

## THE HISTORY OF WATER MANAGEMENT IN THE CENTRAL TISZA REGION

The round 7.200 sq. km area known as the **CENTRAL TISZA REGION** is formed by plains crossed by a 1800 km long central section of the River Tisza between Tiszafüred and the mouth of the River Körös. Precisely delimited both geographically (hydrographically) and economically, as well as historically, it is a typical lowland, where life and development have at all times been determined by waters.

County Szolnok occupies three-quarters (5,571 sq.km) of its area, the rest including smaller parts of the adjacent counties, such as the historical regions of Cumania and Jazygia (Fig. 1).

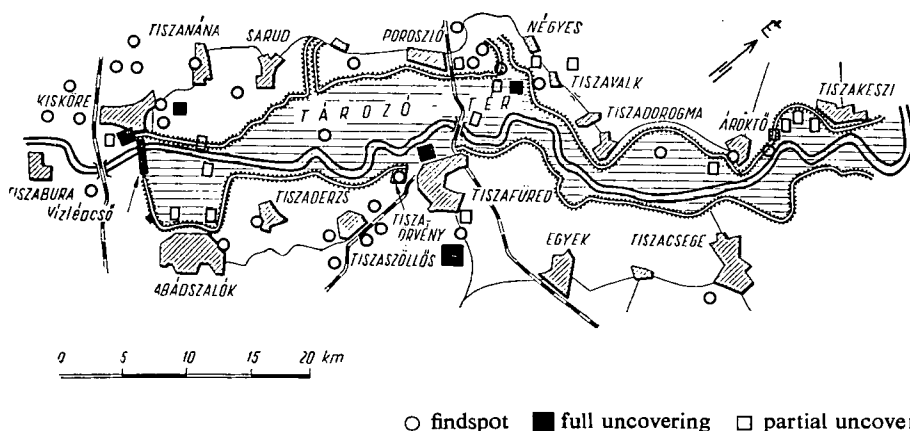


Fig. 1. Archaeological findspots of the basin of Heves (Kisköre Reservoir and environs) with the Árpáadian-Age settlement at Tiszaörvény (fishing-village and harbour.) The floodfree high places of the basin have been inhabited areas since the migration period (Age of Völkerwanderung). On the basis of the map of János Damjanich Museum, Szolnok).

The three principal periods of water management in the region, namely (I) "THE ANCIENT WATER USES OF THE FEUDAL AGE", (II) "THE AGE OF THE SYSTEMATIC REGULATION OF WATERWAYS" and finally, (III) "THE AGE OF SOCIALIST WATER MANAGEMENT", must be considered



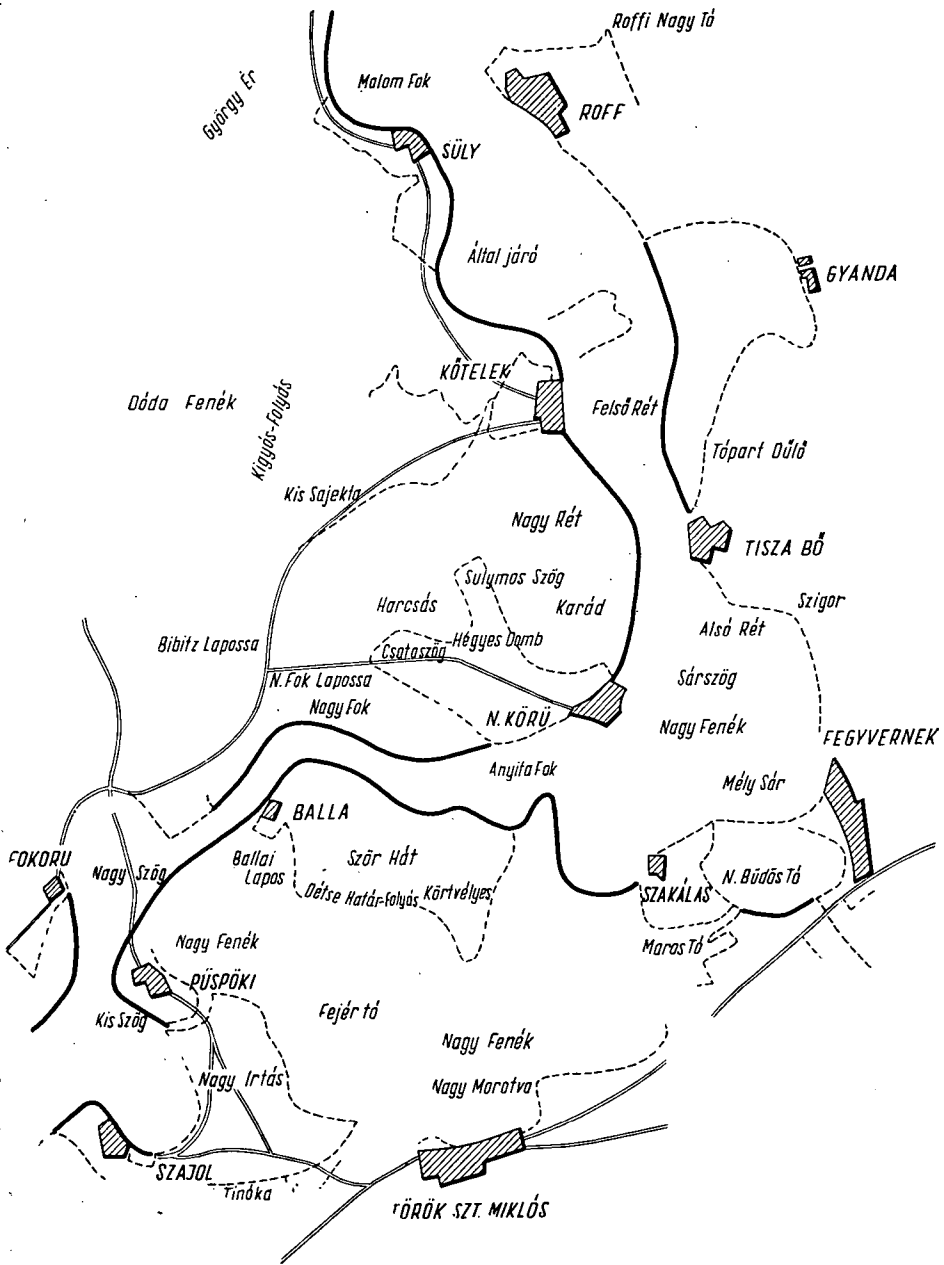


Fig. 2a. Lower part of the natural flood reservoir of the Heves basin between Kisköre and Cserököz. Hydrography of the area covered with the network of headlands, rills and stews. (Map of János LITZNER and József SÁNDOR on the conditions before the river control, 1776. Eger, Á. L. County Heves. Lt. T 117)

In fact, such studies have shown the rainless Hungarian Plains and especially, the driest Central Tisza Region to have always depended on the runoff from the adjoining areas abundant in precipitation and rivers. Of course, the general pattern has been familiar for long, but the specific impacts of the floods carried by the rivers and other watercourses on the economy and development of the area was revealed in recent times only. This implies the disclosure of the possibilities, the means and the methods of flood utilization, in other words, the way flood plain farming was performed.

As a matter of fact, the entire economy of the area was based on the life-spending floods of River Tisza and the Körös system: they provided the natural storage irrigation in Spring for the rich and manifoldly utilized lands surrounding the settlements both on the edge of the high banks and on the islands in the flood plain. Before field growing of cereals (i. e. bumper crops) became wide-spread, floods have caused damages in extraordinary cases only. The high waters were distributed, "spread" by the overflow points of the river, brooklets and intermittent streams and the flood water found natural storage in a great number of abandoned oxbow bends, lakes and other depressions covering densely the area. This, on the one hand, has moderated the intensity (and the height) of the flood waves and, on the other hand, has stored the water for plants and animals in the dry season. Up to the second half of the 18th century, this region of the country was the most abundant in lakes, pools and brooklets connecting them, where fishing and fish pond culture flourished since the 11th century (the age of the Árpádhouse). The famous nomadic cattle breeding in the region, first of all in the plains on the left-hand side (Great Cumania and the adjoining Hortobágy) was based on the irrigation of pastures and meadows by the annual floods, as demonstrated long ago by the ethnographic studies of István Györffy. It is also due to the conditions described that willow, poplar, further reed and rush, etc. have become the principal raw materials for popular architecture and handicraft. In addition, waters also played an important role in other regards in the economy of the region: in ancient marsh fishing and poultry breeding in the settlements around the flood plains, just as in ancient hemp and flax farming, as well as in the famous tobacco farming of Heves which spread in the 18th century, or in the vineyards and orchards known already in the Middle Ages. (Namely, these were planted on the slopes around the flood plains, displacing the ancient gallery-forests in order to make use of the humid micro-climate and of the irrigation possibilities for tobacco farming.)

Even in this region so abounding in waters, ponds and lakes were most numerous — besides the Sárrét in the Körös-Berettyó area — in the Heves basin on the northern, and in the Alpár basin on the southern margin of the region, where a series of fish ponds surrounded by meadows, pastures and gallery-forests, used since the age of the Árpáds abutted on one another.

In present water management planning efforts are made essentially to make use of these natural conditions — once utilized by autochthonous agriculture but later forgotten for a time offering unmatched possibilities even in our days: through the storage of water by means of the Tisza barrages (Kisköre and Csongrád), as well as by the so-called flood retention reservoirs moderating the flood peaks in the Körös River system. In like manner, the example shown by nature and its ancient utilization is followed by the network of the (Cumanian and Jazygian) main irrigation canals and the adjacent irrigation schemes on the right- and left-hand banks. (Of course, this is performed at a higher level in accordance with the possibilities and the technological standards of our days, and moreover, by multiplying the old possibilities of economic utilization and by bringing the old means and methods to perfection (Fig. 3).

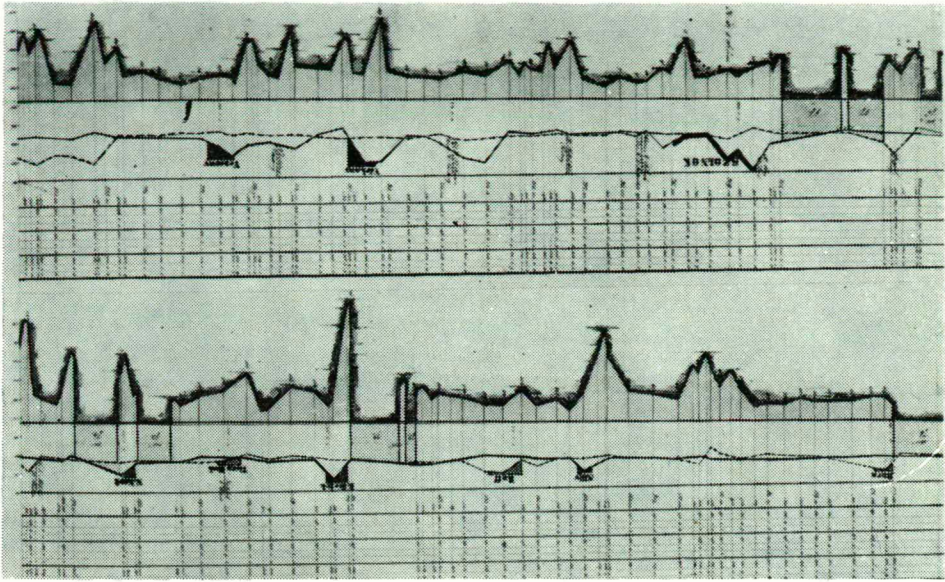


Fig. 3. The development of settlements was not impeded but promoted by waters: a large part of the settlements in the Middle Tisza Region are riverside settlements — coming into being at the edge of the Tisza flood-plain (From Pál Vásárhelyi's Tisza-control longitudinal section. OL. Vizr. Int. Tisza 38).

### The age of systematical regulation (1846—1944)

During the 100 years indicated in this title, water regulation has played a decisive role in laying the foundations of economic development and in opening the way for capitalist-type commodity production. Obviously, owing to the conditions of the region described earlier, the solution of the various regulation and reclamation tasks called for a considerably larger amount of work than elsewhere.

This is illustrated by the fact that the numerous cuts carried out in the whole Tisza Valley in order to accelerate the passage of floods have shortened the course of the river by 37 per cent on the average whereas, in the area considered, by 42,7 per cent.

The flood control and land drainage activities of the water associations organized by local interests have extended to more than 50 per cent of the area: 360 000 hectares of flood plains were reclaimed and made arable the construction of by 612 km of flood levees. An especially immense and rather lengthy work has carried out to correct as far as possible the trace of the levees following the meandering river and to develop a relatively regular flood bed. The last major section of the flood plain at Fegyvernek incorporated into the control system as late as 1925 only. Still, the widest flood bed in the whole Tisza Valley is in the region, in the Heves basin and is utilized presently as the Kisköre Reservoir (Fig. 4).

Likewise, *low-water regulation* serving the interests of navigation was needed primarily in the Central Tisza region.

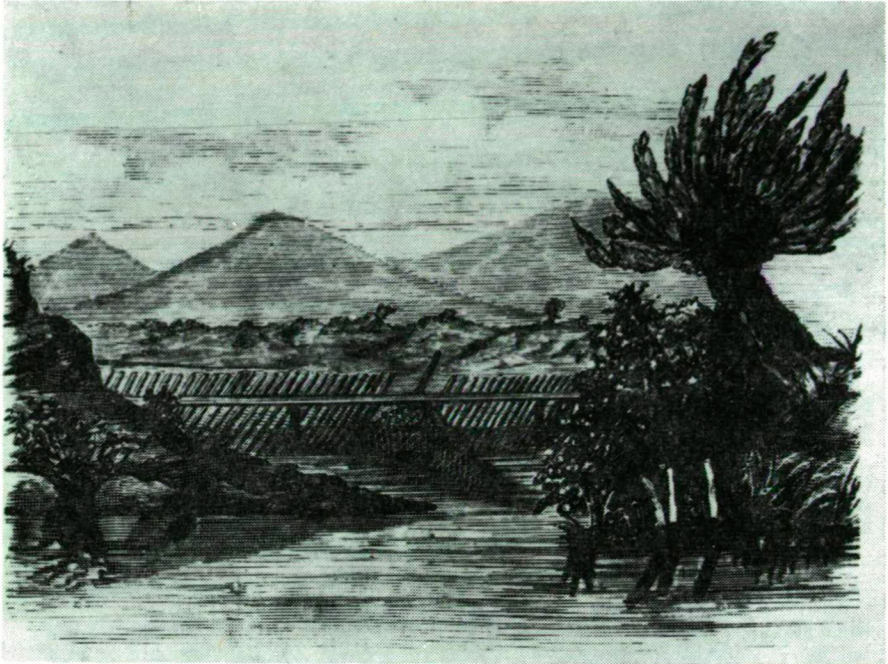


Fig. 4. The so-called headland which had a central part in the ancient flood-plain farming. (After OTTÓ HERMAN)

The extent of *land drainage* which was commenced chiefly in the 1870's also by water associations is characterized by the canal network of 3,133 km length and by a large number of pumping stations draining 260,000 hectares. For some associations the area of the flood plain controlled was the same or almost the same as reclaimed by drainage. The first drainage pumping station in the Tisza Valley was built in this region in 1879 (Vol. 2, Fig. 26).

The comprehensive programme of István Széchenyi (1791—1860) the promoter of systematical reclamation, aimed at *watershed regulation in the Tisza Valley* (1846), could however, be realized in part only under capitalist conditions (Vol. 2, Fig. 26). In the interest of commodity production controlled exclusively by market considerations, the water engineering works were confined to flood control serving field growing of cereals (extensive farming with the lowest manpower and capital requirement) and later on, from the 1870's and 80's to land drainage. The neglect of river regulation, which is inseparable from flood control as well as the grave errors committed were not remedied until the turn of the century, on the basis of the *long-range work programme* (1891) of Jenő Kvassay (1850—1919). The elimination of damages caused by waters, which implied only one side and the first steps of Széchenyi's Reform Age concept, was eventually distorted to a one-sided attempt "to get rid of waters at all costs". All this happened in spite of the fact that it was not only the promoters who saw the complexity of the tasks involved but also, as early as at the end of the last century, Kvassay very definitely drew up the future's water storage and water resources management tasks. (To illustrate how much a project may differ

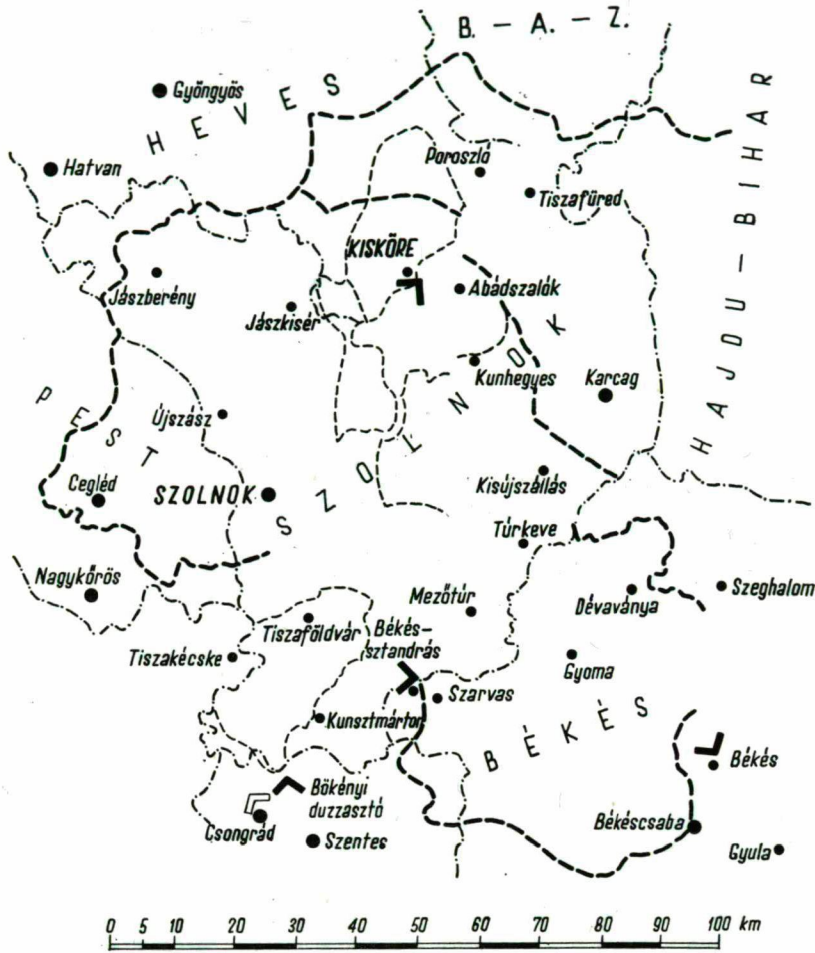


Fig. 5. Flood-plain settlement-conditions of the area below Kisköre, before river-control. After Sámuel Lányi's survey of 1833—1845. (Planned by ZSIGMOND KÁROLYI, drawn by ÉVA VICZIÁN)

from and, more than that, turn against the intentions and the objectives of its initiators, the history of the Tisza regulations provides a very characteristic example: the works carried out did not only impede but, virtually, put an end to the water uses of be developed in the first place, such as navigation, irrigation, fishery and pond farming and, for a time, they even removed the possibilities of not only their development but also their practice.

For this distortion of development the mechanism of capitalistic commodity production was responsible. Where production is controlled by the interests of a remote market and development turns against the local conditions and requirements, where profit is the only objective of production and the sole measure of its effectiveness, there, beyond exploiting manpower, this self-determined mechanism with its ruthless exhaustion exploits nature itself in the same way. Together with its other inherent contradictions, it leads inevitably to disturbances in the balance between



Fig. 6. Characteristic village on the Tisza-banks, in the middle of the 19th century. Contemporary cut.

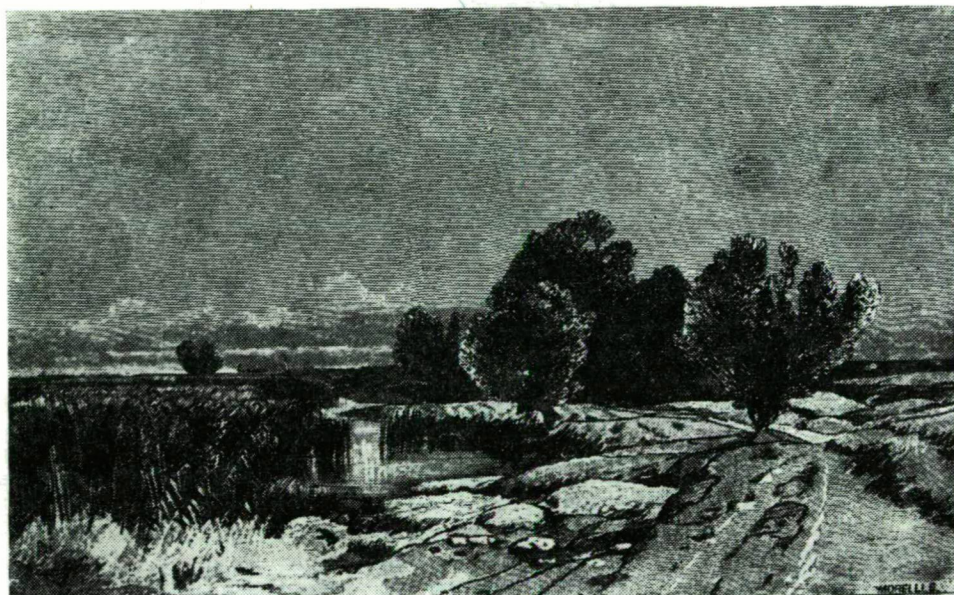


Fig. 7. Characteristic flood-plain reed-bank and willow-poplar grove in the middle of the 19th century. Contemporary cut.

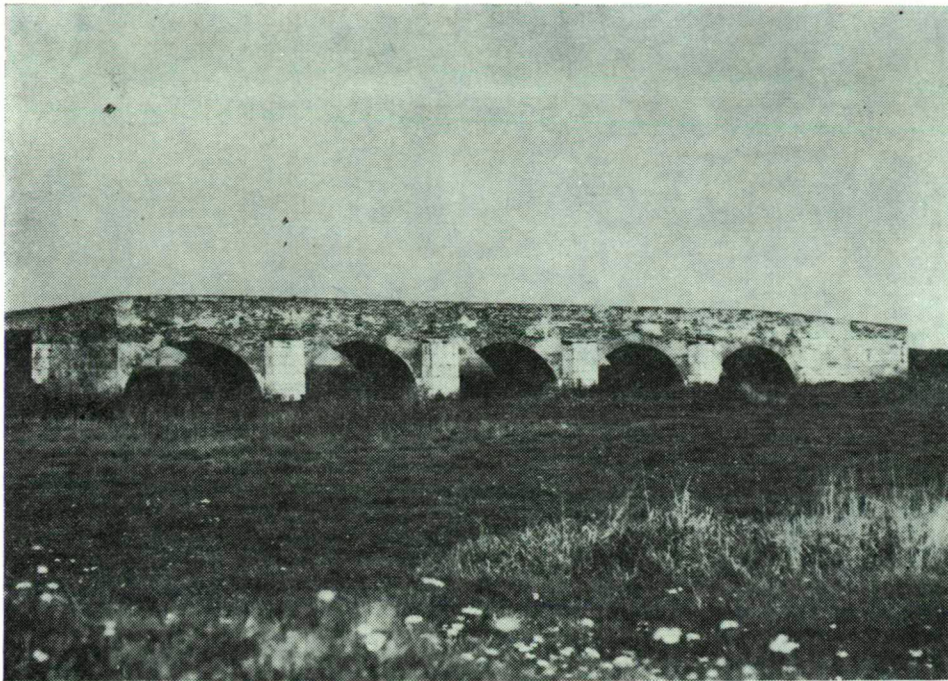


Fig. 8. The Zádor-bridge was at its building (1805—1809) the longest bridge of the country; it bridged over a bigger water-course than the Hortobágy. Its two outermost arches were washed away by the extraordinary flood in the Tisza-valley in 1830. Since then — after the formation of the system of dry farming (“agger”)—it stands dry in the middle of the steppe (“puszta”), east of Karcag, at the edge of the Hortobágy National Park. The former bed of the Zádor has fully filled up and disappeared without any trace.

the natural environment and society, as it has become widely known from recent ecological studies.

As a particular, local reflection, of this general law no advanced water utilization in accordance with the ancient water uses based on natural conditions and centuries of experience, such as navigation, fishery and pond farming, irrigation and animal breeding on irrigated pastures etc., could develop. Moreover, together with the dissolution of the ancient forms, in fact, as a result of flood protection itself, all activities of this short gradually came to an end.

This was why the *irrigation programme* (1937) initiated in 1931 by ELEMÉR SAJÓ (1875—1934) (Vol. 2, Fig. 36) who in his attempt to find a way out from the impasse, returned to the Reform Age traditions, could not get — even up to the present — beyond the introductory-preparatory stage. (The situation and tasks of the water service were aggravated by the advent in 1940 of a wet period with extensive precipitation, floods and excess runoff, causing damages unprecedented in the first half of the century.)



Fig. 9. Characteristic Tisza headlands on the confines of Tiszadob and Tiszalucz — among them the headland at the Hortobágy and Zádor. On August 27, 1846, on the old proposal of MÁTYÁS HUSZÁR, the work of Tisza-control began here. (Detail from Pál Vásárhelyi's Tisza-control longitudinal section, 1845)

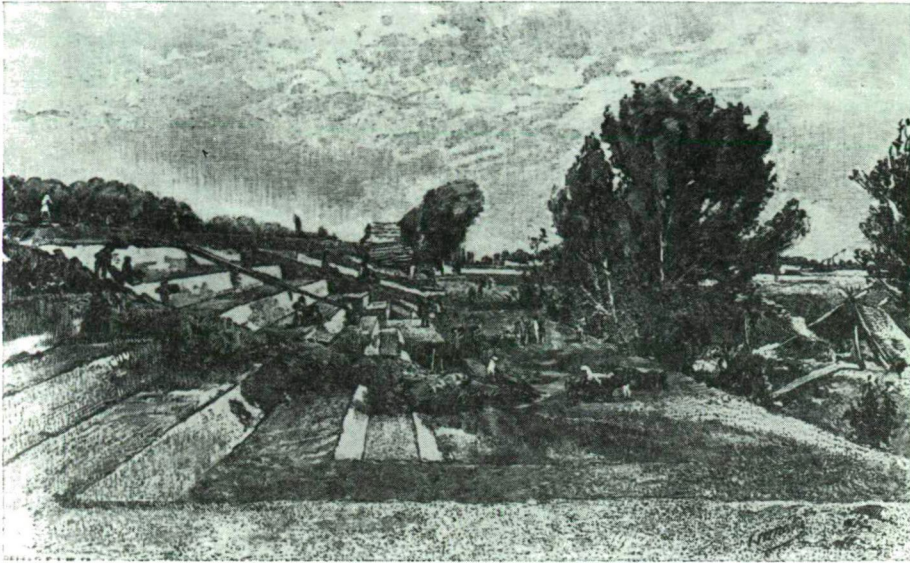


Fig. 10. Works of dam-development at the Tisza in the 1880s. (Contemporary cut) (KTV II, Fig. 22, p. 67)

### **The impacts of the socialist water management (1945—1975)**

It was on these bases, burdened with this heritage and, under conditions aggravated by the destructions of war, that the reorganized water service started its activity in 1945.

The efforts at the rapid reconstruction of the destroyed flood control and drainage works by which the grave dangers of the floods in the years 1945 and 46 were averted are comparable to the memorable success of flood protection in 1919. (To appreciate this achievement it should be taken into account that owing to wartime evacuation, the local water organizations were deprived of the upper technical guidance in the most crucial moment.)

More recently major flood control works were carried out in the Szolnok area, mainly along the river Zagyva and on the right-hand bank of the Tisza River. Besides preventive measures and good organization, this has also contributed to averting from the region the dangers of the great flood on the River Tisza in 1970.

The main *obstacles* to irrigation farming were removed as the distribution of land made an end to feudal property conditions. At the same time the introduction of planned economy has offered new *possibilities* for the realization of old ambitions and projects. The difficulties of reconstruction and the voluntarist tendencies in the economic policy have, however, guided development towards objectives and at a pace, which proved economically and technically unsound and unfounded. Nonetheless, the work inspired by the long-awaited possibility to achieve the old projects yielded significant results, even in spite of the disturbing elements.

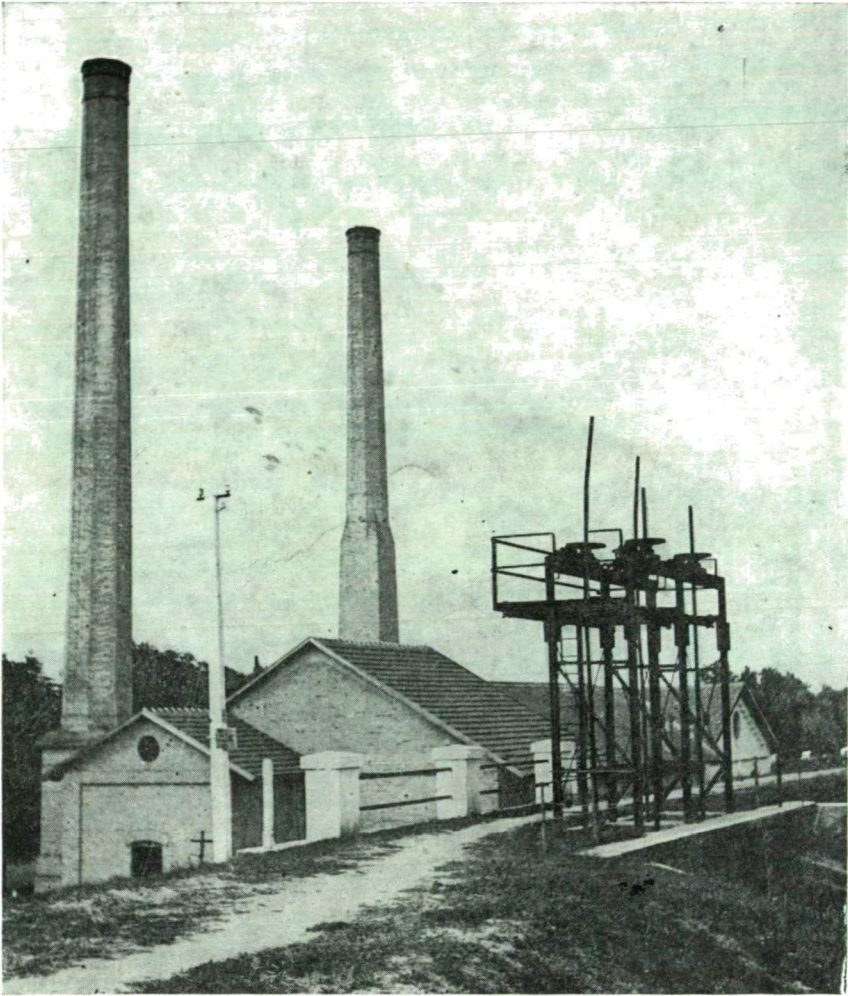


Fig. 11. Pump station at Sajfok, built in 1878. Its first machine unit was still to be brought from England. The later ones were already delivered by Hungarian factories. They are in good working order even today, fulfilling an auxiliary role. (The pump station is "a technical memorial")

The work of the water service was always flexibly adjusted to the requirements and tasks as they arose and provided the appropriate conditions for their solution. of the major technical innovations of the transition period mention must be made of the mobile pumps (Kienitz pumps) that proved indispensable in both land drainage and irrigation; of the introduction of floating diversions (1948); and the use of the Kund-type trenching plough in the construction of irrigation plants. The overloading of the drainage network, which was used also for irrigation (i. e. the delay of the separation of the two systems), and rice growing as monoculture for the utilization of alkali soil areas, has, however, soon slowed down the pace of development.

In spite of the practical errors, the early stage of irrigation development has positively demonstrated that no economic evolution of the region is possible without the most wide-spread use of irrigation farming.

Simultaneously, the need of developing also the traditional form of fish pond farming to utilize the conditions of the area in a highly reasonable manner, for the retention of excess runoff and for the storage of irrigation water has been generally



Fig. 12. The "thirsty earth". A characteristically hard ground with rents, in the time of dry farming in a year of drought — in the Nagykunság.

recognized. (Up to 1975, 25 fish ponds have been established with a total area of 1,884 hectares.)

The development of agricultural water utilization, first of all of irrigation, as well as of water resources management in the area has been made possible by the largest and most significant project not only in the canalization of the River Tisza, but also in the entire Hungarian water management, namely the Kisköre barrage and its reservoir

The storage lake above the barrage, with a surface of 127 sq. km, will provide a storage capacity of 300 and 400 million cu. m. by the end of the second- and in the ultimate — stage, respectively; with its rate of flow of 144 and 175 cu-m/sec, respectively, it will supply water for round 300,000 hectares of irrigated land and 12,000 hectares of fish ponds.

The barrage is, however, more than a project of purely agricultural interest, in that it contributes also to both industrial and domestic water supply. The latter

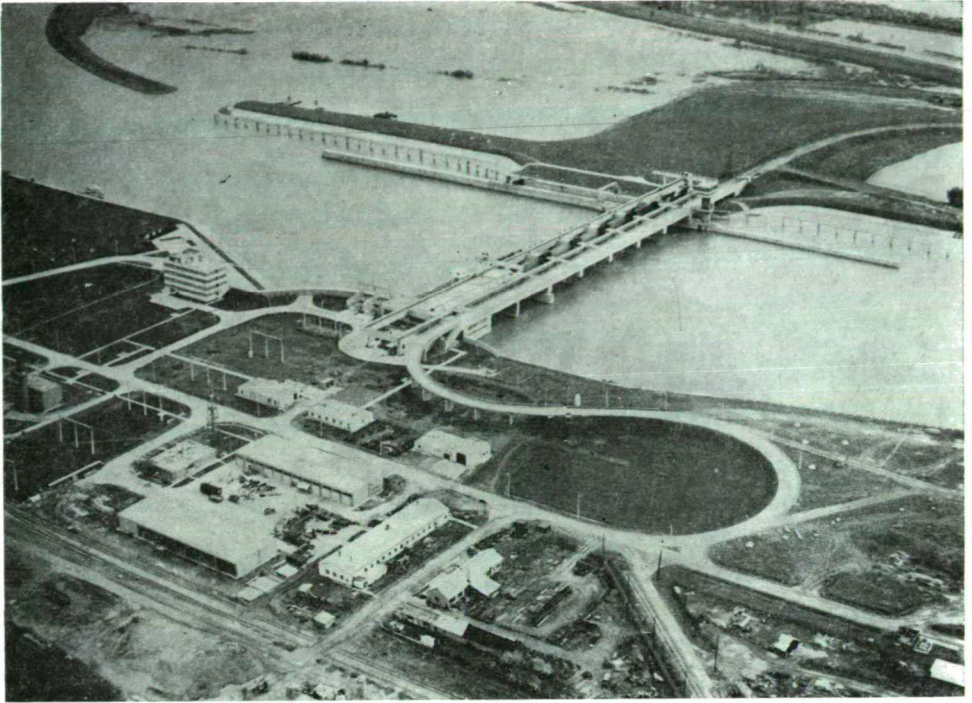


Fig. 13. Our largest hydraulic establishment, the Kisköre River Barrage, prepares the ecosystem change from dry farming towards irrigation. (Its reservoir is under filling)

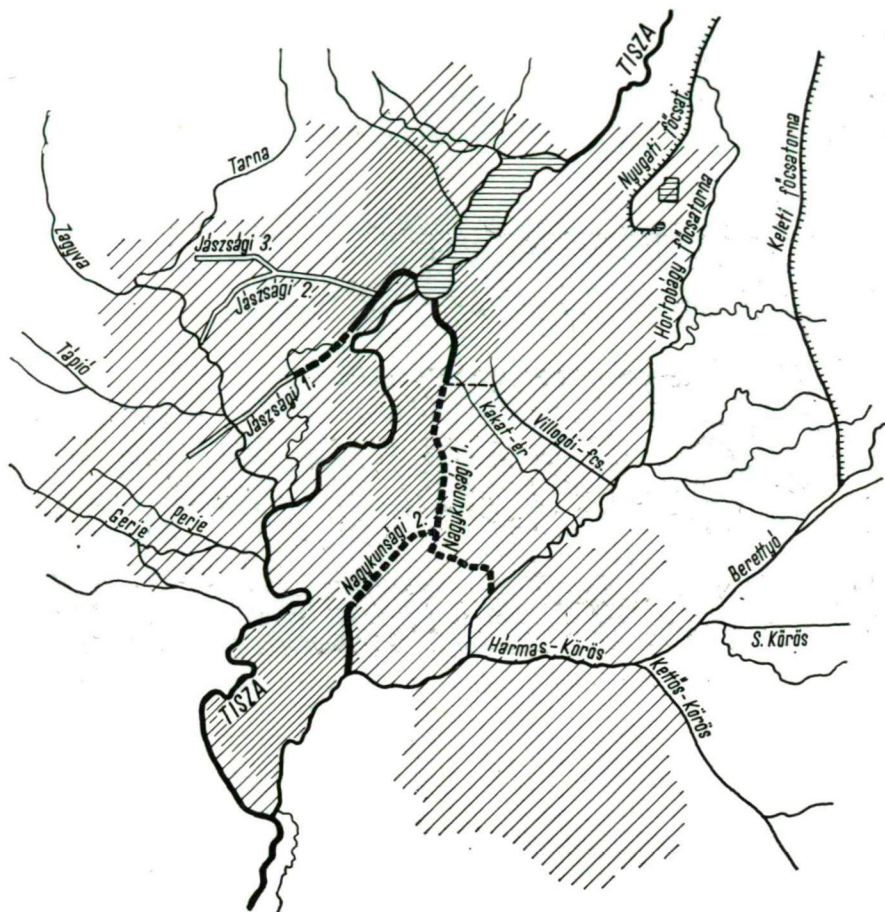
contribution is an indirect one, since by meeting other demands ground waters of potable quality are liberated for domestic purposes. Thus as the most significant storage lake in this country so far, it is the *first large project of new, advanced water resources management based upon storage*, which offers the only workable solution under the conditions of our country. It is of extraordinary theoretical and practical importance as the starting point of regional development in the Central Tisza Region.

(It will meet the water demands in the area up to the completion of the Csongrád Barrage and the Danube—Tisza—Canal.)

As a multi-purpose water management project, the barrage represents a considerable progress also in the development of waterways, through extending the navigable reach of the Tisza River by 120 km. Its hydroelectric plant doubles the country's water-power utilization, and beyond improving project economics, the energy produced is very significant, especially from the local, or the regional view-point (103 million kWh/year).

It is also worth mentioning that the potentialities are open for a completely new recreation area capable of accomodating 50,000 people along the 40 km long shore of the storage lake and in this context, the lake will help of solve the environmental problems of the region.

Besides the development of irrigation, as well as of storage — and water resources management, the most important progress has been made in the field of public utility water supply.



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 ////////////// having functioned already in 1975.

Fig. 14. The Kisköre River Barrage and its irrigation works. A well arranged plotting of the main works and irrigations (1975).

The expansion of water works, based on an abundant source of supply, has become an especially effective factor in the development and “urbanization” of the town *Szolnok*; it is the indispensable basis for improving domestic water supply and for growing industrialization alike.

The once densely populated and important Jazygian-Cumanian towns (*Jászberény*, *Karcag*, *Kisújszállás*, *Túrkeve*, etc.), which rivaled even *Szolnok* in size and economic significance, have gradually slowed down in development, lacking comparable sources of supply. The limits of their water works with drawing water from deep confined aquifers are the limits to their urbanization and industrialization as well. Consequently, it is urgent and of vital importance for improving their adverse position to establish the “Central Tisza Regional Water Supply System”, which will be of the same basic importance for the future of the area as the *Kisköre* barrage and storage lake.

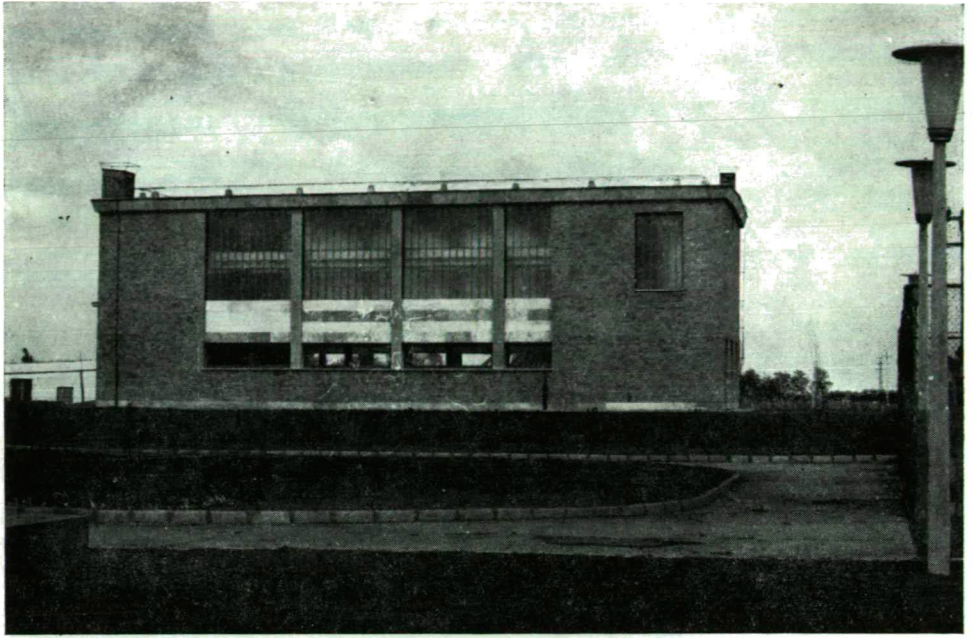


Fig. 15. Automatic centre of pressure of an up-to-date irrigation plant at Kisujszállás.

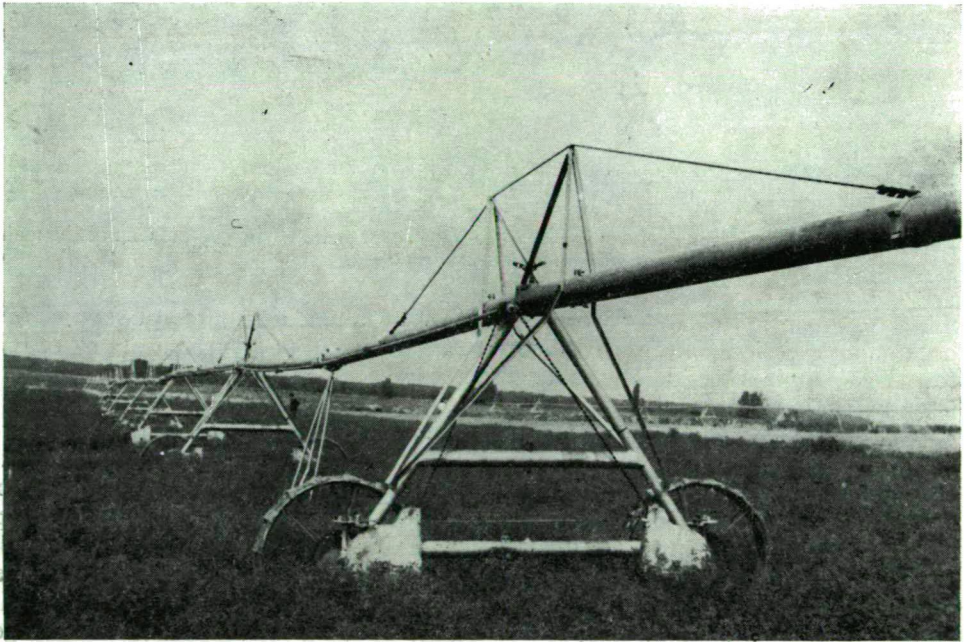


Fig. 16. Up-to-date raining plant of machine transplantation into the Nagykunság.

- NK XII border of irrigation plant
- ////// sprinkling plant at Mezőkéke
- ||||||| sprinkling plant at Tiszaföldvár
- ////// sprinkling plant at Kungyalu
- irrigation channel
- pressure centre
- ⊗ provisional floating drainage

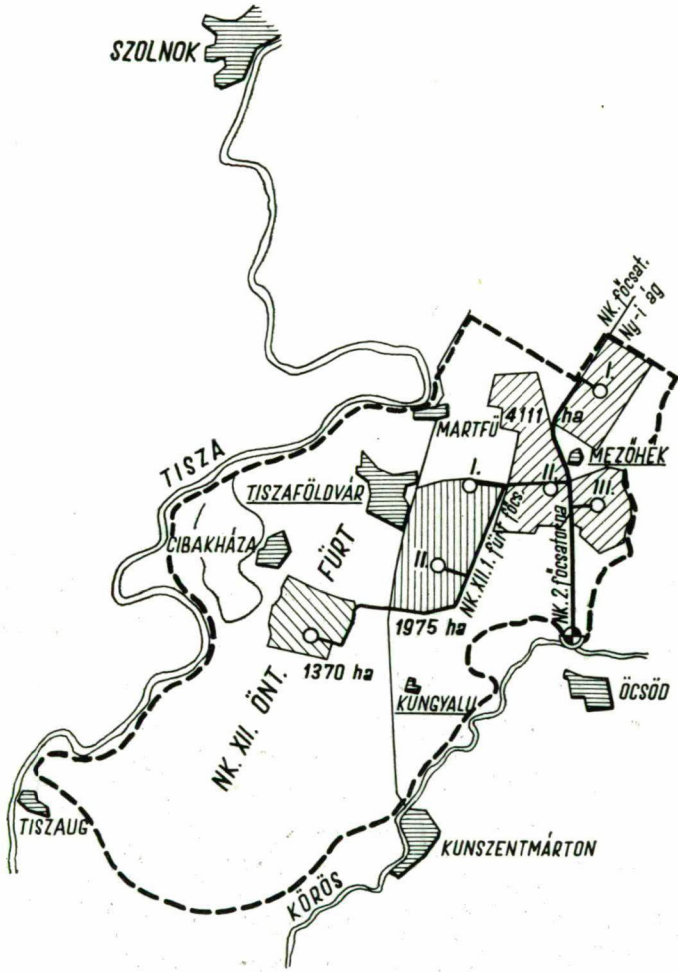


Fig. 18. Provisionary float-governed water-hoisting of Main Channel NK—II at Öcsöd



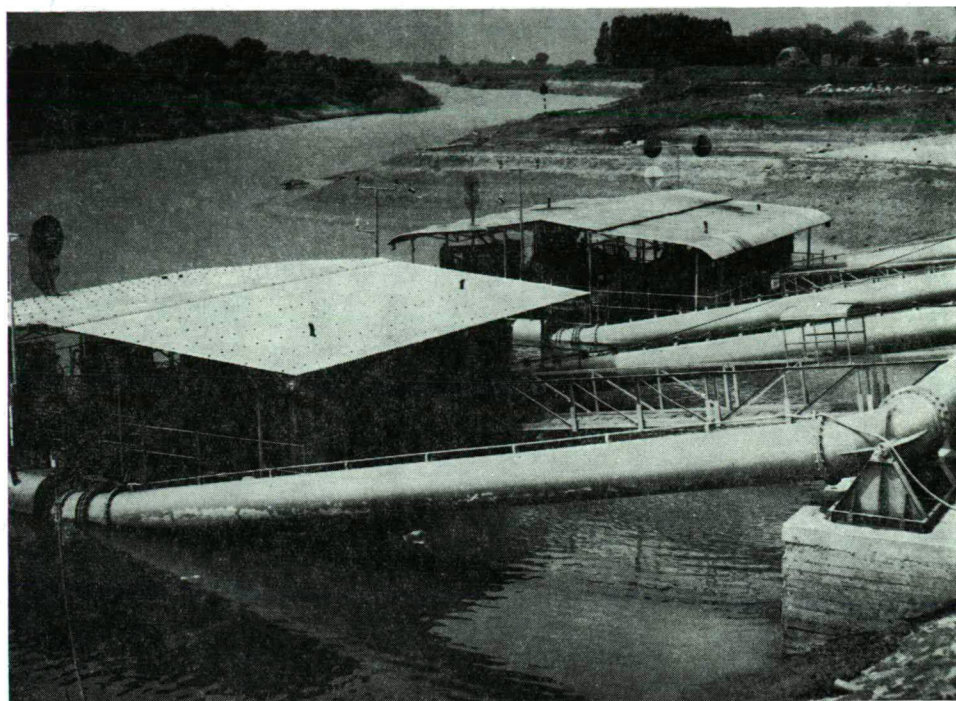


Fig. 17. Irrigation plant NK—XII — in the Nagykunság, built in the most fertile region of the country.

From the analysis of the 30 years of water management development a very essential conclusion can be drawn; namely, the building up of socialism (i. e., socialist industrialization passing through the same course of development as the first industrial revolution but in a planned and accelerated way) has arrived at a new period, which is characterized by the worldwide process of the “second industrial revolution” (i.e., the technical-scientific revolution) and urbanization.

As a consequence of this evolution, the Central Tisza Region considered underdeveloped not long ago is also confronted with all the typical problems of this new period, including besides water management and pollution control, the general problem of environment protection as well.

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