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THE BALTIC-BLACK SEA WATERWAY

IN CONNECTION WITH THE

„Coal Canal Silesia-Dantzig“



1. The relation of the Baltic-Black Sea system of canals to Russian and German waterways.

The waterways of Russia have played a very important part in the traffic of that vast country.

The traffic of goods on the railroads and waterways of the entire Russian Empire (excluding Finland) was:

in billions of ton-kilometers:
in the year:

	1908	1909	1910	1911
by railroads	43,6	48,7	50,8	55,0
by waterways	31,4	36,9	36,7	42,5
total	75,2	85,6	87,5	97,5
% of waterways traffic . . .	41,9%	43,1%	42,0%	43,6%
Total length of railroads klm:	66 500	67 000	67 100	68 200
" " " waterways "	60 000	60 000	60 000	60 000

Of the sum of 55 000 of ton-kilometers transported in 1911 by railroads the amount of the grain transported was 16,6%, of the coal 15,3%, of the wood 12,3% and of the petroleum 4,8%.

On the waterways the amount of the wood transported was 43%, of the petroleum 24%, of the grain 11,3% and of the coal 1,7% only.

Thus we see that about forty three per cent of the total transportation of the country passed through the waterways and when consideration is given to the short season of water navigation which, in Northern Russia lasts from May to October, about 180—200 days, in middle Russia from April to November about 240 days and in

western and southern Russia, Poland and the Ukraina from March to November about 280—300 days yearly, one can realize that a much larger percentage would have been possible had the waterways not been frozen over such a large portion of the year. This percentage of transportation was possible on a net of waterways very incomplete as a whole, and possessing very few canals and canalized rivers. Only the Volga, the Mississippi of Europe, and the Caspian Sea were joined with the Neva and Baltic by a system of canals sufficiently improved for passing of the great Volga ships of 2000 tons capacity. Over fifty per cent of all Russian river steam boats were found on this stream and its tributaries. The average tonnage of barges on the Volga ranged from 2000 to 5000 tons. The largest recent vessels—the Nobel's steel motor barges for petroleum have transport capacity of 10,000 tons.

The tributary rivers of the Black Sea had no junction with the rivers of the Baltic Sea. The existing but old canal joining the Vistula and Dnieper between their tributaries, the Bug and Pripiat, built 150 years ago was practical only for rafts.

In 1909 the Russian Government elaborated a practical plan for a network of waterways which would unite all existing principal waterways of the country, and thereby create the largest net of waterways in the world, having throughout dimensions sufficient to care for the traffic of the standard Volga barges—1640 tons capacity, 15 meters width, 80 meters length, and 1.65 meters draft. Such a net of waterways would have joined the Baltic, Black, White and Caspian Seas and the Northern Ocean, and with their tributary rivers would have served Russia, the Ukraina, Caucasus, Poland and Balkan States, Siberia, Central Asia, as well as giving water communication to Germany and Western Europe.

The following main waterways were proposed.

First—from the Baltic Sea at Petersburg, through the river Neva, Lakes Ladoga and Onega, Mariinski canal, thence by the Sheksna to the river Volga, near Rybinsk. This is the existing main waterway of Russia joining North-Western Russia and the Baltic Sea, with the South-Eastern provinces and the Caspian Sea, with a minimum depth of 1.80 m. The traffic on this waterway amounts to from 9 to 12 million tons annually and no coal cargo is included as that part of Russia uses only wood or naphtha as fuel. The depth of 1.80 m. to 2 meters on the Volga has been maintained by dredging. Some efforts were made to employ dikes, but owing to the great cost and length, dredging was instituted, and navigation for over 2500 miles of the Volga system, was so maintained. There were about forty dredges in the Volga fleet, of capacity of from 200 to 400 cubic meters per hour. For maintaining sufficient depth on the river Sheksna, its canalization was executed in the year 1911—1917, nine locks being built.

Second—the next important waterway proposed was for the purpose of joining the Baltic with the Black Sea by building a canal between the Duna - by Witebsk and the Dnieper - by Orsha, and then by canalization of the Duna between Witebsk and Riga, and of the Dnieper between Orsha and the mouth of the Pripiat. The cost of this undertaking was estimated at sixty million dollars. It would also have been necessary to regulate the central portion of the Dnieper to the waterfalls near Ekaterinoslaw, as this portion of the river is only partially regulated. From Ekaterinoslaw to Aleksandrowsk — 70 kilometers — are situated seven waterfalls having a total fall of 36 meters. The project proposed their canalization by the building of two or four water dams, thereby obtaining water power stations for over 500,000 HP. The lower part of the Dnieper was partially regulated having a depth of 2 meters and for the last 100 kilometers before the outlet, 4 meters. The depths were maintained by 25 dredges of capacity of from 150 to 250 cubic meters per hour each. Traffic on the middle and lower Dnieper amounted to from 1.5 to 1.8 million tons annually.

Third—There was always the possibility of joining the Dnieper with the Black Sea by the Vistula or the Niemen, instead of the Duna, and although those directions were preferable from technical and commercial points of view they were not from the then political point of view, because in utilizing the Vistula or Niemen, the boundaries of the then German Empire would have been entered, while with the Duna route the waterway would be improved entirely within the borders of Russia. Notwithstanding the political objections, the Russian Government from 1912, began to recognize the great commercial advantages to be derived from a Dnieper-Vistula canal and proposed a waterway from Warsaw to the Dnieper. The estimated cost of this improvement including the building of canals, canalization of the Bug, and regulation and partial canalization of the Pripiat, amounted to 50 million dollars. However no further action was taken by Russia except that a detailed project was elaborated in 1913 — 1917.

During the German occupation of the Ukraine in the year 1918, the Ukrainian Government, realizing the importance of such a waterway for the development of the country so poorly equipped with means of transportation, delegated a commission to Germany and Poland for the purpose of organizing an international corporation for building the Vistula-Dnieper canal. At about the same time the „Hauptkommando“, proposed another canal between the Pripiat and the Niemen. From a technical and commercial point of view, even for Germany, this direction was not as convenient as the Vistula-Dnieper, but again from the political point of view, the Hauptkommando did not desire that a canal should pass through a portion of Poland whose hostility to Germany was certain. Nevertheless the chief of German waterways and well known engineer, Sympher, interrogated on that question in July 1918, declared that the only reasonable direction for creating the main and central European waterway from Hambourg to the Black Sea, was as proposed, namely, the canal Vistula-Bug-Pripiat-Dnieper, which route would pass through the lowest point of the European watershed—140 meters above sea level.

Fourth—Therefore from the foregoing and by the process of elimination, the Vistula-Dnieper route becomes the most important waterway to be created in Eastern Europe, even from the point of view of the ancient Russian Government, commercially and economically, and from the best German authorities as well. Before entering into a discussion of the projected canals in Poland as a part of the Baltic-Black Sea Waterways, it is well to call attention to the canalization of the lower part of the Donetz for the length of 220 kilometers, completed in 1913 at an expense of 2,800,000 dollars, and to the beginning of the canalization of the river Don. This work was the beginning of the South Russian waterway which, passing near the Donetz Coal Basin, would join the Dnieper to the Don by utilizing the rivers Samara and Donetz, and then passing through the river Don and a canal between the Don and Volga near Tzaritzin, thereby joining the Volga with the affluences of the Black Sea.

Other main waterway undertakings by the Russian Government, which should be mentioned are: a) the junction of the Volga with the Ob by a canal, passing through the Ural mountains and utilizing the rivers Kama, Tshusowaia, Iset and Tobol. This project was elaborated in 1913—1917. b) the canalization of the river Oka, a tributary to the Volga. The building of two upper locks below the mouth of the canalized river Moskwa to Oka begun in 1911 was terminated, and allows vessels from the Volga region to reach the city of Moscow. It was proposed to join the Oka with the Desna, the tributary to the Dnieper, and thus to create a main Western-Eastern-Central continental waterway, the beginning of which should be in Western Europe and the end in Siberia and Central-Asia. c) Finally we must mention the North-Russian waterway, consisting in the junction of the Mariinski Canal with the river Sukhona and the Northern Dwina, by utilizing the existing old Wirtembergski canal, which should now be entirely renewed.

II. The projected canals in Poland.

The proposed canals in Poland have a close connection with all of the projected Russian waterways, and form the junction with the Western European waterways. They are as follows:

1. The West-Eastern canal from the Western to the Eastern frontiers of Poland (from the river Wartha to the river Pripiat) will form an important part of the Baltic-Black Sea waterway.

2. The North-South canal, or the Coal Canal Silesia-Dantzig, joins the Silesian coal basin with the West-Eastern canal and the Baltic-Black Sea System between Dantzig and Kherson.

Taking into consideration first, the actual political circumstances in the Ukraine which makes impossible the actual beginning of construction work in the near future, and second, the probable larger and earlier income to be derived from the Coal Canal undertaking, it is now possible to build this portion of the network which can be executed immediately and can assure by itself the necessary earnings on the capital invested.

These canals will join the coal and industrial region of Silesia with the industrial and agricultural regions of Pozen, Lodz, Warsaw and Dantzig. Thus the regions abounding in wood and corn will have the cheapest means of transportation to the region of their consumption, which will assure the intensity of traffic necessary for a high earning power of the undertaking.

The possible prolongation of the Coal Canal to south will join also Tchecho-Slovakia and its rich industry and coal region with the Baltic-Black Sea system of waterways and with the main gateway to Russia.

The Silesia-Dantzig Coal Canal begins in the south-eastern corner of upper Silesia, where, between the industrial towns of Sosnowice, Katowice, Konigshutte, Beuthen, Bendin, and near to them, will be situated the ports of greatest expedition of coal. Owing to the extraordinary natural conditions, that the canal in this industrial region will follow for an important distance the little river Brynica, which during 500 years has been the boundary line between Poland and its western neighbors — Germany, Bohemia, Austria and Prussia, — it is now possible to project a canal in the midst of a thickly populated and intensely industrial region without demolishing a single building nor crossing more than two or three highways and only two railroads, in a distance of 50 kilometers.

After leaving Silesia in the direction of Dantzig, the canal will pass the industrial cities of Tshenstochova, Lodz and other towns, then through Goplo lake after which it will enter the Vistula near Thorn. From this place the Silesian-Dantzig waterway will, for the present, use the river Vistula. From the former Russian frontier—20 kilometers above Thorn—to its outlet in Dantzig, for the length of 240 kilometers, the Vistula has been regulated by the German Government at a cost of 23 million dollars. Nevertheless the regulation of the lower Vistula cannot be considered as entirely complete. The average depth is only 1.40 m and this depth has at times, during very low water, been to some extent diminished. The regulation of this section of the Vistula was evidently not made entirely from the point of view of navigation and therefore has some defects for our purposes. The current is headed in too straight a direction, the turnings of the river are made with too great a radius and too small angles. The works consist principally of perpendicular dikes and should be completed by longitudinal dikes, and the width of the summer bed of the river should be considerably diminished.

We are of the opinion that in time, it will be found practical and economical to build a lateral canal from Tczew 28 kilometers above the mouth of the Vistula, to the sea at Dantzig. At this point the river enters the „Freistaat Dantzig“ and it would there be possible to improve a sea port on Polish territory, as a principal port of the Baltic-Black Sea system. A sea level canal of 25 km. length of sufficient dimensions for ocean going vessels could be constructed through the level terrain existing in this locality, at a minimum of expense, and the waterway Silesia-Dantzig would be shortened 20 kilometers, in comparison to the existing way through the Vistula and its branch the Todte Vistula.

III. Estimated cost, income, and economic considerations of the first section of the Baltic Black Sea System.

The estimate of the cost of the Canals Silesia-Dantzig, with branches to Poznań and Warsaw, having a total length of 960 kilometers, amounts to 70 million dollars. The value of the existing Polish railways covering 16,000 kilometers, amounts to approximately 800 million dollars. The railroads of Russian Poland in the last year before the war, gave about ten per cent net income, and the total of all railways now belonging to Poland gave a result of about five per cent. The total pre-war traffic on the entire net of railways now owned by Poland, surpassed 15,000 millions of ton-kilometers and with the traffic on the rivers reached 17 millions of ton kilometers.

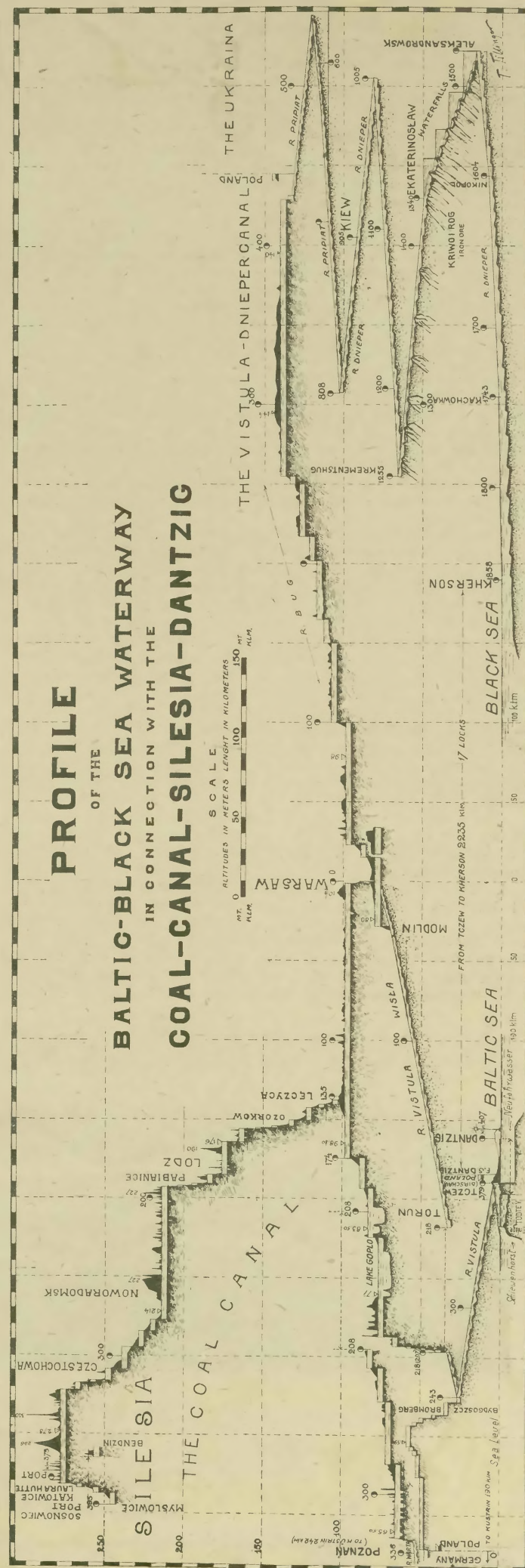
In Germany where the existing waterways do not run so advantageously as regards the traffic of the country, as do the projected Polish canals, they carried before the war 19 millions of ton-kilometers or about 27% of the entire traffic of the country. In Russia 43% of the entire traffic was handled by the waterways. Therefore we believe it conservative to state that the traffic possibilities of the proposed Polish network of canals, which will advantageously serve both the ancient German territory as well as the former Russian territory (approximately in equal portions) will amount to not less than one third (33%) of the entire transport labor of the country. As the total traffic before the war was above 17 000 millions of ton-kilometers yearly, taking into consideration the natural increase of population, industry and traffic, during 20 years, from 1913 to 1933, as fifty per cent the traffic requirements of the country will be in excess of 25 million ton-kilometers and we can assume that the transportation for waterways will equal one third or 8 300 millions. It is necessary to mention that all the railways in the proximity of the projected Coal Canal are overloaded by the existing traffic.

The intensity of the traffic on the proposed canals is assured. In 1913 the coal transportation alone from the Silesian coal basin in the direction of the proposed canal, amounted to 12,700,000 tons out of the 40 million tons produced in the territory now belonging to Poland. In the calculations of the probable revenue of this section of the undertaking, it is assumed that within eight years after the completion of the canals, the transportation of coal will amount to 10 million tons. This is a reasonable estimate taking into consideration the unquestionable increase of the coal requirements with the natural growth of industry and population. Assuming a canal charge of 19 cents per 100 ton kilometer, which rate joined with the barge tariff is fifty per cent cheaper than railway charges, and taking into consideration all other expenses, the detailed calculation found in the first booklet of the „Coal Canal Silesia-Dantzig“ indicates the revenue of the entire undertaking as not less than 17 per cent from the beginning of stabilized traffic including the income of the collateral enterprises (hydro-electric, etc.).

It is interesting to note that the total cost of construction of the Coal Canal Silesia-Dantzig with branches to Warsaw and Pozen, about 70 million dollars *will not amount in cost to the value of the annual production of coal in Poland*, and by diminishing the cost of transportation, the canals will automatically increase the value of this production. Therefore even if the international aspect of the undertaking were not considered these canals cannot be considered as an improvement too expensive for Polish industry whose production in 1910 amounted to 1100 million dollars. The value of the yearly agricultural production of Poland was about 1500 million dollars.

IV. *General conditions influencing the earning capacity of Waterways as they relate to the Coal Canal Silesia-Dantzig.*

The income of canal and river exploitation and improvement, when consisting only in receiving of canal tols, increases exactly in proportion to the increase in traffic. In this respect canal and waterway enterprises differ radically from railway systems, which handle the traffic by their own rolling stock and are dependent from time to time upon labor conditions which sometimes makes a situation in which the revenue of the enterprise diminishes although the traffic increases. In a canal or waterway enterprise the cost of maintainance is very low and the main portion of the income can be considered as net revenue. Nevertheless it has often been pointed out that canal and waterway enterprises will not give a sufficient revenue to interest investors and as illustrations, we are referred to the canals of France and England. To answer this question it is necessary to point out that to assure regular and satisfactory income from waterway enterprises certain conditions are indispensable. *First* and above all, a great traffic must be assured, greater in fact than an amount which might be considered sufficient for a railway. Canals with small traffic cannot be profitable because the cost of upkeep is approximately the same as that of canals of large traffic, and the revenue increases proportionately to the amount of actual traffic. It is also well to point



out that the cost of maintainance of a canal for 1000 ton boats is approximately the same as that of a canal for boats of 600 ton cargo, yet the traffic capacity of such a canal is forty per cent higher. *Second*, for the securing of a sufficient amount of traffic, it is necessary that the canals possess satisfactory dimensions throughout the entire network of canals and rivers. The French canals have dimensions only large enough to admit ship of 300 tons capacity. Therefore traffic does not obtain an intensity which assures a satisfactory income and so cannot compete with the railways. The English canals have many different dimensions and therefore cannot be considered as a practical system of canals of water transportation. They are a conglomeration of different short canals built without a general plan for the whole network of waterways, and so cannot compete with railroads. *Third*, another condition not sufficiently appreciated which relates both to the securing of the quantity of cargo and to the income to be derived from its handling, is that a minimum lenght of haul on the canal or system of waterways must be from 300 to 400 kilometers. This point is well illustrated on the lower Dnieper where depth conditions are better than on the Volga, and where the ports both of departure—Alexandrowsk—and of arrival—Kherson—are better improved, where the adjacent country is richer than along the Volga and abounds in iron ore, coal and wheat, yet the traffic does not attain to two million tons. Under less favorable conditions on the Volga where no coal is transported, the traffic surpasses twelve million tons. This is because the lower Dnieper has only 300 kilometers of length from the waterfalls to its mouth while the waterway Volga—Marinski canal—Neva has more than 3000 kilometers.

Unquestionably then *the length of a waterway increases its traffic*. In the undertaking of the Baltic Black Sea System of waterways it is of great importance that waterways of the same dimensions which in Western Europe do not give satisfactory revenue, can be very productive in Eastern Europe where the great distances will assure them an intense and profitable traffic.

The waterway Silesia-Dantzig will be 650 kilometers in length, and the Dantzig-Kherson main canal and waterway 2200 kilometers. Joined as they will be to the German canals their length will be increased 1000 kilometers to the west. Then when connected with the Russian waterway the length will be further increased by many thousands of kilometers, and the traffic on such an enormous net of canals and waterways, will undoubtedly attain such intensity that the income and net earning capacity of the enterprise herein described, will be assured in a substantial manner.

The entire enterprise of the Baltic-Black Sea system of waterways of a total lenght of 3000 kilometers involves the following parts which should be executed gradually, according to politic and economic circumstances:

I. The Western part including the Coal Canal Silesia-Dantzig with branches to Warsaw and to Poznań. These waterways will create: a) the western junction of the future main waterway to Russia and to Black-Sea in three directions: with the Baltic-Sea (Dantzig), the German net of waterways (r. Warta) and finally through the Coal Canal with the Silesia and Tchecho-Slovakia. b) the necessary financial foundation for the further enterprise

which is assured owing to the traffic that will surely follow the building of this first portion of the canal system.

The detailed project of these canals is now beeing worked aut by the Ministry of Public Works. The society in formation „Coal Canal Silesia-Dantzig“ has in view realization of this project, as the most remunerative of the entire system of Baltic-Black Sea waterways. The cost of the enterprise (750 klm. of waterways) is estimated approximately at 70 million dollars.

II. The junction canal Vistula-Dnieper, total lenght 450 klm., is estimated to cost 35 million dollars.

III. The sea level canal from Dantzig (Gdańsk) to Tczew (Dirschau), 27 klm. will cost about 5 million of dollars.

IV. The termination of regulation of the Vistula between Toruń (Thorn) and Tczew will probably be executed by Polish government and will cost about 20 million dollars.

V. The canalization of the waterfalls of the Dnieper will cost approximately 20 million dollars, at least 500.000 H. P. beeing obtained.

VI. The regulation of the r. Pripiat and Dnieper needs an expense of at least 70 million dollars.

Thus we see, that the cost of the entire system of the Baltic-Black-Sea waterway, with its three western branches of a totale lenght over 3000 kilometers amounts approximately to 220 million dollars.

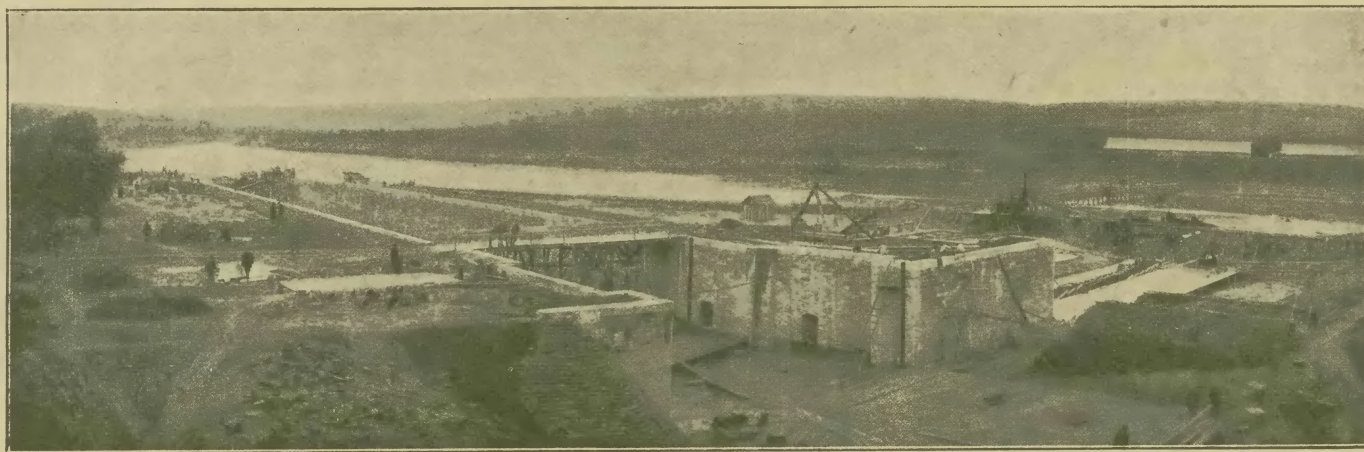
In this more or less technical treatment of the relation of the Baltic-Black-Sea canal and waterway improvement to the Russian and German waterways, all political and military considerations have been eliminated. We believe that existing conditions now warrant and demand the handling of this great European waterway undertaking as an International affair of first and lasting importance. With such a system for distribution in operation during the autumn of 1921, covering practically all of Eastern Europe and reaching the millions of starving in Russia, the famine conditions of the winter 1921 — 1922 would never have existed. With abundant yields of grain in Poland, Roumania, Serbia and Tchecho-Slovakia, amplified by stores from America, a constant stream of relief could have gone Eastward and millions of lives would have been saved. We believe the international character of this undertaking as well as its great power for good, will prevent its construction being longer delayed and surely this war tired world will welcome the beginning of such a construction where thousands will be employed and which will be conducted strickly along the most approved engineering and commercial lines. To this end the organizers of the undertaking as well as the undersigned, their coworkers, brought together by the Great War from the heart of Russia, the Ukraine, Poland and America, have pledged their best efforts for the realization of the greatest possibilities of this undertaking.

William I. Shuman

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Canalization of river Donetz in
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View of a lock in construction on the canalized river Donetz in Russia in 1913.

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