Direction: Rational use of natural resources.

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FROM SMALL PONDS TILL GIGANTIC ARTIFICIAL SEAS: HISTORY OF WATER RESERVOIRS CREATON IN THE WORLD

The large dams and reservoirs have multiple functions: hydropower, supply with drinking or industrial water, irrigations, pisciculture, leisure, etc. Let's start with the oldest times. The construction of the first reservoirs is associated with the emergence of a settled life and agriculture in arid and subarid regions. At least 4 thousand years ago the construction of reservoirs for irrigation of land in Egypt, Mesopotamia and China began.

The first reservoirs were created approximately 3000 years BC. in ancient Egypt under the pharaoh of the southern kingdom of Menes for the diversion of the Nile River from the site where the capital of the city of Memphis was being built at the time. Around 2300 BC the "famous and mysterious" reservoir of Möhris (south-west of present-day Cairo) was created, which Herodotus considered one of the wonders of the world. Around 2500 years BC on the river Tigr a Nimrud dam 12 m high was built. The dam of Karnalbo was built on the river Albarregas in Spain in the II century BC, and the resultant reservoir, with a volume of 10 million m3, still exists.

The creation of reservoirs continued at the end of the ancient period – in the first centuries of our era, mainly in such centers of civilization as Mesopotamia, Iran, the Roman Empire, etc. In West Iran, for the development of irrigation, the Shuster Dam was built. At the beginning of our era, thousands of ponds and small reservoirs were built in the Nabataean kingdom (on the territory of modern Jordan and Israel) to collect rainwater; The largest reservoir was located on the river Sig, in the then capital of the kingdom of Peter, and was formed by a dam 14 m high. From those times two dams were preserved (Schnitter, 1965). The scale of the hydrotechnical construction is presented by data on Iran, where in the era of King Darius I (VI century BC), in the interests of irrigation, 9 dams were created on the river. The creation of reservoirs of BC. was also carried out in East and South Asia – in China, Japan, India, Sri Lanka. In China, since ancient times, large works have been carried out on the construction of dams, dams, reservoirs, canals for irrigation and navigation. Of the known objects, one can point to the Gukov dam in the province of Shengxi (240 BC). In Japan in 172 AD. created a reservoir Kaermumatoyke near the future first capital, the city of Nara. In India, on the peninsula of Kathiyavar, about 300 BC. During the reign of Chandragupta, the Sudarsana reservoir was built (Schnitter, 1965). In Ceylon, for the purpose of irrigation, several water bodies were built, including the Great Dam (494 AD), and others.

In the Middle Ages (the end of the 5-mid-17th century), as the material production increased, the population grew and, accordingly, the demand for agricultural and industrial products increased, the rate of water management construction and the creation of reservoirs gradually increased. The construction of reservoirs for irrigation purposes in the arid regions of the world continued – in Middle-earth, the Middle East, South and East Asia. So, in Iran, dams were built for irrigation, water supply, river channeling, etc. The Bend-Emir reservoir is still in operation; it can serve as an example of an ancient complex object, since it was intended for irrigation and obtaining mechanical energy (at present the mill is replaced by a hydroelectric power station) and was used for navigation and water supply. The Karab reservoir in Central Iran has also been preserved, although it is strongly silted (Hartung, 1972).

In China extensive water management was conducted in the interfluve between the Yellow River and the Yangtze River in the interests of irrigation and inland navigation. In Japan for the period 522-1603 years. Approximately 30 reservoirs with dams above 15 m were built, and in the period of Japan's self-isolation (1603-1867) – 540 reservoirs with dams over 15 m high (Schnitter, 1965). In Ceylon in the Middle Ages, the now famous dams of Parakram (or Topava, 1186) and Padawil were built. In India, in the 11th century Madhya Pradesh built the Bhoepur raft, in Mysore near the town of Mandya, the motina of the Moti-Tala (now exploited).

In Europe, the creation of reservoirs was carried out at different periods of history. In the Middle Ages, this was associated with the development of crafts and fish farming. In the Czech and Slovak Republics to date, the reservoirs created in the XIV-XVI centuries are in operation: Dvorzhishte – 1367, Kharuzitsky – 1512, Rozhmberg – 1590. Here in the XVI century the total area of reservoirs and ponds was 1800 km2. In Poland, reservoirs began to be built also from the 16th century; up to the present time, 10 reservoirs created in the XIV-XVIII centuries are being exploited. In Germany, the first reservoirs appeared in the Ore Mountains in the Freiburg area (Grossharmensdorf – 1524, Oberer Hart – 1591) and in Harz (Toifelstaich – 1696). (Dubrovin, Matarzin, 1959)

Many reservoirs were built in the era of the industrial revolution and the development of capitalism in the XVIII - XIX centuries. An important role in this was played by the increased need for mechanical energy for spinning, weaving, metalworking, sawmilling, mining enterprises. Such reservoirs appeared in large numbers in Western Europe, Austria-Hungary, Russia (Karelia, Central district, Ural). In order to develop water transport, which required regulation of flow to increase low-cost costs and supply of multiple channels with water, reservoirs were created in England, Germany, and Russia.

The next stage of the creation of reservoirs began at the turn of the 19th and 20th centuries. in connection with the development of the electric power industry. The construction of hydroelectric power plants reached the greatest scale in Switzerland, Austria, France, Germany, Italy, Sweden, Norway, the USA, and Japan. More and more reservoirs were created for irrigation, flood control (especially in the USA, India, some European countries). Until the end of the XIX and the beginning of the XX century, mainly large reservoirs were created.

The problem of reservoirs in Ukraine is also very relevant. The largest rivers are regulated by whole cascades of large reservoirs. So, back in the 30s and 70s of the last century a cascade of 6 reservoirs was created on the Dnieper, in the 80's – two large reservoirs on the Dniester River (previously the Dubossary reservoir in Moldova was also created here). In total, 1103 reservoirs with a total capacity of 55.3 km³ have been created in Ukraine, as well as a number of ponds on small rivers. Their role is great for electricity generation, water supply, irrigation and other branches of the Ukrainian economy. At the same time, acute environmental problems arise during their operation. This makes it necessary to revise the entire strategy for the use of water resources in Ukraine, as well as to develop a set of measures to improve the ecological status of these artificial reservoirs. Some of them, obviously, must be simply eliminated.

Despite the millennial history of construction, reservoirs with good reason can be called the product of our century. The total volume of all the reservoirs of the planet that existed at the end of the nineteenth century was only 15 km. Now only one Bratsk water reservoir on the river. Angara has a volume of 169 km^3, which is 11 times more than the volume of all the reservoirs of the planet that existed at the turn of the two centuries. (Avakyan, Voropaev, 1986) The present stage of the creation of reservoirs began after World War II.

During this period, reservoirs are created in almost all countries of the world, but especially in the socialist countries, including the USSR, in developing countries, as well as in some capitalist countries such as Spain, USA, Canada, Australia, Norway, Sweden and other.

The regulation of the flow began mainly to solve complex problems: the development of hydropower, water supply for urban agglomerations, industrial areas, large irrigation systems, and also to create conditions for rest and improve the ecological condition of large natural objects and areas. During this period, water objects were created and are being created practically in all countries of the world. According to the data of AB Avakyan (Avakyan, 1987), the creation of reservoirs has acquired a massive and widespread character over the past 50 years, when their number on the globe has quadrupled, and the total volume has increased 10-fold, including in Latin America – 35 times, Africa – 60 times, Asia – 90 times. During this period, all the largest reservoirs of our planet were built.

The dams and reservoirs have been built for multiple purposes: supply with drinking or industrial water, irrigations, water for animals, pisciculture, hydropower, transport, leisure, etc. The first reservoirs were built in the Near and Middle East, because of the water deficit. The first ponds on the Romanian territory were constructed in the Moldavian Plain and they were mentioned in documents as early as the reign of Stephen the Great. The most numerous and the largest ponds in Romania are situated in the Moldavian Plain (counties of Botoş ani and Iaş i) and in the Transylvanian Plain (counties of Cluj and Mureş). The current reservoirs are large-sized and they have complex functions. The largest are used mainly for hydropower. They are built in mountainous or isolated areas because they occupy significant surfaces (North America, Asia, South America, etc). On the Romanian territory, there are 246 large-sized dams which harbour reservoirs comprising important water reserves.

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