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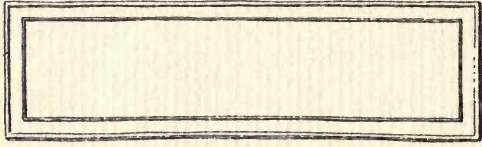


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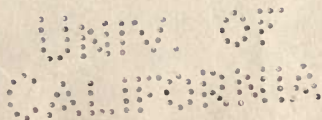
# The Caucasian Petroleum Industry and its Importance for Eastern Europe and Asia

BY

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*Hon. Secretary and Member of the Executive Council of  
The Russo-British Chamber of Commerce in London.*

Paper read at the 29th General Meeting of the Members  
of The Institution of Petroleum Technologists on Tuesday,  
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Sir BOVERTON REDWOOD, Bart., Chairman of the Meeting, made the following concluding remarks :—

“The paper was unquestionably a most valuable statistical record, eminently worthy of rendering value for future reference by inclusion in the Journal of the Institution of Petroleum Technologists. He was sure that the Institution might be congratulated, therefore, in having induced so eminent an authority as Mr. Ghambashidze to enlighten them on the subject, for he spoke with the fullest information and his statements might be accepted unquestionably.”

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## INTRODUCTION.

In the following description of the Caucasian Petroleum Industry we have endeavoured to give a short historical sketch of the development of this industry, which occupies the second important position in the world. Its potentialities are unlimited and its exploitation in the past was greatly hampered. Petroleum as a fuel for modern industry is occupying a very prominent position and it is getting more and more difficult to supply the ever increasing demands.

The geographical position of the Caucasian oilfields justifies the expectation that it will play an enormous part in the development of local industries in the wide areas of the Middle East, and the local needs will be so great that export abroad will be curtailed. The Middle and Near East, with its unlimited natural wealth, has all the conditions for creating huge industries, and the wide fields of Asia and enormous population will be a ready market for the products of those industries.

The native element has a huge capital invested in that industry, native labour is already predominant in its exploitation and, with normal conditions for its development, will provide ample ground for foreign investors.

Petroleum is also going to play an important part in the running of very extensive railway lines which are going to be constructed throughout the whole of Western Asia. Such expectation is the more justified by the experiences gained on the Transcaucasian railways which, from the very beginning of their construction, have used crude oil as fuel.

The present and potential value of the Caucasian Petroleum Industry runs into several thousand million pounds.





# The Caucasian Petroleum Industry and its Importance for Eastern Europe and Asia.

By D. GHAMBASHIDZE, *Hon. Secretary and Member of the Executive Council of the Russo-British Chamber of Commerce in London.*

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IN dealing with the Petroleum Industry in Eastern Europe we have to consider various fields of production which are chiefly concentrated in the Caucasus, on both sides of the main Caucasian Mountains, while some are situated in the Transcaspian districts.

They are the Baku, Grozni, Kuban, and Guria fields to the west of the Caspian Sea, and the Uralsk and Transcaspian fields to the east.

All these latter fields are, up to the present, of much smaller importance than Baku. Some of them are only in the experimental stage, or not yet worked to their full capacity, and will therefore only be dealt with shortly here, before we enter upon the subject of the classical and prominent field of Baku.

*Tcheleken.*—Tcheleken is a small island in the Bay of Krasnovodsk in Transcaspia, and contains some not very considerable oil areas, but some fountains were produced on it from rather shallow depths, and brought it greatly into prominence. The oil produced is mostly brought to Baku for refining; it contains a high percentage of paraffin, and leaves on treatment an unusually heavy residue of thick tar, which at ordinary temperatures is almost solid, and must be mixed with the more fluid residues of the Baku oil before it can be burnt in the usual firing appliances.

The production of crude oil from the Island was: in 1911, 15,000,000 poods: 1912, 12,000,000 poods: 1913, 7,600,000 poods: 1914, 5,000,000 poods. Other oil-fields in this district are also found on the shore of the Caspian Sea near Tchikishliar, and at about 20 versts from the Bala-Ishem Station of the Transcaspian Railway. The latter is called the Naphtha Hill, and in consequence of the shortage of fuel the Railway Company intended to build a branch line to it, and to start its exploitation.

*Fergana.*—Fergana is in the central part of Turkestan, near the Station Vanovsk on the Central Asiatic Railway. The greater part of this field belongs to Nobel Brothers, who struck the first flowing well in 1904 at a place near Chimion, and have since then increased the number of their wells to ten in 1915. The annual production varies between 1 and 2 million poods, but the whole region is being developed, and a refinery built, as well as a pipe-line to the above-named station.

*Kuban District.*—The Kuban District is situated on the north-western slope of the Caucasian Main Chain, and comprises several fields whose importance is not yet established. *Anapa* and *Taman* are two of them, whose prospecting was begun in 1912, chiefly by British capital, but no final results were arrived at before the war stopped further activities. The *Maikop* field came to the fore in 1909, when a prolific gusher broke out in it so unexpectedly that the oil was lost, as no preparations for its storage had been made. Enormous excitement followed this event. Companies were formed, speculation in land and feverish borings began on all sides. A pipe-line was laid to the Station Einem, and also two pipes to the port of Tuapse, but unfortunately the production of the field was a great disappointment, as only a few wells yielded oil, and in 1916 only five of the 66 Companies founded in London for the exploitation of this field were still working, mostly in the centre and the south-eastern part of it. It is expected that deeper drilling will give better results. The aggregate depths of all the wells drilled in 1912 amounted to 11,929 sajens, and in 1913 to 14,475 sajens, and the production of crude oil was in 1912, 9,262,118 poods: 1913, 5,844,798: 1914, 5,000,000.

*Grozni.*—The Grozni oil-fields are situated on the northern slope of the Caucasian Mountains, and are connected with the Vladicaucas railway by the Baku line. Deep boring began there in 1903, as hand-dug wells, which formerly had been utilised, were found to be quite inadequate. In fact, the important oil horizons lie very deep in this field, and most of the original wells are now down between 3,000 and 4,000 feet, and nevertheless their productivity is diminish-



ing. However, new sections have been taken up during the last few years, and are being methodically worked, specially also as concerns prevention of the flooding of the wells by surface water, which accident had repeatedly happened in the beginning of the exploitation. The total area-worked in the field in 1916 was 2,861 desiatines (7,066 acres), and there were 773 wells, of which 385 were in operation. The total of the drillings executed in 1913 were 203,000 feet: in 1914, 290,000 feet: in 1915, 181,930 feet: and in 1916, 153,807 feet.

The total output of the field was: in 1911, 70,000,000 poods: 1912, 65,000,000: 1913, 70,000,000: 1914, 98,455,000: 1915, 88,165,000: 1916, 102,727,615: 1917, 9,198,000 (during January only). A great part of the Grozni oil is exported through the port of Novorossisk. The quantities shipped from there were: in 1910, 170,609 tons: in 1911, 234,285: 1912, 213,186: 1913, 219,480: 1914, 149,330. The closing of the Dardanelles stopped further exports, and as the Grozni oil is specially suitable for the production of high-class benzine, the consequence was that enormous quantities of it are accumulating in the field.

*Ural-Caspian and Djingi.*—These fields cover a large area on the north-eastern shore of the Caspian Sea, the two principal centres of production being Dos-Sor in the Emba district and Novobogatinsk. The former district is in a rather unfavourable position as far as drinking water is concerned, and the crude oil produced contains a somewhat high percentage of sulphur. The operations began in 1912, and in 1915 the number of wells amounted to about 60. The production of the Ural districts was as follows: in 1912, 1,014,825 poods: 1913, 7,181,776: 1914, 16,630,985: 1915, 16,620,724: 1916, 15,649,000.

*Djingi* is a new field on the west of the Ural river, extending northward from the shore of the Caspian Sea. The prospects are believed to be very favourable, and several wells sunk by Nobel Brothers have given satisfactory results. The situation of all these fields so near the Volga makes their great importance for the Russian home trade obvious.

*Guria.*—This oil-field is situated in the district of Ozurgeti, at a distance of 25 miles from Batum, and only 5 miles from the small ports of Supsa and Nicolas on the Black Sea in Georgia.

Natural outflows of petroleum had been known there for a long time, but only in 1911 a Baku firm made a trial boring which produced a flowing well at a depth of only 63 feet. This immediately caused a great rush to take up lands in the neighbourhood; experts were sent to the spot and several British and other Companies

formed. Drilling was started in 1913 in three places, but the outbreak of the war interrupted the work.

The research will, no doubt, be taken up again as soon as circumstances permit, as the exceptionally favourable position of this field practically on the Black Sea coast makes it specially interesting.

*Baku.*—After these few remarks on the comparatively minor Russian oil-fields, we now come to Baku, which to-day is still the all-important centre of the Russian oil industry. The principal objects of this paper will be to consider the present situation of the industry, and to give the latest available statistical data and information, but it will omit the technical side of the business, as the members of this Institution are of course fully acquainted with this special part of the subject. The following remarks will therefore deal only with the economic aspect of the industry, which, while of the highest importance to the trade in general, is perhaps less of the domain of the technical expert.

I. *Production of Crude Oil.*—Before 1870 all the crude petroleum was obtained from surface pits, dug by hand, and rarely more than 50 feet deep. In that year boring according to the American system was first tried, and a hole was drilled to a depth of 20 sajens, but had then to be abandoned. However, this new system was further employed and with better success, and we find in 1872: two boreholes in operation; in 1873, 13; in 1874, 26; in 1875, 35; in 1876, 62; and in 1887, even 216. Although in those days the diameter of the tubing was very small, boring proved very profitable, as in many cases the new wells produced from 3,000 to 10,000 poods of oil in twenty-four hours. But these successes of the boring operations also had quite adverse economic results, for the desire for fountains became so fascinating that most of the producers feverishly tried to drill as deep as possible, leaving the upper strata unexploited, and then the abundance of fountains resulted in many cases in the actual loss of oil and damage to neighbouring properties. Also, there was occasionally an over-production of crude oil, with consequent fall of prices.

In 1873, Robert Nobel arrived on the scene in Baku, and to his enterprise and technical genius a great deal of the subsequent rapid development of the industry is due. This development and general awakening of enterprise is best reflected by the number of boreholes in operation during the periods mentioned, as follows: 1893, 458: 1894, 532: 1895, 604: 1896, 734: 1897, 917: 1898, 1,107: 1899, 1,357: 1900, 1,710: 1901, 2,036: 1902, 1,967: 1903, 1,982: 1904, 2,171: 1905, 2,162: 1906, 2,149: 1907, 2,511: 1908, 2,668: 1909,



2,818 : 1910, 2,026 : 1911, 3,065 : 1912, 2,412 : 1913, 2,670 : 1914, 2,541.

The aggregate depths of drilling executed during each year of the same period were: 1893, 10,986 sajens: 1894, 12,859: 1895, 20,762: 1896, 28,125: 1897, 39,847: 1898, 57,515: 1899, 81,832: 1900, 83,140: 1901, 75,783: 1902, 40,390: 1903, 49,355: 1904, 62,354: 1905, 35,666: 1906, 48,110: 1907, 61,253: 1908, 56,793: 1909, 51,803: 1910, 48,436: 1911, 44,864: 1912, 53,554: 1913, 64,285: 1914, 51,086: 1915, not recorded: 1916, 4,300.

A comparison of the yearly drillings with the corresponding productions shows, as it was to be expected, that in order to maintain and increase the production, the wells had to be sunk to greater and greater depths. In 1910, of all the producing wells, 385 were at a depth of from 250 to 300 sajens, 117 from 300 to 350, and 27 of over 350 sajens. Of course, at such depths boring operations are very slow and expensive. A well costs 100,000 to 150,000 roubles, and cannot be finished in less than two or two and a half years. The enormous falling-off in the drilling during 1916 is accounted for by the difficulty of obtaining the requisite materials and tools, and their enormous price.

The production of petroleum in Caucasus since the beginning of this century was as follows (in millions of poods): 1901, 707.2: 1902, 672.5: 1903, 631.1: 1904, 657.1: 1905, 453.1: 1906, 490: 1907, 518: 1908, 528: 1909, 531: 1910, 582: 1911, 557: 1912, 566.6: 1913, 559: 1914, 557: 1915, 572: 1916, 603: 1917, 584 (estimated).

The number of firms engaged in the production during the same period was: 1901, 185: 1902, 182: 1903, 185: 1904, 179: 1905, 169: 1906, 170: 1907, 189: 1908, 185: 1909, 192: 1910, 198: 1911, 191. These figures are fairly stationary, and the firms in question can conveniently be divided according to their relative importance into five groups, viz.:

- (1) 7 firms with an average yearly production of over 20 million poods each;
- (2) 5 of over 10 million;
- (3) 11 from 5 to 10 million;
- (4) 20 of from 2 to 5 million; and
- (5) 135 less than 2 million poods each.

From the middle of the year 1912 a very serious process of concentration of the large and middle-sized producing firms began, and towards the end of 1913 the following grouping ensued:

I. The Shell Group, including: The Caspian and Black Sea Co., Soutchastniki, Kavkas and Schibaieff, produced 50.8 million



poods, or 11·8 % of the total production of the four older Baku fields and Surakhani.

II. General Russian Corporation, including: Aramasd, Balakhany Co., Apsheron Co., Quarnstrem, Grassilnikoff Successors, Lianosoff, Mantacheff, Mansuetoff, Moscow-Caucasian Co., Naftalan Co., A. C. Melikoff, Melikoff & Makhmuroff, Tiflis Co., and Shikhovo Co. This group produced 55·1 million poods, or 12·8 % of the total output.

III. Nobel Brothers produced 61·2 million poods, or 14·2 % of the total output.

IV. The 165 remaining firms, each working separately, produced 253 million poods, or 58·8 % of the total.

As shown above, the first three groups produced 41·2 % of the total output of the Caucasus, and if they should unite, they would not only control the production, but also the sale of the products. So far no signs of trusts have appeared yet, although there are many cases of joint contracts being entered into. In order to show the relative importance of the different Russian fields, I give the following rough figures of their output during 1915-6 (in millions of poods):

	1915.	1916.		1915.	1916.
Baku ...	451	379	Maikop ...	8	3
Grozni ...	88	102	Emba ...	17	15
Tcheleken ...	3	3	Fergana ...	2	2

The most recent figures of the average daily production in Baku are

1915.	1916.	1917, Jan.-Feb.	1917, March.
940,000	906,000	803,000	758,000 poods.

The prices of crude oil in Baku were (in kopeks per pood):

	1906.	1907.	1908.	1909.	1910.	1911.	1912.
January ...	18·1	23	24·6	19·2	18·55	14·14	28·4
February ...	22·2	24·4	25·6	20	18·65	15·47	31·0
March ...	24	25·2	26	21·6	17·48	16·8	34·4
April ...	23·9	25·3	24	21·3	16	17·43	32·7
May ...	23·5	28·6	23·2	21·2	15·1	18	34·56
June ...	24·2	27·4	22	21·7	14·9	20·1	35·9
July ...	25·5	28·3	20·9	21·9	14·4	22·5	35·6
August ...	26·7	28·5	21·1	21·5	14·3	24·76	36·35
September ..	26·7	29	21·2	20·9	14	26	36·2
October ...	24	25·4	20·9	19·4	14	22·75	36
November...	22·3	24·5	19·4	19·6	14	22·12	36·5
December...	22·6	24·9	18·9	18·5	13·8	23·58	37·0
Average...	23·8	26·7	22·5	20·5	15·43	20·65	34·55

	1913.	1914.	1915.	1916.	1917.	1918.
January ...	37·5	30	30·2	48·6	45	96
February ...	37·5	27·75	28·5	46	55	96
March ...	37·9	41·5	37·6	45	61	—
April ...	39·5	38·1	41·3	45	65	—
May ...	39·4	35·1	41·5	45	65	—
June ...	40·4	44·7	41·25	49	60	—
July ...	45·6	47·3	47	45	60	—
August ...	52·9	42·5	47·1	45	60	—
September ...	53·0	39·5	41	45	60	—
October ...	46·6	29·4	41·6	45	96	—
November ...	43·9	24	44·6	45	96	—
December...	38·6	28·3	53·2	45	96	—
Average ...	42·7	35·7	41·2	45·7	68	96

As these figures show, the prices of the crude oil vary considerably from causes which can mostly not be controlled by the producers. But in a general manner these variations do not much affect the trade, and if in any year the market is low, the deficiency will soon be recovered, as happened, for instance, in the years 1910 and 1911. Since March, 1916, the prices have been officially fixed by the Government, but this legal maximum is not maintained in practice, and a premium of  $19\frac{1}{2}$  kopeks per pood was, for instance, paid in February, 1917, and this increased to 29 kopeks per pood above the official figure in March of the same year.

In normal times the profits on the sale of the crude oil fluctuate between 13 and 18 %, so that the business is quite profitable. The percentage varies according to the strength of the firm in question ; the big houses are of course better able to protect themselves against expected market fluctuations, and to secure favourable conditions by acting together. Such was the case in 1910, when the price of masut in Baku was from 32 to 35 kopeks per pood, while in Moscow it reached 60 kopeks. This figure forced the factories in that district to abandon oil fuel, and fall back upon coal, the price of which was then 18 kopeks per pood.

II. *Refining.*—The first illuminating oil produced in Baku was distilled from the oil-impregnated sand, called “Kir,” from which some 15 to 20 % of oil were extracted in 1860. The process used was very defective, and there was no regular market for the product, so that the enterprise collapsed.

A new era started with the visit of the celebrated Professor Mendeleeff, who suggested many improvements in the technics of



the distillation and refining of the products. Many other chemists also worked at the solution of the numerous problems connected with the industry; crude oil was introduced in place of the oil sand as raw material, the use of sulphuric acid was begun in the refining process, and slowly the product was improved and brought nearer to the standard of the American kerosene.

In 1872 there were in the Baku district about 57 distilleries, but their business was most irregular, and work was often suspended, so that they produced only about 2,400 poods of kerosene and 2,860 poods of lubricating oil. At first the distillation had been effected by means of small retorts or closed vessels, which had to be reopened after each operation, thus causing a great loss of time and fuel. In 1875 a continuous system was patented, which was then improved by Nobel, and by which alone the production could have reached its present enormous figures. In 1876 the number of refineries established in Baku amounted to 140. They were mostly erected in the centre of the town, or near it, and made it nearly uninhabitable by their smoke and refuse, which flowed into the streets and the harbour. A special district was therefore selected, to which all had to remove, and which forms now what is properly called "The Black Town."

One of the great difficulties of the industry in its beginning had been the necessity of sulphuric acid, which had to be brought from Europe at great expense. In 1883 Nobels built a factory for its production on the spot from Caucasian pyrites, mined in the neighbourhood of Alexandropol, and other factories for the same purposes and for the regeneration of the acids have since then been established. The installation of the present great number of refineries has also in its turn given rise to a multitude of other auxiliary mechanical and industrial works.

Officially the refineries are divided into three categories according to their products, viz:—(1) kerosene; (2) benzine and goudron, and (3) lubricating masut. It is difficult to draw a strict line between them, but the relative numbers in all Russia were:

	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Cat. 1.	95	92	92	95	95	98	75	80
„ 2.	23	19	22	27	20	19	20	17
„ 3.	59	54	55	50	46	58	50	40
Total	177	165	169	172	161	175	145	137

In 1897 there was a decrease in the number of refineries, owing to the liquidation of the Union of Refiners, and to other conditions



of the industry. At first kerosene was the principal product of the refineries, and was exported abroad in large quantities, while the residues of the distillation were burnt, with their valuable constituents. Only later the latter were also extracted, to the great advantage of the factories, and now they form a valuable source of profit.

The following list shows the proportion of factories producing chiefly the various substances :

	1906.	1907.	1908.	1909.	1910.	1911.	1912.
kerosene ...	59	59	54	54	43	39	10
lubricant ...	17	17	19	17	16	14	9
solar oil ...	2	2	3	3	3	3	1
benzine ...	1	1	2	2	2	2	3
residues ...	5	6	6	7	6	5	3
paraffin ...	1	1	1	1	1	1	2
	—	—	—	—	—	—	—
	85	86	85	84	71	64	28

Nearly all the petroleum produced in the Caucasus is refined in that region. The refineries existing in Nijni-Novgorod, Moscow, Petrograd and Riga, distil only about 10 or 12 million poods per annum.

In calculating the cost of the refining operations we have to take into consideration as a basis the cost of the crude oil delivered at the refinery, the fuel, for which often the residues of the distillation are used, the cost of chemicals, administration and labour and general expenses.

The following table shows the lowest and the highest prices (in kopeks per pood) of kerosene in Baku delivered in tank-cars on railway or f.o.b. the steamers in the port, for the years mentioned :

			In Tank-cars.	F.o.b. Steamers.
1906 ...	...	...	23·6—39·2	21 —41
1907 ...	...	...	26·7—43·1	26·8 —44·3
1908 ...	...	...	24·9—30·7	24·6 —34·2
1909 ...	...	...	24·4—32	23·9 —32
1910 ...	...	...	17 —28·5	15·7 —28
1911 ...	...	...	19 —34·1	18·66—33·58

As an indication of the proportions of the various articles produced by the Baku refineries, we give herewith the list for April, 1916. Their total production amounted to 23,848,900 poods, composed as follows :

Illuminating oils (kerosene, pyro-naphtha and astral oil) ... ..	5,874,900	poods.
Lubricating oils (spindle, machine, cylinder, vaseline, viscosine) ... ..	980,500	„
Solar oils, light and heavy ... ..	514,000	„
Benzine ... ..	101,300	„
Naphtha residues ... ..	13,585,000	„
Paraffin ... ..	6,800	„
Other products (gasoline, goudron, oil residues, lubricating masut, etc.) ... ..	2,786,400	„

III. *Transport.*—In the early stages of the industry the transport conditions were very primitive. The crude oil was carried from the wells in skins and barrels loaded on carts or camels, and Nobels were the first to lay a pipe-line to their factory. Later on pipes were laid between the factories and the port. These obvious improvements met in the beginning with fierce resistance from the workpeople. The transport of the finished products to the consumers was equally difficult. There was then no railway from Baku to Tiflis, and the only way to the Black Sea was thus shut off. On the other side the navigation on the Volga was only possible during six months of the year, and the monopoly of the Steamship Companies Mercur and Kavkas on the Caspian Sea imposed high rates on the Baku products. Improvements were again due to the Nobels, who built the first cistern wagons for transporting the oil on the railways, instead of using wooden barrels, which were often unsatisfactory.

In order to open an outlet on the Black Sea, Nobel Brothers constructed in 1889 a pipe-line from Mikhailovo to Kvirili over the Suram Mountain, which forms the most difficult part of the railway between Baku and Batum. The transport by the railway, which was now available, was very unsatisfactory, principally owing to the configuration of the country, as the line was often flooded, which caused interruptions of the traffic for weeks and even months at a time. The idea of replacing it by a pipe-line for the transport of the oil was therefore natural, and a project had already been formed in 1882. But its execution met with great delays, and the western part of it, from Mikhailovo to Batum, was only ready in 1890, while the portion from Baku to Mikhailovo began to work only in 1906. The whole length of the pipe-line from Baku to Batum is about 560 miles, and requires 19 pumping stations. The diameter of the pipe is 8 in., and it has a capacity of 60 million poods per year. Its cost was 25 million roubles.

The quantities of oil thus transported were:—In 1900, 21,490 thousand poods : 1901, 59,162 : 1902, 56,495 : 1903, 52,780 : 1904,

64,695 : 1905, 19,543 : 1906, 21,760 : 1907, 26,570 : 1908, 27,674 : 1909, 19,788 : 1910, 26,425 : 1911, 23,630 : 1912, 22,000.

Since the closing of the Dardanelles the pipe-line has been partly idle, and was then used for the transport of kerosene distillate for fuel, and even for crude oil. The charge for pumping oil from Baku to Batum was 13 kopeks per pood, while the railway charged 16 kopeks per pood on oil to be exported, and 26 kopeks per pood for that destined for consumption in Russia.

While this pipe-line is now more than sufficient for the transport of the Baku products to the Black Sea, the trade has at its disposal on the Caspian Sea a considerable number of steamers and sailing vessels adapted for it, as the following list shows :

	No. of Steamers.	Capacity Cub. ft.	No. of Sailers.	Capacity Cub. ft.
1906	131	5,294,774	140	2,886,841
1907	129	5,230,246	144	2,792,719
1908	129	5,225,100	142	2,764,849
1909	127	5,200,245	145	2,846,982
1910	120	5,239,409	150	2,993,653
1911	121	5,011,191	147	2,899,687
1912	118	5,518,664	60	1,755,034

In 1912 the transport of petroleum products formed 37 % of the whole traffic on the Volga, and 5 % of the total traffic on all the Russian railways. The means of transport used at present for the Baku products are shown by the quantities forwarded during April, 1916 :

By Transcaucasian Railway...	...	2,553,200 poods.
"          "          " to Batum	1,019,500	"
" Vladicaucas Railway	531,700	"
" Sea to Astrakhan...	43,818,500	"
"      " Petrovsk	304,900	"
" Transcaucasia	773,700	"
" Persia	247,600	"
" Other ports	421,000	"

Total 49,670,100 poods.

Of the other producing centres Grozni sends a part of its crude oil to the refineries in Novorossisk, whence the light oils are exported, while the residues, which amount to about 16 million poods per year, are pumped to Petrovsk on the Caspian Sea by pipe-line, and there shipped by steamer to Astrakhan and Central Russia. The Maikop production goes for refining mostly to Ekaterinodar, and is consumed locally.



IV. *Distribution.*—(1) HOME MARKET.—This market is of the highest importance to the Baku industry, and even more so to the whole country, as heating and lighting materials are generally scarce, and especially coal, which is indispensable in many industries, labours under great and chronic difficulties of transport. As the export trade has considerably diminished, specially since 1905, and in consequence of the American competition, the home market has easily absorbed by far the greatest part of the production, and the consumption can only increase in the future as new manufactures will be created in the country.

For this reason the Government had in 1916 worked out a plan for the distribution of the available illuminating oil, which is estimated at 60,392,000 poods. Of this quantity the following apportionment between May, 1917, and May, 1918, was:

The Railways	...	...	5,394,000 poods.
Petrograd District	...	...	7,798,000 "
Petrograd Central	...	...	10,640,000 "
Southern District	...	...	8,115,000 "
Volga	"	...	4,450,000 "
Kieff	"	...	5,313,000 "
Odessa	"	...	2,556,000 "
Rostoff	"	...	5,105,000 "
Caucasus	"	...	2,370,000 "
Ural	"	...	2,003,000 "
Siberia	"	...	2,816,000 "
East Siberia	"	...	563,000 "
Far Eastern	"	...	277,000 "
Turkestan	"	...	2,943,000 "

Only 6½ million poods can be directly transported by water to the centres of consumption, while 40 million poods will be carried by sea to the Volga ports, there to be reloaded on the railways, and the rest will be carried by railway only direct from the factories to the consumers.

As to fuel oil, even much larger quantities have in the last few years been shipped to the Volga ports for distribution in the interior of Russia, viz. : 1913, 77,035,100 poods; 1914, 75,024,200; 1915, 102,799,400. The great increase of 1915 is due to the disturbance of the coal production by the war, and the urgent necessity of obtaining fuel from other sources. The consumption of the immediate neighbourhood of the producing centres is in itself not inconsiderable. Baku, for instance, uses from 10 % to 15 % of its production of crude oil as fuel, although this quantity is gradually decreasing, as electric energy and fuel-

saving engines are being introduced. The whole of the Caucasus, and especially the Transcaucasian Railway, used in 1912 15,000,000 poods, and the Vladicaucas Railway 17,000,000.

The home trade in kerosene was in Russia subject to Government Control, and to an Excise Duty, of which more will be said later. The storage of the oil coming from the factories has given rise to quite an important Government control, thus:

	1901.	1902.	1903.	1904.	1905.	1906.
No. of Storages	71	64	69	60	69	
„ „ Reservoirs	340	290	327	255	365	
Quantities stored	38,681	44,928	43,828	30,087	53,354	pds.

The relative proportion of the various petroleum products in Caucasia was as follows:

	Kerosene.	Lubricating.	Solar.	Residues.	Others.	Total.
1901	135,631	16,788	537	329,364	1,951	484,071
1902	128,150	16,984	1,280	383,136	2,870	512,414
1903	154,921	19,984	3,821	324,436	2,736	564,898
1904	162,150	19,800	3,050	330,665	1,937	517,692
1905	80,509	13,584	2,037	292,656	1,860	390,646

The stocks held in Baku on January 1st of the respective years (in poods):

	1912.	1913.	1914.	1915.
Crude... ..	15,174,212	21,254,634	17,338,297	30,000,000
Residues ... ..	29,824,676	31,163,920	25,358,896	41,886,800
Illuminating... ..	8,196,998	10,149,010	9,157,302	11,209,600
Lubricating ... ..	2,008,878	2,130,061	2,131,730	2,070,600
Benzine ... ..	311,606	890,607	1,056,899	1,523,200
Solar Oils, etc.	2,129,368	2,233,015	2,084,949	1,960,300
	<u>57,645,738</u>	<u>67,821,247</u>	<u>57,128,073</u>	<u>88,650,500</u>

(2) EXPORT TRADE.—It may seem strange that the products of the Baku petroleum industry should, from the very beginning, have been almost exclusively utilised for the export trade, and not for the home consumption. One of the chief reasons for this anomaly was the fact that Baku was far distant from the chief distributing centres of the Empire, and had practically no railway connection with them. Also, the Government was fostering the export trade from its initial stages. It released the export goods from the Excise Duty, and even encouraged the exporters by a special export premium of 4%. The export for foreign countries was chiefly concentrated in the Black Sea port of Batum, whence the goods were shipped to the countries of Western Europe, Africa and the Far East. The



export through the Caspian Sea to Persia was of comparatively small importance.

The Transcaucasian Railway and the pipe-line to Batum were really the makers of this export trade, and at the same time gave to the port of Batum a considerable increase of activity and importance. About 100 huge tanks were erected there for storing the oil brought from Baku by rail and by the pipe-line. Then about 10 special factories were started for the manufacture of tin cans and wooden cases, which, in the beginning, were the usual mode of packing of the oil for export, each case containing usually 2 cans of 4 gallons each of petroleum. This packing required a great deal of work, and occupied a great number of men and important installations of modern machinery. Rothschild's factory, which was installed in 1892, was the most important, and could produce and fill 36,000 tins per day, and pack them into the respective wooden cases. This factory occupied about 1,400 hands, and had 28 iron tanks of its own. The export of such cases from Batum amounted to 2,276,512 cases in 1910, and to 1,400,000 cases in 1912. Two-thirds of the entire export of the port of Batum consisted of petroleum products, and the port had no competition to fear from the other Black Sea ports, as for instance to the port of Novorossisk, the railway tariff on petroleum products was  $7\frac{1}{4}$  kopeks higher than on the Transcaucasian Railway. But from the beginning, the Baku exporters had to face the American competition on the foreign markets, and this, after some time, became too strong for them, as they were not organised. Nobel Brothers attempted to unite the representatives of the industry, but their attempt failed, as everybody was suspicious. The firm of Rothschild adopted a different attitude. They entered into contracts with various producers, and accepted their products for sale on commission. In October, 1893, the Government summoned a conference of Baku industrials to Petrograd. This was attended by men representing 60 % of the entire industry, and they endeavoured to combine the organisation of export. An agreement was reached, and Nobel Brothers and Rothschild were appointed as representatives for the interests of all the exporters. The same firms were also empowered to enter into an agreement with the Standard Oil Company for the purpose of dividing the world's markets, which agreement came into force on February 19th, 1894. In March of the same year the Transcaucasian Railway lowered its tariff from 19 kopeks to 14 kopeks per pood, and in July further to 9 kopeks per pood. This measure had a most beneficial effect, and increased the exports. But the Union did



not live long, and was wound up on October 1st, 1897. The Baku industrials had unfortunately failed to understand their interests, and to follow the lead of such up-to-date firms as Nobel Brothers and Rothschild.

During the above epoch the chief product of export was illuminating oil, and it was principally directed to Turkey, Egypt, Persia, India, Indo-China, China and Japan. The following amounts are (in millions of poods):

	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
To Europe ...	22	20	22	19	18	23	30	32
To the Far East	28	23	29	33	34	33	39	43
Eastward per-centage ...	56	55·5	57	63·4	65·4	60	56·5	57·3

In spite of this activity the export trade was not properly organised, as the Baku industry had no direct connection with the various markets, and had to rely upon intermediaries and dealers, who had the trade in their hands both in Europe and abroad. The lack of a commercial fleet under the Russian flag was also a great disadvantage, as it enabled the foreign buyers to profit by the freights. Practically the entire export was then in the hands of the big firms like Nobel and Rothschild, who controlled it in their own interests. The export of petroleum products through all ports and Custom houses of the Empire was as follows (in thousands of poods): 1901, 18,227: 1902, 91,237: 1903, 95,528: 1904, 119,115: 1905, 51,988: 1906, 47,941: 1907, 44,792: 1908, 50,281: 1909, 48,512. The total exports from Baku alone amounted to in 1913, 371: 1914, 322: 1915, 385: 1916, 409 millions of poods.

The total of 1916 comprises the following details: kerosene, 61,900,000 poods: lubricating oil, 7,500,000: residues, 271,800,000: crude oil, 63,700,000: solar oil, 1,900,000: benzine, 1,100,000: other products, 900,000: total, 408,800,000 poods. Of these quantities there were forwarded by sea to Russia and Persia, 366,400,000 poods: by rail to Russia, 38,400,000: by road, 4,100,000. The consumption of all products of the industry in home and export trades is approximately as follows, in million poods and percentages:

1.	As fuel in Baku district	... ..	100 or 18.5 %
2.	„ „ on railways	... ..	120 „ 22.2 %
	„ „ in industries (including 30 million poods burnt in internal-combustion engines)	... ..	120 „ 22.2 %
	„ „ by Caspian and Volga Steamers	... ..	60 „ 11.1 %
3.	„ „ illuminating oil in Russia	... ..	75 „ 13.9 %
	„ „ „ „ exported abroad	... ..	30 „ 5.5 %
4.	„ lubricating oil in Russia	... ..	7 „ 1.3 %
	„ „ „ „ exported abroad	... ..	13 „ 2.4 %
5.	„ other products (chiefly benzine) in Russia	... ..	5 „ 1.0 %
	„ „ „ „ exported abroad	... ..	10 „ 1.9 %
			540 „ 100 %

There is a marked decline in the export figures since 1905, which coincides with the troubles in Baku, although these difficulties were not the principal cause of it. The exports to England, France, Holland, Belgium and Germany had declined considerably, but of decisive importance was the loss of the Indian, Chinese and Japanese markets, which had absorbed nearly 70% of the whole exports. The decline of the export had a very damaging effect on the development of the industry, and more particularly on that of the port of Batum, as it coincided with the gradual introduction of the tank-steamers, which to a great extent superseded the former mode of shipment in cases. Most of the case factories had to be closed, and the workmen dismissed. At the same time the receipts of the Transcaucasian Railway and of the pipe-line diminished in proportion with the traffic, and the latter specially had to content itself now with only a small proportion of the transport for which it had been built.

(3) AMERICAN AND OTHER FOREIGN COMPETITION.—In the early sixties the first cargo of American kerosene was imported into Russia, about 100,000 poods, and this caused more attention to be paid to the production of Baku. In 1872 the imports had already increased to about 1,630,000 poods, and from this time America became the most serious competitor with Russia. The particularly favourable geographical position of Pennsylvania, being connected with the Atlantic by a net of railways and pipe-lines, and having direct connection with the commercial centres of the world, and its own fleet, had a great deal to do with this success.

While the freight from New York to Kronstadt was about 30 kopeks per pood, it amounted to 35 kopeks for the journey from



Baku to Nijni-Novgorod. The American industry had also at its disposal great and cheap credit facilities, which was not the case in Baku, and added to this, Baku had to pay excise duty to the Government long before the goods were sold—in short, there were no restrictions on the trade in the United States, whilst the Government regulations in Russia were very onerous.

Also, owing to its chemical composition, and to better methods of refining, the Pennsylvanian petroleum gave 75% of illuminating oils, while that of Baku only contained 33%, so that, altogether, the two industries had to develop under diametrically opposite conditions. The effect of these combined facilities showed itself in the production, which in Texas, Louisiana, Indiana, Kansas and California reached 260 million poods in 1901, 485 in 1903, and 761 in 1905.

Further serious competition then arose also in other directions. In the early nineties petroleum began to be produced in Galicia and Rumania, and these two countries soon squeezed the Russian product out of the German and Austrian markets. An industry also sprung up in the Dutch Indies and in Burma, and supplied the vast Eastern market which had been of such great importance to Baku.

For comparison of the recent and present relative importance of the principal producing countries, the following table shows production in barrels of 42 gallons:

	1914.	1915.	1916. *	1917 (estimated).
United States ..	265,762,533	281,104,104	300,767,158	341,800,000
Caucasia .. ..	67,020,522	68,548,062	72,801,116	70,000,000
Mexico .. ..	21,188,427	32,910,508	39,817,402	60,000,000
Dutch East Indies ..	12,826,579	12,386,808	13,174,399	14,500,000
Rumania .. ..	12,705,208	12,029,913	10,298,208	11,000,000
Galicia .. ..	5,033,350	4,158,899	6,461,766	5,000,000

V. *Labour.*—Towards the close of the nineteenth century, the industrial district of Baku became a great centre of accumulation of labour. Workmen came to that city from four different sources: from the Volga district, where it is the usual thing for the peasants to go for extra earnings during the autumn and winter months; from the Transcaspian district; from Persia, where there is an abundance of very cheap labour, and from the Caucasus. According to nationalities they may be divided into Russians, Tartars, Armenians, Persians, etc. There is a great difference in these various elements, in the way of their productivity, standard of life and traditions, and whilst such a mixture makes them difficult to handle, there is on the other hand an advantage in this point that it has taken them a long time to unite. Until 1903 there were



practically no strikes in the district, but in that year, when strikes occurred all over Russia, partly for political and partly for economic reasons, Baku was prominent in this movement.

It must here be mentioned that the difficulty of the labour movement in Russia, especially as far as it affects the interests of industry, has always had the following peculiar basis, that whilst in Western Europe, like Germany, Austria, France, Great Britain and America, strikes have chiefly been organised by the Trade Unions, and for economic reasons, in Russia, labour strikes have always been promoted and utilised by Socialistic parties for political reasons, at least as long as there were no Trade Unions in the country. Consequently in all the strike movements the police immediately interfered, not recognising either economic or political reasons, and considering strikes as an unlawful method of activity. This interference, with few exceptions, was a factor rather aggravating than improving the relationship between masters and men, very often prolonging the strikes and causing even bloodshed. Such interference on the part of the police was without exception looked upon unfavourably by the masters, who preferred to deal themselves with the strikes of their men. The Armenian-Tartar massacre of 1904, in conjunction with the revolution of 1905, endangered the position of the industry enormously, and the Government absolutely failed to arrive at a satisfactory settlement. In 1906 the first attempts were made to organise Trade Unions in the Baku district, and considering the very difficult situation, they have been rather helpful in ameliorating the unhealthy state of affairs. A special Council of the Petroleum Industrials also actively assisted in settling the labour question, and at a special conference with the Ministry of Commerce and Industry in Petrograd a labour delegation from Baku was invited to participate, and present their views of labour. As far as the economic grievances of the working men go, they had not much to complain of, compared with other industrial districts of Russia, as a considerable reduction of working hours, and increased wages, were introduced.

One of the most ridiculous demands of the workmen was the so-called "nagradnya" (bonus), which had unfortunately been introduced by some firms which made good profits. In consequence, all the workmen began to demand it, not caring about the crisis through which the industry was passing. The ignorance of the leaders of the men was appalling. Had they been acquainted with the condition of the industry, and with the fact that foreign competition had nearly stopped the export trade, they would not have embarrassed the capitalists with the strikes, thus adding to

their difficulties, and killing the goose that laid the golden eggs. It must be mentioned here that the Council of Petroleum Industrials had constructed very up-to-date and healthy places of amusement for the workers, and that the hospitals provided for them were established on quite modern lines and exceptional in the whole of Russia.

Unfortunately, as already mentioned, one of the chief difficulties in dealing with labour has always been the clashing of political and economic aspirations, and it may confidently be hoped that after this war one of the reasons, especially political, will be disposed of, and that properly-organised Trade Unions, with a better understanding between masters and men, will be possible.

In 1913 the number of workmen and officials directly engaged in the Petroleum Industry in the Caucasus was about 60,000, out of which about 46,000 were connected with the Baku fields, viz., 42,105 in the production, and 3,925 in the refineries, pipe-lines and docks. In the Grozni district there were about 7,200 men engaged in the production, and 372 in the refineries, total 7,572. Maikop occupied 1,270 men in the production, and 74 in the refineries, total 1,344. The refineries in Novorossisk employed about 134 men, and the pumping station in Batum 363.

According to nationalities the workmen were divided as follows: Tartars and Persians, 21,488, or 54·3 %: Russians, 9,123, or 23·1 %: Armenians, 7,704, or 19·4 %: Georgians, 1,236, or 3·2 %.

According to occupations the relative numbers work out in the following proportion: administration, 6·6 %: foremen, 14·3 %: mechanics, 4·2 %: skilled workmen, 36·9 %: unskilled labourers, 27·8 %: apprentices, 1·0 %: other workers, 9·2 %.

In Baku itself the numbers of men employed in the Oil Industry amounted to 46,439 on September 1st, 1915, and to 48,526 on September 1st, 1916.

The latter were distributed in the different branches as follows: petroleum production, 31,199: boring, 8,812: mechanical workshops, 3,714: refining, 4,801: total, 48,526 men.

In 1909 the 8 hours working-day was introduced for the men working at the wells, and 9 hours for those in the shops. Housing is provided for 71 % of all the officials and workmen by their employers; 22 % of them are paid lodging-money, while the remaining 7 % are not specially provided for.

In 1910, on account of the crisis, about 27 % of the men lost their occupations, but in 1912, with the renewal of the industry, their number increased again, and kept on increasing until 1914.

Wages were increased by 20-25 % in 1913 after the strikes, and since the war began, have been further advanced very considerably.



VI. *Association of Petroleum Industrialists.*—The petroleum industries of Baku, Grozni and Maikop are organised in several associations for protecting the interests of their industry. The most important of them is the Baku Association, founded in 1889. Originally its functions were very modest, but at present it has grown into a very important organisation. In 1914 its budget amounted to Rbl. 2,704,875. The following were the items of its expenditure :

1.	For medical aid	...	...	...	Rbl. 860,000
2.	„ education	...	...	...	„ 248,000
3.	„ road construction	...	...	...	„ 131,000
4.	„ collection of statistics and publications				„ 70,000
5.	„ collection and sale of oil otherwise lost				
	on the roads...	...	...	...	„ 57,000
6.	„ drainage and lighting	...	...	...	„ 52,000
7.	„ maintenance of the police force	...			„ 587,000

The income of the Association is derived from the following sources: the basis is a payment of  $\frac{1}{2}$  kopek per pood of crude oil produced in the whole district, which, for the convenience of levying, is divided as follows:

For each pood delivered to the pumping station	0.29	kopek.
„ „ „ pumped to the refineries	0.06	„
„ „ „ of petroleum pumped from Bibi-Eibat to the refineries	0.35	„
„ „ „ of crude oil transported from Bibi-Eibat	0.50	„
„ „ „ of crude oil transported from refineries	0.15	„
„ „ „ of kerosene transported from refineries	0.2625	„
„ „ „ of residue and goudron	0.13125	„

An important revenue is also obtained from the sale of oil collected on the roadways which would otherwise be lost and a nuisance; the amount realised from this source amounted in 1914 to as much as Rbl. 459,000. Substantial sums were also derived from payments for medical assistance given to people not directly connected with the industry.

Membership of the Association is restricted to those engaged in the production, refining and pumping of the petroleum. In order to have voting power at the general meetings the firms must have a production of petroleum of 100,000 to 500,000 poods, refining 100,000 to 200,000 poods, or pumping from 1 to 2 million poods per



annum. One additional vote is allowed in case the production is over 1 million, refining over 400,000, or pumping over 4 million poods per annum. A further additional vote is granted in case of the production being over 2 million poods, refining over 800,000 poods, or pumping over 8 million poods.

The Council of the Association is composed of nine members, elected for a period of three years. Their work is honorary and consists of supervising, but the actual management is confined to the Executive Council, which is composed of the Chairman, of the representative of the Council with the Government, of the Financial Adviser, and three members—one of them managing the medical, the second the technical, and the third the educational departments. The Department of Medical Aid includes: six ambulances, apothecaries, two hospitals with 440 beds, 40 doctors, 120 midwives, nurses, dispensers and other staff, and 252 servants. In 1914 the hospitals recorded 412,660 visits; 23,609 patients were visited by doctors at their homes. The Educational Department of the Association maintains 9 schools with 57 branches, 79 teachers and 2,386 pupils. The children of the workmen are taught gratuitously, and besides this four large libraries are maintained for the men themselves. Altogether the work of the Association is very beneficial for the industry and for those engaged in it.

VII. *Ownership of Land.*—(1) CROWN PROPERTIES.—With the abolition of the Concession System and the Crown administration in 1872, and with the admission of private initiative, the real development of the industry was made possible. At the time of the winding-up of the Concession system the Baku industrial area consisted of 480 desiatines (1,296 acres). The area was divided into 48 groups of 10 desiatines (27 acres) each. 46 groups were offered for auction to private people, and only two groups were reserved, being subject to litigation between the Crown and private persons. The 46 groups realised at the auction a total of 552,221 roubles. Outside of this area there were still some Crown properties for which claims were given until 1896 for 10 roubles per desiatine, and after 1896 for 100 roubles. In 1892 a special Law was issued regulating Crown properties. They were divided into two categories, those for investigation, those already proved. In 1896 an additional 70 desiatines (188 acres) were put up to auction. The system of auctions became very popular and at the times announced for them there was always great liveliness and speculation in Baku. From 1896 to 1906 Crown lands were also obtained without auction, but against royalty, which very often amounted to 40% of the gross production.

Between 1896 and 1911, 1,212 desiatines (572 acres) were disposed of without auction; 38 desiatines of them against a special tax per pood of oil produced, and 176 desiatines against royalty. In 1912, the Crown lands under exploitation amounted to about 395 desiatines (1,066 acres). In May, 1913, further auctions were held, but their results were not confirmed by the Government. Those held in May, 1914, were more successful and an area of 152 desiatines (410 acres) was handed over to the lessees under varying conditions.

(2) PRIVATE PROPERTIES.—As far as oil lands in private ownership are concerned, they are usually exploited on the basis of royalties varying between 25 and 30 %. With the decrease of the export business, the necessity for increasing the exploited area has much diminished, the more so as many other plots outside of Baku have been taken up for exploitation, and it is certain that the Baku industry will not experience any land-hunger for a considerable time to come.

In 1914 there were in the Baku area under exploitation 1,003 square desiatines, 968 square sajens (2,709 acres) of petroliferous lands, composed as follows :

(1) Private property, 324 desiatines, 2,093 square sajens (876 acres) = 32.4 %.

(2) Crown lands leased on royalty basis on the gross production : 416 desiatines, 895 square sajens (1,126 acres) = 41.5 %.

(3) Crown lands leased for a rent of 100 roubles per desiatine : 178 desiatines, 144 square sajens (481 acres) = 17.8 %.

(4) Crown lands leased for a flat rent of 125,000 roubles : 66 desiatines, 1,995 square sajens (180 acres) = 6.7 %.

(5) Crown and communal lands leased from the peasants : 16 desiatines, 234 square sajens (46 acres) = 1.6 %.

VII. *The Petroleum Industry as a source of income to the State.*—From 1821 to 1825 the Baku field was given by the State as a Concession for a yearly payment of 131,000 roubles, but as this also included the right of exploitation of the Salt Lakes the income from the oil was only 92,000 roubles per annum. In the year 1825 the State exploited the field on its own account, and obtained a profit of 76,000 roubles. From 1826-1834 the Concession system was again introduced, with a maximum annual payment of 97,000 roubles. From 1835-1850 the State began the exploitation again on its own account, with a maximum annual income of 125,000 roubles. From 1850-1867 the Concession system was again introduced, with a maximum annual payment of 162,000 roubles. From 1867-1872 the same system was continued with a payment of 136,000 roubles.



It is interesting to note that during the whole period between 1821 and 1872, only the very negligible quantity of 21,000,000 poods of oil was produced. In 1867 it was recognised that the Concession system was very unsatisfactory, and a special commission was appointed by the Viceroy of the Caucasus in Tiflis to make recommendations. The Commission condemned the Concession system, and recommended the introduction of excise duties on kerosene. With this object in view special regulations were made which came into force in 1873. It was decided to transfer the Crown properties for exploitation by a system of auctions equally open to Russian subjects and to foreigners, the leases to be for a maximum of 24 years. At the same time a special excise duty was introduced to be levied according to the capacity of the distilling apparatus used, at the rate of 4 kopeks per each vedro (2.7 gallons) for every day while the still was in operation. But for various technical reasons these excise regulations were not very beneficial to the industry, and necessitated further improvements.

In 1875 the Minister of Finance, in agreement with the Viceroy of the Caucasus, appointed a special Commission for the working-out of new regulations in place of the existing ones. The new regulations recommended a discount or drawback of 15 kopeks for every pood exported abroad, fixed as a minimum capacity for refining 75 vedros (202 gallons), and lowered the excise per vedro to three kopeks. It freed from excise the lubricating oils obtained from petroleum, and the non-refined residues, also goudron and illuminating gas. It also introduced a measure allowing the payment of the excise during twelve months, fixing the financial year from November to November of each year. Under the same regulation also made, the State also imposed a considerably higher import duty on foreign kerosene, which had also to be paid in gold. These regulations entered into force in 1877, and considerably improved the conditions of the industry, so that in 1887 the Minister of Finance, in considering new sources of income for the State, found it possible to increase the excise on kerosene, in this way getting a special annual revenue of 7 million roubles out of it per year. This latter measure, which came into force in 1888, made a distinction between light and heavy kerosene, the former taken at the specific gravity of 0.730–0.830 with a flashpoint below 45° Celsius, and the latter of a specific gravity of 0.830–0.885, and a flashpoint of 45° Celsius. The excise was fixed for the former at 40 kopeks, and for the latter at 30 kopeks per pood. All other products of petroleum, especially crude oil, were



left free from any duty. The exported kerosene for abroad was already free from excise. The only drawback imposed by these regulations was that the kerosene with a flashpoint at a temperature below 28° C. was considered dangerously inflammable, and the authorities had to prohibit its sale. Otherwise the industry was quite free from Government interference, having not even to pay the trade licences. The result of the regulations for the State were even better than expected, as in 1888 about 6,601,722 roubles were collected, or about 32 % more than the expected 5,000,000 roubles. But, as very often happens, the Government regulations were taken on the line of least resistance, and in 1891 the production of heavy kerosene considerably exceeded that of light kerosene, so that the Minister of Finance had to introduce a new classification, and the specific-gravity limit was fixed at 0.890, instead of at 0.885. Also all oil products with a flashing-point below 80° Celsius were now classified with the heavy illuminating oils and subjected to an excise duty of 30 kopeks. All illuminating oils with a specific gravity below 0.845 had to pay at the higher rate of 40 kopeks per pood. At the same time the excise for illuminating oils from kerosene was fixed at 60 kopeks per pood, and for light ones at 50 kopeks per pood. For 1916 the excise on illuminating oil was further increased to 90 kopeks per pood. The revenue from the excise amounted to: 1893, 16,369.2 thousand roubles: 1894, 18,928.7: 1895, 19,788.1: 1896, 20,925.6: 1897, 22,807.3: 1898, 23,452.5: 1899, 26,184.4: 1900, 25,503.3: 1901, 28,617.3: 1902, 29,597.9: 1903, 31,890.7: 1903, 34,688.3: 1904, 34,890: 1905, 30,003.1: 1910, 46,910: 1911, 42,488: 1912, 50,038: 1913, 48,593: 1914, 54,950: 1915, 62,040: 1916, 82,040.

The considerable falling-off in the revenue of the year 1905 is easily explained by the grave disturbances which took place in Baku in that year and the consequent necessity for extending the time limit for the payment of the excise for several years instead of 12 months.

In 1906 new excise regulations were introduced. It was decided to levy 60 kopeks per pood on all transparent oil products. Great objections were raised to this increase by the Baku industrials, who argued that such a regulation forced them to concentrate only on the production of crude oil, which would be detrimental to the healthy development of the whole industry. But these objections failed to impress the Government, all the more so as the excise was coming in in increasing abundance. It must be mentioned that, considering the bureaucratic system under which Russia was struggling to develop her industries, the State had no ground to

complain about the income derived from the petroleum industry, and the Russian capitalists, as well as any other capitalists, would have been only too delighted to give to the State its due, if only the industry was given its chance.

In 1914 the Government, under the stress of war, made a project of receiving the duty in kind, instead of in cash, and to use the oil thus received for the purposes of the Navy and other public administrations. There was also question of the installation of a Government refinery in Baku, but these projects have so far not materialised. In March, 1917, the Government decided to impose also an excise duty of 5 kopeks per pood on crude oil, which formerly had always been free.

IX. *Participation of Foreign Capital.*—In the development of the Russian Oil Industry foreign capital plays a prominent part. The first important foreign enterprise, that of Nobel Brothers, was founded in 1872 with a capital of 3 million roubles, which was increased in 1881 by 3 million roubles, in 1882 by a further 4 millions, and in 1883 again by 5 millions, thus making a capital of 15 million roubles, and showing the sudden expansion of this business concern. On the other hand, the oldest Russian enterprise, the Bakinskoie Nephtiannoie Obsh., founded in 1874, with a capital of 7½ million roubles, had to write it down to 2 millions in 1894, and only the help of French money brought it again up to about 8 millions. Russian capitalists kept strangely aloof from this industry, even after the railway to Batum had been built and had opened up the prospect of a great export business. Its possibilities were soon recognised by the Rothschilds of Paris, who founded in 1883 the Caspian Black Sea Co., and in 1898 the Masut Co., which was later bought up by the Shell Company.

The following table, from the "Nephtiannoie Dielo," shows the movements in the capital of the older companies:

	Year of Foundation.	Original Capital.	Capital 1915.		
<b>Foreign Capital—</b>					
Baku Petroleum Co....	1874	2·00	7·7	million	rbl.
Nobel Brothers ...	1879	3·00	30·00	"	"
Ragozin ... ..	1880	3·50	1·80	"	"
Caspian Black Sea Co.	1883	1·50	10·00	"	"
Schibaieff ... ..	1884	1·50	6·50	"	"
Russian Naphtha Co.	1884	2·00	24·75	"	"
<b>Russian Capital—</b>					
Mirzoeff ... ..	1886	2·14	3·21	"	"
Caspian Co. ... ..	1887	1·50	10·00	"	"



Therefore, while the foreign enterprises increased their capital by 66·84 million roubles, the Russian Companies only added 9·57 million roubles to theirs.

British capital became specially interested in the Russian oil industry after 1898, and between that year and 1903, 85·72 million roubles were invested in it from this source; the most important enterprises being the Schibaeff Petroleum Co., the Russian Petroleum Co., and the Baku Russian Co. The new fields, like Grozni, are almost entirely controlled by British and French capital.

X. *Prospects of the Industry.*—The present deplorable political and economic situation in Russia does not permit any speculations as to the near future of the Petroleum Industry, although the conditions in the Caucasus are far more satisfactory than in other parts of Russia. But there are still great difficulties to be surmounted, and everything depends on the outcome of the present war. The question of a State monopoly of fuel oil has lately been brought forward again, in the first instance for the necessities of the State during the war. Special committees would be given powers concerning the supervision and distribution of the oil, and on the other hand the producers in Baku and elsewhere would receive from the War Industrial Committee a certain quantity of iron and materials, the scarcity of which is now hampering production. In a general manner we must consider it premature, under the primitive economic conditions of Russia, to speak about monopolies in that country, as such systems can only be recommended to countries where the industrial development is at its full height. Russia, with its wealth of undeveloped resources, can only reckon on quick development by giving full chance to private initiative and enterprise, and it is fairly certain that this view will prevail when the political situation is settled, and when the future economic position comes to be considered. The State can then confidently rely upon getting much larger sources of income by giving full swing to private initiative, than by monopolies which everywhere kill enterprise.

As far as the future participation of foreign capital goes, it may be confidently hoped that it will always be welcome. At the same time it must be mentioned that during the war there has been a great accumulation of capital in Caucasus, some of which will find its way into the oil industry. But a great amount of new installations and technical improvements will have to be provided from abroad, and this will offer great and fruitful opportunities to British finance and enterprise. The expected general development and expanse of industry in the whole of Asia will cause an ever-increasing demand for oil, and this will give new impetus to the production



and to the opening-up and exploitation of new fields. It must be mentioned in conclusion that this vast industry, with its enormous resources and its undoubtedly splendid outlook, is one of those assets which will help Caucasus in her future economic development.

COMPARISON OF RUSSIAN AND BRITISH WEIGHTS AND MEASURES.

1 Pood	...	...	36·11 lbs.
1 Ton	...	...	62·03 poods.
1 Sajen	...	...	7 feet.
1 Verst	...	...	1166 yards.
1 Desiatine	...	...	2·7 acres.
1 Square Sajen	...	...	5·44 square yards.
1 Vedro	...	...	2·7 gallons.

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**LIST OF COMPANIES**  
engaged or interested in the  
**CAUCASIAN PETROLEUM INDUSTRY**  
and Registered in the United Kingdom.

COMPANIES.	Registered (R—Reconstructed).	Nominal Capital. £	Authorised Debentures. £
Anglo-Maikop Corporation, Ltd. ..	R 2- 6-1911	650,000	—
Anglo-Terek Petroleum Co., Ltd. ..	14- 6-1901	160,000	2,500
Australian Maikop Oil Co., Ltd. ..	5- 5-1910	275,000	—
Baku Russian Petroleum Co., Ltd. ..	4- 6-1898	750,000	155,000
	R 3- 1-1910		
Bibi-Eibat Oil Co., Ltd. .. ..	R 4- 2-1913	312,500	65,000
Black Sea Amalgamated Oilfields, Ltd.	26- 3-1915	500,000	—
British Maikop Oil Co., Ltd. .. ..	30- 4-1910	120,000	15,000
British Taman Oilfields, Ltd. ..	8- 7-1912	70,000	—
Caucasian (Tchermoeff) Oilfields, Ltd.	30-10-1913	350,000	—
Central Tcheleken Oilfields, Ltd. ..	6- 9-1912	400,000	—
Central Ural Caspian Oil Co., Ltd. ..	31- 7-1912	50,000	—
Chatma Oilfields, Ltd. .. ..	21-11-1902	351,000	—
Cheleken Oilfields, Ltd. .. ..	30- 6-1910	300,000	—
Emba Caspian Oil Co., Ltd. .. ..	22- 7-1912	2,105,000	—
European Oilfields Corporation, Ltd.	14- 5-1896		
	R 15- 5-1900		
	R 4- 7-1911	385,000	200,000
Fanieff Oil Syndicate, Ltd. .. ..	27-4 -1914	50,000	—
Ferghana Oil Fields, Ltd. .. ..	19-10-1910	750,000	—
Gadjinsky Cheleken Oil Co., Ltd. ..	15-10-1912	1,250,000	—
Gleboff Grozny Petroleum Co., Ltd. ..	15- 8-1910	750,000	—
Gouria Petroleum Corporation, Ltd. ..	7-10-1913	350,000	—
Gouria Syndicate, Ltd. .. ..	4- 5-1912	15,000	—
Grozny-Sundja Oil Fields, Ltd. ..	31- 3-1913	300,000	—
Ildokani Oil Syndicate, Ltd. .. ..	18- 7-1912	26,250	—
International Oil Lands, Ltd. .. ..	27- 1-1914	200,000	—
International Russian Oilfields, Ltd.	22- 2-1913	500,000	—
Iora Oilfields, Ltd. .. ..	8- 6-1911	250,000	—
K. N. Syndicate, Ltd. .. ..	13- 5-1910	17,307	—
Kertch-Taman Oilfields, Ltd. .. ..	25- 6-1913	500,000	—
Kuban Black Sea Oilfields, Ltd. ..	24- 3-1911	300,000	—
Kuban Refining Co., Ltd. .. ..	8-10-1913	200,000	—
Levanovskoe Petroleum Co., Ltd. ..	15-12-1911	300,000	—
London & Maikop Oil Corporation, Ltd. .. ..	24- 3-1910	600,000	—
Maikop Combine, Ltd. .. ..	30-10-1912	750,000	60,000
Maikop Deep Drilling Co., Ltd. ..	27- 1-1912	100,000	—
Maikop Midland Oilfields, Ltd. ..	15- 3-1910	157,500	—
Maikop Orient Oil Co., Ltd. .. ..	1- 5-1911	250,000	—

Carried forward .. £14,394,557 £497,500

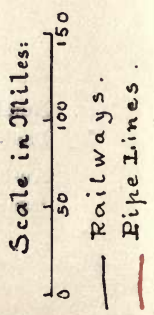
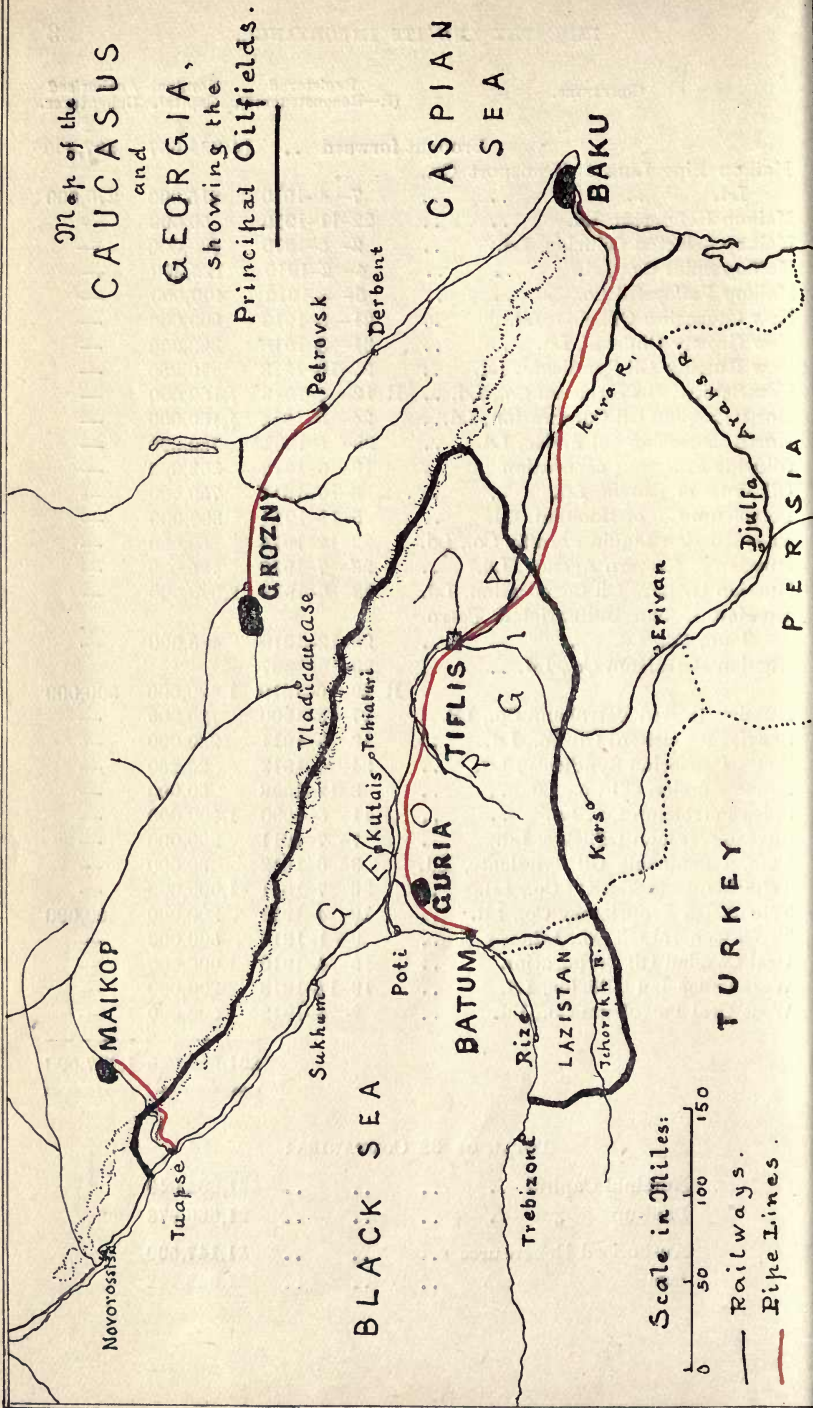
COMPANIES.	Registered (R—Reconstructed).	Nominal	Authorised
		Capital.	Debentures.
		£	£
Brought forward ..		14,394,557	497,500
Maikop Pipe Line & Transport Co., Ld. .. .. .	7- 4-1910	815,000	270,000
Maikop Refineries, Ld. .. ..	22-11-1910	50,000	—
Maikop Selected Oilfields, Ld. ..	2- 5-1910	400,000	—
Maikop Spies Co., Ld. .. ..	4- 2-1910	125,000	—
Maikop Valley Oil Co., Ld. .. ..	5- 5-1910	400,000	—
New Caucasian Oilfields, Ld. ..	21- 8-1913	300,000	—
New Grosny Oilfields, Ld. .. ..	31- 3-1916	360,000	—
New Russian Oil Syndicate, Ld. ..	22-10-1913	10,250	—
New Schibaieff Petroleum Co., Ld. .. R	12- 4-1913	1,160,000	—
North Caspian Oil Corporation, Ld. ...	24- 3-1914	1,100,000	—
North Caucasian Oil Fields, Ld. ..	29- 1-1901	750,000	—
Oilfields Finance Corporation .. ..	19- 6-1912	303,992	—
Oil Trust of Russia, Ld. .. ..	3-10-1911	750,000	—
Petroleum Co. of Ildokani, Ld. .. ..	5-11-1914	300,000	—
Pure Russian Liquid Paraffin Co., Ld.	22-12-1915	50,000	—
Russian & Eastern Agency, Ld. .. ..	23- 7-1912	125,000	—
Russian General Oil Corporation, Ld.	28- 6-1912	2,500,000	—
Russian Kuban Industrial & Petro- leum Co., Ld. .. .. .	29-12-1910	405,000	—
Russian Petroleum Co., Ld. .. ..	29-10-1897		
	R 29- 6-1910	1,400,000	300,000
Russian United Petroleum Co., Ld.	27- 8-1900	120,000	—
Shagirt (Cheleken) Oil Co., Ld. .. ..	18- 7-1911	250,000	—
South Caucasian Syndicate, Ld. .. ..	24- 4-1912	25,250	—
South Russian Oil Co., Ld. .. ..	8-12-1898	60,000	—
Spies Petroleum Co., Ld. .. ..	11- 5-1900	1,500,000	—
Suvaroff Taman Oilfields, Ld. .. ..	7- 7-1911	200,000	—
Taman Peninsula Oil Syndicate, Ld.	3- 6-1912	30,000	—
Tcharken-Cheleken Oil Co., Ld. .. ..	26- 7-1911	1,000,000	—
Tchengelek Proprietary Co., Ld. .. ..	19- 4-1911	200,000	80,000
Terek General Oil Co., Ld. .. ..	9- 1-1914	500,000	—
Ural Caspian Oil Corporation .. ..	15- 4-1910	1,000,000	—
West Caucasian Oilfields, Ld. .. ..	19-11-1913	200,000	—
West Ural Petroleum Co., Ld. .. ..	2- 8-1912	500,000	—
		<u>£31,284,049</u>	<u>1,147,500</u>

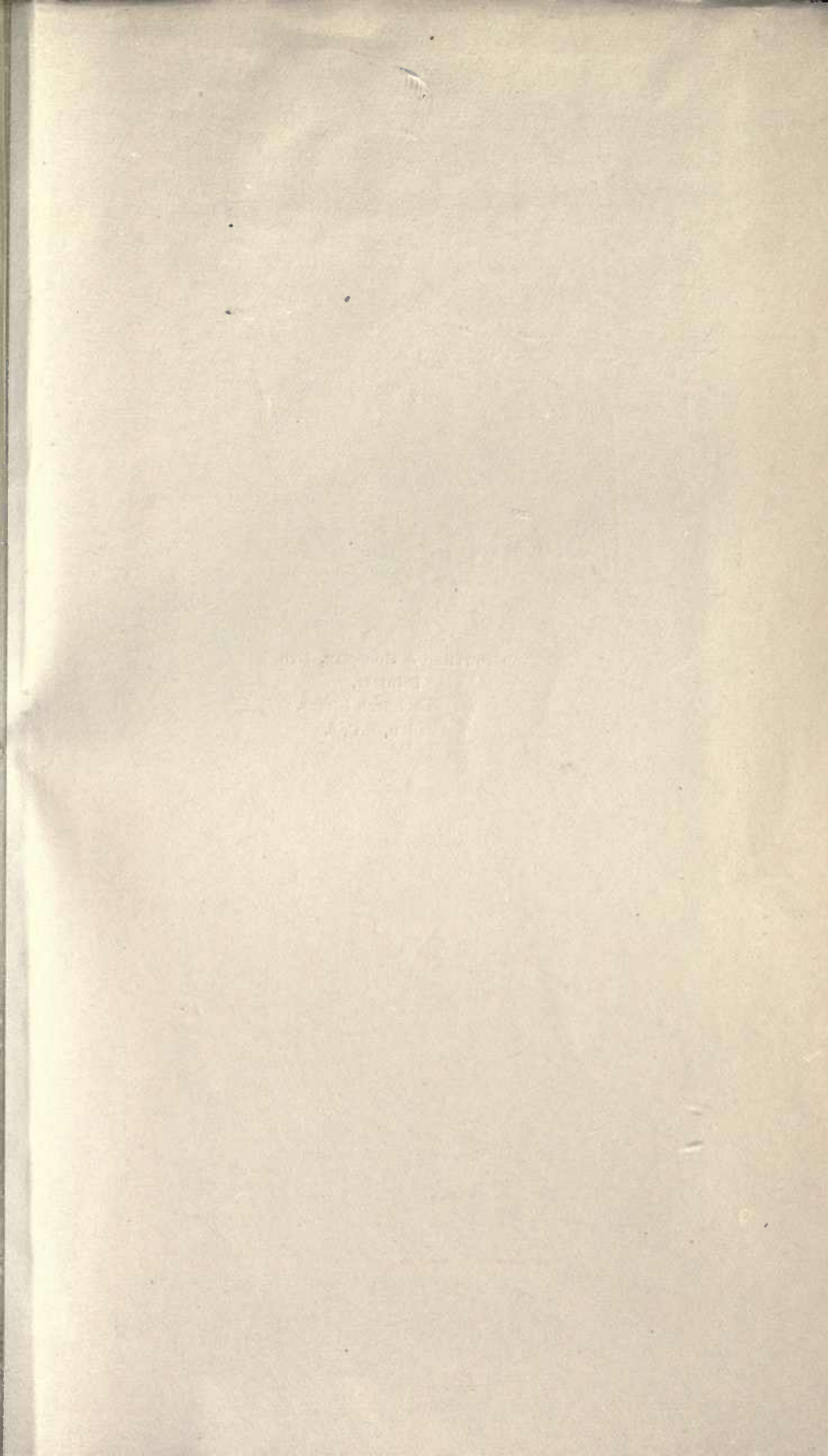
## TOTAL OF 68 COMPANIES :

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Map of the  
**CAUCASUS**  
 and  
**GEORGIA,**  
 showing the  
Principal Oilfields.





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