

CHAPTER IX.

CANALS, DRAINAGE AND EMBANKMENTS.

CANAL irrigation in this district is carried on from streams ^{CANALS} which have been utilised for irrigation by letting water into them from the Eden Canal in the Burdwan district. This canal, ^{Eden Canal.} which is named after a former Lieutenant-Governor of Bengal, Sir Ashley Eden, who opened it in December 1881, takes off from the Damodar above Burdwan town and falls into the Kana Nadi and Kana Damodar at Jamalpur. From it the water of the Damodar is passed by means of weirs and sluices into several silted-up channels, such as the Kantul, Ghia, Kana (or Kunti) and Kana Damodar. The Eden Canal is classified as a work for which neither capital nor revenue accounts are kept, and was constructed in order to bring a supply of fresh water for sanitary purposes from the Damodar river into the natural channels and old river beds of the Burdwan and Hooghly districts; for those districts having been visited in 1861-62 by a severe and highly fatal epidemic of fever which was attributed to the stagnant and insanitary condition of the water-courses. In 1873 the first step towards the construction of the canal was taken by opening out the head of the Kana Nadi, and in 1874 cuts were made connecting this channel with the Kana Damodar and Saraswati. The work was carried out piecemeal, and the complete scheme consisted of (1) a head sluice at Jujuti, admitting the water of the Damodar to the Banks Nullah; (2) a weir in the Banks Nullah at Kanchannagar, with a head sluice admitting the water to the Eden Canal, which, after a course of about 20 miles roughly parallel to the Damodar river, delivered the water into the Kana Damodar and Kana Nadi at Jamalpur, and (3) various subsidiary works. There are also a cut connecting the Kana Nadi with the Saraswati near Gopalnagar, with the necessary regulating works, and two distributaries, which were constructed about the year 1896.

The scheme was designed as a work of sanitary improvement, and not as an irrigation project; but the practice of irrigating from the canal sprang up very soon after

the canal was opened. In 1882 a great demand for water arose and 20,000 acres of rice were irrigated by flow from the canal, while in the two following years the acreage rose to 40,000 and 70,000 acres, respectively. So far, no water-rates had been charged, but it had by this time become evident that a system of irrigation on this scale could not be carried on without involving Government in great expense on account of silt-clearing, management, distribution and other details of maintenance and construction. Irrigation was effected from the system of natural channels and *wadis*, as well as from the canal itself, and the rights of Government in the beds of these channels were not established. A lengthy discussion ensued as to how expenses were to be recouped. It was proposed that the zemindars interested should subscribe, but they failed to agree. In 1886 definite proposals were made by the Commissioner for the entertainment of a small special revenue establishment and the levying of a water-rate at 4 annas a *bigda* (i.e., $12\frac{1}{4}$ th annas per acre). Water was to be supplied on agreements: but as agreements for a sufficient acreage (about 53,000 acres) were not received, the matter still remained unsettled, though some water was supplied.

While the course to be adopted was still under discussion, a tentative system was introduced by the Executive Engineer and his subordinates, under which water was supplied under private agreements, entered into with representatives of the villages, on the condition that a number of contiguous villages submitted applications for water, stating the area to be irrigated and paying the water-rates in advance, excess areas irrigated being paid for subsequently. The scheme succeeded and developed into the present system of irrigation. Water-rate rules under the provisions of the Irrigation Act were issued in 1893, and revised rules appeared in 1898. Under these rules provision is made for the supply of water on the long-lease system, season leases being also allowed and other areas supplied by single waterings. The system of advance payments, except for *rabi* and single waterings, has disappeared.

The annual receipts averaged Rs. 26,594 in the three years 1902-03 to 1904-05, and Rs. 23,385 in the three following years 1905-06 to 1907-08; while the annual expenditure averaged Rs. 29,359 and Rs. 32,394, respectively, thus resulting in a deficit. The area irrigated averaged 27,535 acres in the first triennium, and 22,854 acres in the second (1905-06 to 1907-8). The decrease is due to intentional restriction of the irrigated area on account of the uncertainty of the supply

from the head sluice at Jujuti: a scheme is under consideration for the increase of the supply by the construction of a weir across the Damodar river.

Apart from its utility for irrigation, this work has proved beneficial, from a sanitary point of view, to the villages on the banks of the channels which it flushes, as it ensures a supply of fresh water from the running stream of the Damodar.

In December 1894 the District Board submitted a scheme for the canalization of another dead river, the Kauski, 18½ miles long, and asked Government for a contribution of half the cost. The Government expressed its willingness to undertake the work on payment of half the cost, but, the estimate having been raised to Rs. 72,000, the Board gave up the proposal. The scheme was revived on the application of the late Baba Bāmacharan Bhar of Haripal, a wealthy Calcutta merchant, who generously offered a contribution of Rs. 30,000, and subsequently raised his offer to Rs. 35,000. The project has recently been sanctioned by Government, the estimated cost being Rs. 60,259, and the work is under construction. The District Board has contributed Rs. 8,500 towards the cost, and the balance is to be paid by Government. Schemes for canalizing other silted-up channels are also being considered.

The only drainage works lying entirely in the district are those designed for the drainage of the Dankuni marshes. These marshes, which are about 13 miles long from north to south, are situated in the Serampore subdivision. They consist of a chain or series of *jhils*, i.e., swamps wholly or partially covered with water, which lie between the Hooghly and Saraswati rivers. The total area of land between these rivers is about 70 square miles, of which 8 square miles drain direct into the Hooghly, while 62 square miles form a basin, in the central part of which are the Dankuni *jhils* occupying an area of 27 square miles. This latter area was not only a reservoir for the rainfall which falls over the 62 square miles, but the lowest part was nine feet below high-water level during the rainy season; and prior to its being drained, when the Hooghly was in flood, the tides flowed through the Baidyabati and Bally Khals and raised the level of water in the *jhils* to 15 feet in the month of August, the beds of the *jhils* being about seven feet above mean sea-level. The area of cultivated land varied with the seasons, the minimum being 10½ square miles and the maximum 27 square miles, but a part of this doubtful zone was irregularly cultivated with cold weather crops.

The ravages of Burdwan fever having drawn attention to the unhealthy state of the district, Mr. Adley, c.s., was deputed by



Canalization of the Kauski.

DRAINAGE.

Dankuni drainage works.

Government in 1869 to report whether want of drainage had caused or intensified the prevailing fever, and if so, how it could be rectified. Mr. Adley submitted two reports to Government, dated the 25th June and 10th September 1869, and the principal conclusions he came to were the following:—(1) that the district stood in much need of drainage; (2) that this in a great measure represented the cause of the fever scourge; (3) that the rivers and *kāds* had seriously silted up and deteriorated; (4) that, from an engineering point of view, there was no difficulty about the drainage question; and (5) that if properly conducted, the measures ought to be largely remunerative. Mr. Adley recommended the reclamation of the Dānkuni, Kāllā and Rājāpur swamps; the deepening of the *kāds* and improvement of their embouchures; the re-opening of the Kānā Nadi; the adoption throughout the district of 'high and low level drains, to serve the treble purpose of drainage, irrigation and navigation;' and the introduction of general sanitary measures. A portion of Mr. Adley's scheme—that for draining the Dānkuni marsh—was approved of by Government, and in 1871 the Drainage Act (V of 1871) was passed, under which Commissioners were appointed to carry out the work of draining the Dānkuni *śāls*. The works were commenced in January 1873, and were completed in the same year.

They consist of:—(1) drainage channels, 16½ miles long, excavated through the lowest ground in the middle of the *śāls* and leading to the Baidyabāti Khāl on the north and the Bally Khāl on the south; these two *kāds* have also been partially straightened, widened and deepened; (2) two self-acting sluices, one in each *kād*, with three openings and double gates; and (3) an iron-girdered two-spanned bridge over the Serampore-Chanditalā crossing. The total cost amounted to Rs. 3,97,396, which, with maintenance charges capitalized, have been recovered from the persons interested. The works proved a great success from the first, all the available waste land being brought under cultivation within two years, while the annual report of the Sanitary Commissioner for 1874 stated that a large tract of country, which was formerly the centre of much disease and mortality, had become healthy owing to their completion. At present the annual charges for repairs do not usually exceed Rs. 2,000; but in 1903-04 they went up to Rs. 7,170, while in 1906-07 they fell to Rs. 258.

Rājāpur
drainage
works.

Colonel Haig, who was deputed to make an engineering survey of the district, proposed in 1873 to extend the Dānkuni scheme to other tracts in the south and submitted three drainage schemes, known as the Howrah, Rājāpur and Amtā

schemes. The Howrah and Amtā schemes concern the Howrah district only, while the Rājāpur drainage works drain the southern extremity of Kristānagar thāna in the Serampore subdivision, but lie for the most part in the Howrah district. These works were constructed under the revised Drainage Act VI of 1880, under the provisions of which a small drainage channel west of Rāmpur was also constructed in 1907-08 at a cost of Rs. 3,947.

The Sanitary Drainage Act VIII of 1895 is in force in the district, but has not yet been utilized. It has been proposed recently to canalize part of the Kunti river under this Act, but no final action has yet been taken in the matter.

In a riparian district such as Hooghly, embankments are of exceptional importance. The river Hooghly is not embanked on the west side, as its bank is sufficiently high and the towns are fairly well protected, but along the other rivers there are a number of public embankments, generally under the charge of the Government. In 1907-1908 Government maintained 164 miles, 3,365 feet of B class embankments at its own expense and 6 miles of D class embankments at the expense of the persons benefited. The total cost of repairing the former amounted to Rs. 34,328, and the repairs of the latter cost Rs. 5,053.

On the left bank of the Dwārakeswar and its branch the Sankarā, there is a continuous line (No. 6), 5 miles 250 feet long; and on the right bank of the Dwārakeswar and its other branch the Jhumi, there is another continuous line (No. 7), 6 miles 3,200 feet in length. Besides these, there is a circuit embankment (No. 20), 13 miles 5,108 feet long, beginning at the inner point of bifurcation of the Sankarā and Jhumi, going round on the inner circuit and terminating again in that point. The aggregate length of the three Dwārakeswar embankments is thus 39 miles 3,278 feet.

The river Dāmodar has a continuous line of high embankments on the left bank, 106 miles 1,114 feet long (No. 32), of which 41 miles 3,494 feet are in the Hooghly district. It has also on the right bank six detached embankments with a total length of 47 miles 2,000 feet, of which 12 miles 4,250 feet are in the Hooghly district (Nos. 36 and 37). The left embankment of the Dāmodar being continuous for more than one hundred miles, has been provided with many sluices to allow for irrigation and the outflow of inland drainage. Among these sluices may be mentioned that at Kamarā, constructed in 1883-84 at a cost of Rs. 5,451; a channel inside the sluice was excavated in 1889-90 at a cost of Rs. 4,659.

The Kānā Nadi, the Kānā Dāmodar, the Saraswati and the Rūpnārāyan (left bank), have zamindāri embankments at various

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places. To prevent parts of Amtā and Kristanagar thānas being flooded at times of heavy rainfall, the zamindari *bāndhs* on the left bank of the Madāriā Khāl are being remodelled for six miles from Dilākhās to Penre (in the Howrah district), at a cost of Rs. 30,000. The zamindari *bāndhs* are, as a rule, in a state of disrepair.

History of
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ments.

The necessity for embankments in this district has long been recognized, and they date back to a period anterior to British rule. It was, in fact, considered to be a duty of the zamindars "to secure their lands from inundation by repairing the embankments." The cost of repairing the *bāndhs* was known as *puṭbandī* and was realized by the zamindars from the tenants concerned. When the British took over the ceded districts, numerous embankments were in existence in Hooghly, the most important being within the Burdwan Rāj estate, which owned those along the Dāmodar, those on the Dwārakeswar and the Silai, and those on the Ajai river. In 1178 B.S. (1771-72 A.D.), the year after the great famine, the total *puṭbandī* charges of the Rāj were assessed at Rs. 50,000. The Rājā having fallen into arrears in the payment of land revenue, the Government took charge of the estate for several years, and entered into a contract with a Mr. Fraser for the repair of the embankments. The contract expired in 1783, and the Government then decided to make a settlement with the Rājā, "as being more agreeable to the zamindari constitution," and assessed the *puṭbandī* charges at Rs. 60,000. This assessment was confirmed at the decennial and permanent settlements and was deducted from the Rājā's total land revenue. The Rājā occasionally entered into contracts with Europeans for the execution of the necessary repairs, e.g., with Mr. Marriot in 1800. The appointment of the latter was at first questioned by the Board, which subsequently allowed advances to be made to him.

The upkeep of the embankments under this system appears to have been inefficient, and the admonitions of the Board of Revenue were not infrequently conveyed to the Rājā through the Collector. At length, their neglected state necessitated the formation of a special committee to take care of them: in December 1803 and March 1804, we find the Rājā complaining of its requisitions. As a further measure for their improvement, Regulation VI was passed in 1806. When the Rājā's estates of Mandalgāt (Howrah) and Chitwā (Ghātāl, Midnapore) were sold, his assessment was reduced to since Rs. 53,742. At length, wearied with annual demands for repairs (the cost of which now and then exceeded the amount assessed), the Rājā engaged in

1828 to pay that sum as revenue on condition that Government took over and maintained the embankments.

As late as 1833, there was no reliable record distinguishing Government from the zamindari *bāndhs*; and in May 1835, the Superintendent of Embankments remarked that, owing to the gradual disrepair and decay of the latter, every successive flood did more and more damage. He gave the following list of the various kinds of embankments:—(1) *Gangurā*, river embankments; (2) *Sirāhā* or *pargana*, boundary embankments; (3) *Grām-dhārī*, village boundary embankments; (4) *Fāri*, second embankments; (5) *Hāssīāh*, creek embankments; (6) *Khāl*, cross embankments in creeks and *nullāhs*; (7) *Jāl-nikāsi*, drainage embankments; (8) Masonry sluices; (9) *Bols* or wooden sluices. In 1836, the embankment question was taken up in earnest by the Government. The Superintendent was ordered to examine the records of the Collector's office and ascertain, if possible, the respective responsibility of Government and of the zamindars and a committee was ordered to meet at Hijili and Tamluk in the cold season of 1837-38 to consider all points connected with the existing system. A marked improvement was observed in 1845, when no fewer than 89 masonry sluices had been reconstructed in lieu of the cuts formerly made by the ryots. In 1846 another committee was appointed to report on the whole subject of the embankments of the Bengal rivers; and this committee made the drastic recommendation that all existing *bāndhs* should be removed entirely and a system of drainage channels substituted.

In the meantime, the floods of the Dāmodar continued to play havoc with its banks, which between 1847 and 1854 were breached in numerous places nearly every year, e.g., 25 breaches took place in 1847, 14 in 1849, 56 in 1850, 45 in 1852 and 28 in 1854. Large sums had to be spent in filling up these breaches and in repairing or strengthening the embankments, and the question of maintaining them was thus forced on the attention of Government. After a prolonged enquiry, it was decided to complete and strengthen the left embankment, and to remove the right embankments for 20 miles, retaining only such embankments as were situated at angles and curves of the river where the current bore directly upon the land. These orders were carried out before the flood season of 1859. After further enquiries which lasted several years, the Lieutenant-Governor in May 1863 expressed his opinion that the removal of the right embankment had been a judicious measure, that whatever partial damage might have been sustained by the natural action of the river, was not to be

compared with the injury and devastation formerly produced by the sudden and violent irruption of the river bursting its embankments, and that the general fertility of the area subject to inundation had been greatly increased. Since then, the Damodar, being unrestrained by embankments along its western bank, has made a large breach at Beguā in Burdwan, and has poured through it over the eastern half of thess Arāmbāgh and Khānkul, causing immense damage to the winter crops. Government has lately decided to close this breach by a weir.

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