment, I.S. Jafarov held position of Director in the department of geology and field development in Tyumen oil company.

6. In October, Government of Azerbaijan approves documents about social and ecological impact assessment of Shah-Deniz field development. In November the Government approves similar documents on social and ecological impact assessment within the project of construction of South Caucasus gas pipeline.

7. President of Romania Ion Iliesku visited Baku on 29 of October and declared that Romania was ready to transport Azerbaijani oil and gas to Europe and also buy Caspian hydrocarbons.

8. On 22 November, during his presentation to the students of Azerbaijan State Economic University, US special envoy for energy issues on the Caspian region, Stephen Mann said that proven reserves of the Caspian basin stand at around 50 billion bbls of oil, while potential resources could be as high as 85 billion bbls. according to him, natural gas resources of the region is about 6 trillion cubic meters.

9. Total oil production in Azerbaijan was 12.686 million tons; of which, 7.444 million tons were produced by SOCAR and 5.242 million tons were produced by AIOC.

10. Professor F.I. Samedova published a monograph "Azerbaijan's Crude Oils and Their Characteristics". In this fundamental work, she extensively describes nature and properties of crude oils from various oil and gas bearing areas of Azerbaijan. The studies are based on applying various physical-chemical and spectral methods.

12. For the first time in the world, Professor A.L. Shabanov applied chemical sensor controls and spin-labeled organic compounds for defining oil layers' watering.

### 2003

1. In February, agreement was signed by BP (project operator), Statoil, TOTAL, NICO, LUKAgip, TPAO and SOCAR on Stage 1 development of Shah-Deniz gas-condensate field. According the agreement, a new gas export pipeline, so-called South-Caucasus gas pipeline from Azerbaijan through Georgia up to Georgian-Turkish border would be built. Total length of the pipeline would be 690 km, of which 442 km will be in Azerbaijan and 248 km in Georgia.

2. On 23 July, President of LUKoil Vaghid Alekperov visited Baku and held discussions about the details of exploration work in D-222 (Yalama) block in the Azerbaijani sector of the Caspian Sea. A native of Baku Vaghid Alekperov would take part in the launching ceremony of Leader (DSS-20) semisubmersible drilling rig, constructed by Maersk of Denmark.

3. In late October, first exploration well was spudded in Zafar-Mashal offshore structure, by using Leader (DSS) rig. Drilling location has a water depth of 618m and well depth is projected at 6800m. Project operator is Exxon. Exxon is also operator in projects Nakhchivan and Oguz.

4. In November, oil tanker "Jalil Mamedgulizadeh", built in Russian shipyard Red Sormovo, was delivered to Baku. The tanker, with capacity of 8000 tons is intended for transportation of Kazakhstan crude oil to Baku. The crude would later be shipped through BTJ. (Two more tankers are being built for Azerbaijan - each with capacity of 13000 tons).

6. Total oil production in Azerbaijan was 15.38 million tons for 2003. Total gas production was 5.17 billion cubic meters. From these totals, SOCAR share was about 58% in oil production and more than 80% in gas production.

7. On 04 June, 22nd PSA was signed between Shengli Oil and SOCAR for the development of Pirsaat oil-bearing block. Capital investments are estimated at 80 million USD.

**2004**

1. In the beginning of February, in Baku the governments of Azerbaijan, Georgia and Turkey signed basic inter-governmental agreements on construction of an oil pipeline of BTC. It was decided to name the pipeline and oil terminal at Jeyhan after Heydar Aliyev (1923-2003), former President of Azerbaijan and author of new oil strategy of Azerbaijan. The pipeline will carry 50 million tons of oil per annum and

will have a total length of 1770 km, stretching through the territories of Azerbaijan, Georgia and Turkey and connecting Caspian oil fields reches with the Mediterranean Sea.

2. In February, AIOC started drilling pre-drilled wells in East Azeri with semisubmersible drilling rig of Dada Gorgud.

3. By the middle of April, volume of oil produced from Chirag to date totaled to 32 million tons, of which 28 million tons has been exported through the pipeline of Baku-Supsa, put into operation in the beginning of 1999.

4. David Woodward, President of BP informed about 70% of the BTC pipes are welded in Azerbaijan and Georgia and in Turkey, which has the longest section of the pipeline, the work is also successfully progressing, where 50% of the pipes are welded.

5. On 18 May, Caspian Technical Training Center in Sangachal was officially opened. The training center is established to train technicians for ACG, Shah-Deniz, BTJ and SCG. According to David

Woodward "it is a unique center of its kind in the Caspian region, equipped up to the highest international standards and can train up to 400 technicians (drillmen) at a time."

6. In June, in Baku a PSA between SOCAR and Noble Sky Ltd. Was signed for the rehabilitation and development of Garachukhur oil field. This is the 23rd oil contract of Azerbaijan with International companies. Capital investments by Noble Sky Ltd. in the project are projected at 220 million USD.

7. Vice-president of BP Azerbaijan for Shah-Deniz project, Rob Kelly informed that the first gas from Shah-Deniz field will be received on 01 October 2006. Cost of Stage I development of Shah-Deniz field is estimated at 3.2 billion USD, of which 2.3 billion USD will be spent for the field

development and 900 million USD for the construction of South-Caucasus Gas pipeline.

8. In the beginning of October, Bulgarian President Georgy Pirvanov visited Baku and held talks with Azerbaijani President Ilham Aliyev on the export of Azerbaijani oil to European markets..

9. In October, the construction of South-Caucasus Gas pipeline, which will carry natural gas from Azerbaijani field of Shah-Deniz on the Caspian Sea to Turkey, via the territory of Georgia, began. Diameter of the gas pipeline is 106.6 cm with throughput capacity of 20 billion cubic meters per year. The pipeline construction will cost 950 million USD.

10. In November, tanker "Heydar Aliyev" filled with Kazakhstani crude oil (about 12 thousand tons) arrived at Dubandi port of Baku from Aktau in Kazakhstan. The tanker will regularly carry Kazakh crude oil to Azerbaijan (making 7 trips a month).

11. In November, President of Azerbaijan Ilham Aliyev took part in the celebrations dedicated to the 55th Anniversary of first oil production from Neft Dashlari (Oil Rocks) oilfield on the Caspian Sea.

12. On 10 December, in Baku, in the Cinema House of the Union of cinematographers of Azerbaijan, presentation of a documentary film titled "Saga of Fiery Family" took place. The documentary, which was shot by director Sergey Bosenko, at "Rosinfofilm", talked about Nobel family and about the contribution of Nobel brothers to the Russian (Baku) oil business.

13. In December, Energy Intelligence Group published ranking of the largest oil companies of the world, based on the figures of 2003. The criteria used in ranking were company oil and gas reserves and also production rates. The first seven oil and gas companies in the world were: Saudi Aramco

(Saudi Arabia), ExxonMobil (USA), PDVSA (Venezuela), NIOC (Iran), RD/Shell (Great Britain/Netherlands).

BP (Great Britain) and ChevronTexaco (USA). Russian LUKoil and Azerbaijan's SOCAR were 20th and 36 th, respectively.

14. 24th PSA of Azerbaijan was signed between AzEN Oil and SOCAR for rehabilitation and development of Binagadi oil field on 29 October. Capital investments in the project are estimated at 618 million USD.

15. 25th PSA of Azerbaijan was signed between Caspian Energy Group and SOCAR for rehabilitation and development of Kyurovdagh oil field on 05 November. Capital investments in the project are estimated at 200-300 million USD.

16. In Houston (USA), the prominent oil scientist Yusif Safarov (1907-1963), twice the Stalin Prize laureate was posthumous rewarded with the order of "Ocean Star" for the exploring and exploitation of world-famous sea-oilfields on the Caspian Sea in 1945-1952.

#### 2005

1. For the first four months AIOC exported 2 million 774 thousand tons of oil; an increase in export came from East Azeri, where production started in February of this year. The export volume is 34.5% or 709 thousand tons more than it was in the same period of the previous year.

2. In May the 10th, the first stage of pumping the technical oil into BTC export pipeline started. Filling the pipeline with crude oil started on May 25. In a Press Release, BP Azerbaijan said that for complete filling of the pipeline about 10 million bbls of oil will be needed. Loading the first tanker with oil in port of Jeyhan is scheduled for the fourth quarter of 2005. The pipeline BTC with 1770 km long is the second longest oil pipeline in the world after Russia's "Druzhba".

3. On 01 June, the VIII International Conference titled "Energy, ecology and economy" started in Baku. Scientists from the USA, Germany, Italy, Japan, Russia, Turkey, Iran and many other countries participated in this Conference. Main issues discussed during the Conference were protection of ecological balance on the Caspian Sea, technical safety of oil and gas pipelines, alternative energy sources and various other related issues.

4. "Baky Fehlesi" (Baku Worker), a large industrial enterprise producing oil machinery celebrated its 105th Anniversary. This factory was established in 1900, in Sabunchi settlement, on the basis of workshops of oil company "A. Benkendorf". The factory for many years had been the main oil machine building plant in Soviet Union and was supplying oil machinery and equipment not only to the USSR, but also to more than 27 countries worldwide.

5. This year was announced as the Year of Yu. Mamedaliyev by UNESCO, to mark the 100th Anniversary of outstanding Azerbaijani chemist's birthday. Mamedaliyev invented fuels during the World War II and these fuels were named as the Fuels of Victory, to underline their importance in Soviet victory during World War II.

6. President of BP Azerbaijan, David Woodward announced that during 2005 average daily oil production from Chirag would level at 134 thousand barrels per day and average daily oil production from Central Azeri will average at 106 thousand barrels per day.

7. During September 25-27, in Johannesburg (in South Africa) the XVIII World Oil Congress took place. More than 3000 delegates from 65 countries, members of the World Oil Council (WOC) took part at the event. Azerbaijan was accepted as a full member of WOC at this Congress.

8. On 16 August, 26th PSA of Azerbaijan was signed

between SOCAR and Rafi Oil of UAE for the rehabilitation and further development of Surakhani oil field. Capital investments are estimated at 400 million USD.

9. This year, Azerbaijan produced 22 million 248 thousand tons of oil and 5 billion 818.3 million cubic meters of gas. The oil produced by SOCAR, joint ventures, onshore operating companies made up 8 million 967 thousand tons from the total volume of production.

#### **2006**

1. In January - 60,3 thousand tons of Azeri Light grade oil is injected into BTC pipeline. For complete filling of BTC pipeline, 10 million bbls of oil is needed. Until now, about 630 thousand tons of oil is injected into BTC pipeline. Full commissioning of BTC pipeline is scheduled for the spring of this year.

2. In March - BP (the operator ACG field development) has commissioned the tenth production well on Central Azeri platform. In 2006, average daily oil production from ACG is planned at 458 thousand barrels per day.

3. In May - 399 thousand 361 tons of oil was transported through Baku-Novorossiysk pipeline (Northern Export route). 66 thousand 790 tons of oil from the mentioned volume belongs to SOCAR, whereas 332 thousand 571 tons of oil belongs to AIOC-partners.

4. For the first time, nanotechnology is used in production cycles at SOCAR enterprises. The original idea belongs to academician Azad Mirzajanzadeh; initial results indicate the success of the new technology.

5. In November - Bill Schroeder is appointed President of BP Azerbaijan. He replaces David Woodward who had been in that position for eight years.

6. In November - SOCAR and Russneft signed a PSA to rehabilitate and develop ZykH-Hovsani oil field. Investments

are projected in the range of 100 - 150 million USD.

7. According to data from journals "Petroleum Intelligence Weekly" and "Petroleum Economics Policy Solutions", 94% of World's hydrocarbon reserves, which stand at 1.37 trillion barrels, belongs to 20 countries. Saudi Arabia takes the lead (with total reserves of 289 billion barrels; Canada is second (with total reserves of 179 billion, including oil sands). Azerbaijan stands at 17th place (with total reserves of 14 billion barrels).

8. Total oil production in Azerbaijan in 2006 was 32 million tons. This was a record production for Azerbaijan. The highest previous oil production in Azerbaijan was 23.5 million tons in 1941.

9. This year, refineries of Azerbaijan processed 7 million 392 thousand tons of crude oil.

#### *2007*

1. BTC pipeline transports 600 thousand barrels of oil per day. It's one of the longest oil pipelines in the world with total length of 1768 km. BTC pipeline delivers oil from Sangachal oil terminal in Azerbaijan to Jeyhan terminal in Turkey.

2. On 10 April, vice-president of "Shell" oil company Guy Oaten has declared that "Shell" examines the possibility of oil transportation from Kazakhstani oilfields (Kashagan and others) via BTC pipeline. Vice-president also announced that "Shell" was interested in cooperation with SOCAR in the area of oil production, refining and marketing.

3. On April 23-24, the First Caspian oil trading and transportation Conference was held in Baku. The Conference was organized by the British company "Confidence Energy Ltd.". The purpose of the Conference was bring together oil trading and transportation experts together to discuss potential and problems associated with the development of Central Asia-

Europe transport corridor.

4. During July, 2 millions 875 thousands and 125 tons of Azerbaijani oil was transported by BTC pipeline. During the same months SOCAR exported more than 100 thousands tons of Azerbaijani crude via Baku-Novorossiysk oil export pipeline (Northern route).

5. On the 16th of August, BP finished drilling very deep and most expensive well on the Caspian Sea. The well was Shah-Deniz 4th exploration well (SDX-4), drilled in the gas-condensate field of Shah-Deniz: the well's total depth was 7301 meters and in current prices its cost was 240 millions USD.

6. On the 4th of September, the construction of 48-inch-long gas-pipeline Sangachal - Gazimagomed with total length of 47 km and throughput capacity of 5-6 millions cubic meters of gas per day was completed. The gas-pipeline is intended for natural gas supplies from gas-condensate field Shah-Deniz.

7. On October 4-5, in Baku it was occurred the International Conference "The policy of sustainable development of the Caspian Sea", the main purposes of which were - the research of the reasons of the Caspian's oil pollution, and the creation of the possibility for solution of ecologic problems by the co-operation with International organizations and States-donors. The representatives from Germany, Kazakhstan, Iran, Turkmenistan and Georgia took place on the conference.

8. By the end of October, 100 millions tons of crude oil was produced on the block of oilfields "ACG".

9. On 31st of October in Baku port, the ceremony of acceptance of the cargo boat "Caspian Pride" built on the plant Brevik in Norway by the SOCAR's request was held. From this point during 10 years this boat will service for the



operations on the block of oilfields "ACG" and on the gas-condensate field Shah-Deniz.

10. On 25th of December, 20-inch long gas pipe-line Neftyanie Kamni (Oil Rocks) - Bakhar with length of 66.6 km and carrying capacity of 5.5 millions cubic meters per a day was placed in operation. The gas pipe-line is intended for transport of natural gas extracted from field Guneshli to onshore.

**2008**

1. From January-February the oil production in Azerbaijan was about 9 million tons. For the same period the country exported about 6 million tons of oil and about 350 thousand tons of mineral oil.

2. Since the beginning of March, the Chinese Operation Company Salyan Oil has been extracting oil from the offshore oil fields of "Kyursangi-Garabagly". Drilling from the first well this year from the "Kyursangi" oilfield has now been completed to an estimated depth of 4000 m. This year the company plans to drill 6 wells each to depth of 3500-4000 m.

3. The British oil service company RBG Ltd. has signed a contract for 4 years with company BP Exploration Caspian Sea on service 5 sea objects: 1) an oilfield "Azeri-Chirag-Guneshli", 2) gas-condensate field "Shah-Deniz" and three export pipelines - BTC, Baku-Supsa and the South Caucasian gas pipeline. Annual cost of the contract is 20 million USD.

4. On March, 18-20th, in Ankara there passed VII International oil and gas exhibition-conference TUROGE-2008, the organizer of this was British company ITE Group. On this conference there were discussed the oil recovery and gas problems on the Caspian and Black seas, prospects of transportation of oil and gas resources and a role of Turkey in this sphere. At conference Ministers of Energy and repre-

sentatives of the governments of Turkey, Azerbaijan, the USA, Great Britain, Russia, Italy, Greece, Iran, India, etc. have taken part.

5. In April from the port of Jeyhan 25 tankers (with more than 18,7 million barrels) carrying oil of Azeri Light mark extracted from the block of oilfields "Azeri-Chirag-Guneshli" in the Azerbaijan sector of the Caspian Sea have been shipped. Oil transportation was carried out by the BTC pipeline.

6. On May, 17th in Mexico City (Mexico) at University UNAM has taken place conference on a theme "Azerbaijan: influence of oil resources on modern strategy"; on which there were discussed a role of Azerbaijan in maintenance of the international safety and influence of oil and gas elaborations in Caspian Sea on global power partnership. University UNAM (Universidad Nacional Autonoma de Mexico) is based in 1551, and it is one of the largest universities of Latin America.

7. Azerbaijan vessel "Israfil Huseynov" has finished a pipeline lining on an oilfield "Yuri Korchagin" on a shelf of Northern Caspian Sea developed by Russian "LUKoil". Extension of the pipeline - 58 km, diameter - 12 inches; was conducted at a depth of 10-20 m. The quality check-up of pipeline was carried out by special towboat "Ehram Haligov" together with the necessary equipment and experts.

8. The delegation of Azerbaijan has taken part on XIX World Oil Congress (Madrid; 28.06 - 03.07); there were discussed the problems of developing oil business, cooperation between the largest oil companies, questions of power savings and environmental situation. On this congress the representatives of Spain, Saudi Arabia, Iran, Qatar, Algeria, Nigeria, Angola, Venezuela, Colombia, Uruguay, etc have taken part.



*Dmitry Golubyatnikov*



*Ivan Gubkin*



*Konstantin Krasusky*



*Igor Kurchatov*



*Mark Dalin*



*Fuad Samedov*



*Sabit Orujov*



*Eyub Taghiyev*



*Izzet Orujova*



*V.I. Tikhomirov*



*Ali Kuliye*



*Soltan Mekhtiyev*



*Akhad Yakubov*



*Farman Salmanov*



*Azad Mirzajanzadeh*



*Rahim Shukyurov*



19, October, 2000, Ankara. SOCAR President Natig Aliyev, BP Azerbaijan Associate President David Woodward and Unocal Vice-President Andrew Fawthrop signing the BTC agreement.



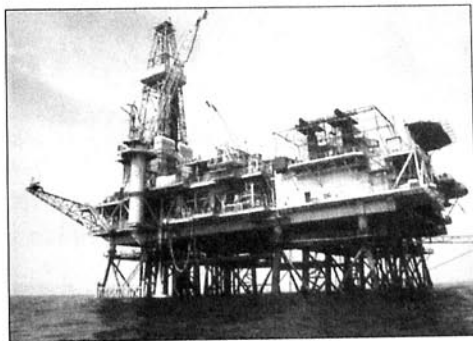
Rovnag Abdullayev, President of SOCAR; Baku, 2008



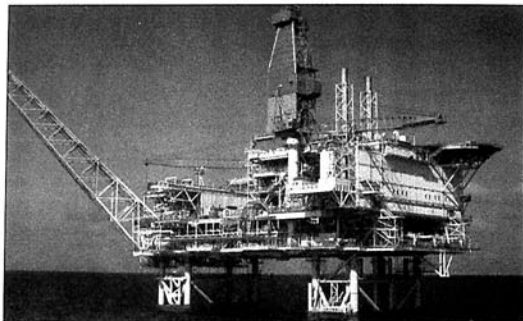
Vaghit Alekperov, President of LUKoil; Moscow, 2008



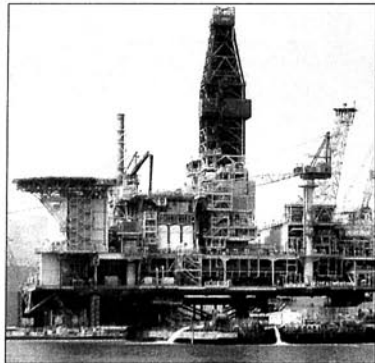
Semi-submerged drilling unit "Dada Gorgud", 1996



"Chirag" platform, 1997



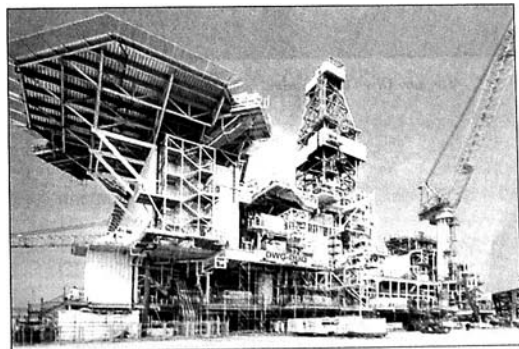
*"Central Azeri" platform, 2006*



*"East Azeri" platform, 2007*



*"Shah-Deniz" platform, 2007*



*"Deep-Water Guneshli" platform, 2007*



Heydar Aliyev Oil Terminal in Ceyhan (Turkey), 2007

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