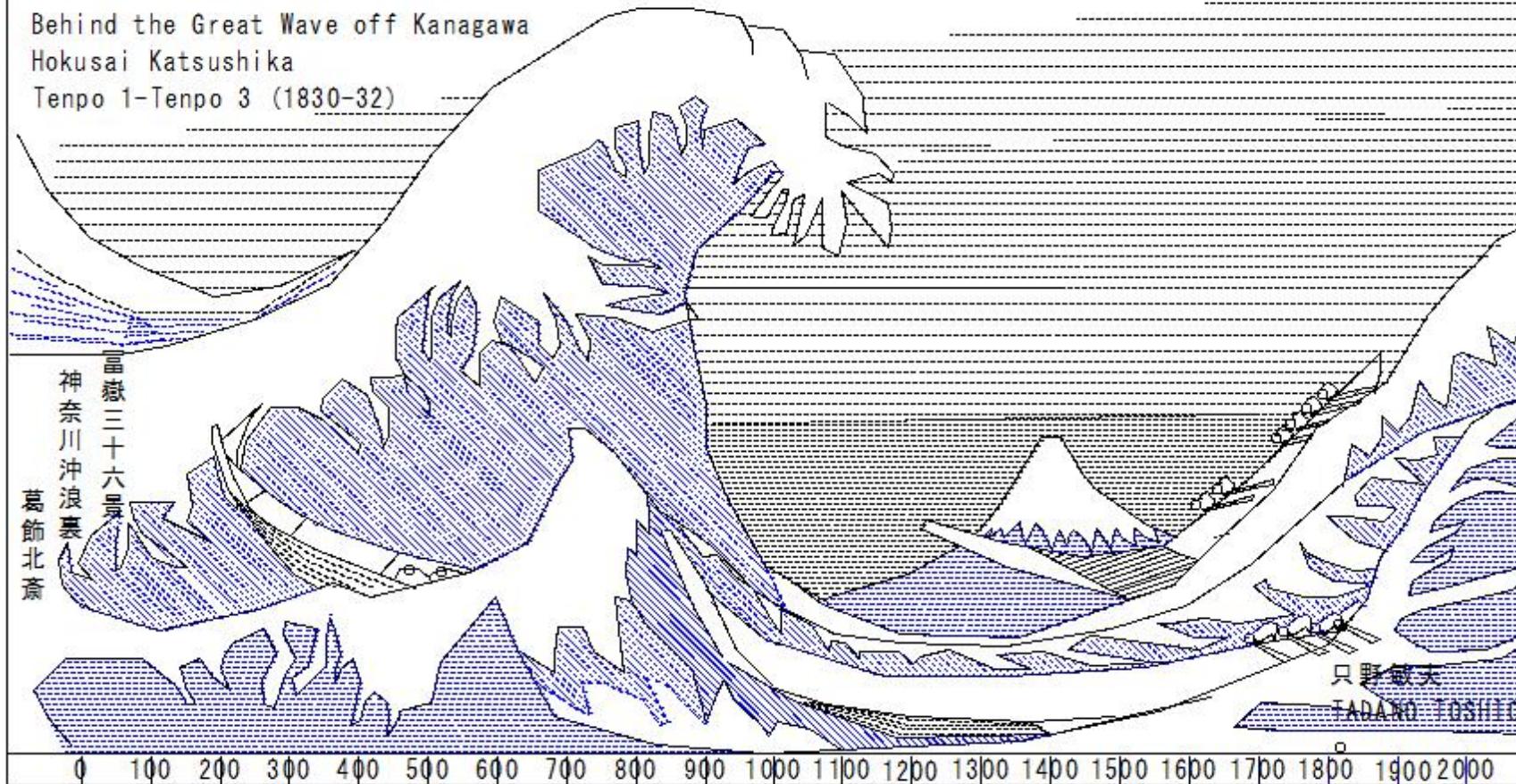


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Thirty-six Views of Mount Fuji
Behind the Great Wave off Kanagawa
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- (He945) Gorobe Irrigation Canal(Nagano)
- (He946) Fukarayousui Irrigation Canal (Shizuoka)
- (He947) Fukarayousui Irrigation Canal (Shizuoka)
- (He948) Fukarayousui Irrigation Canal (Shizuoka)

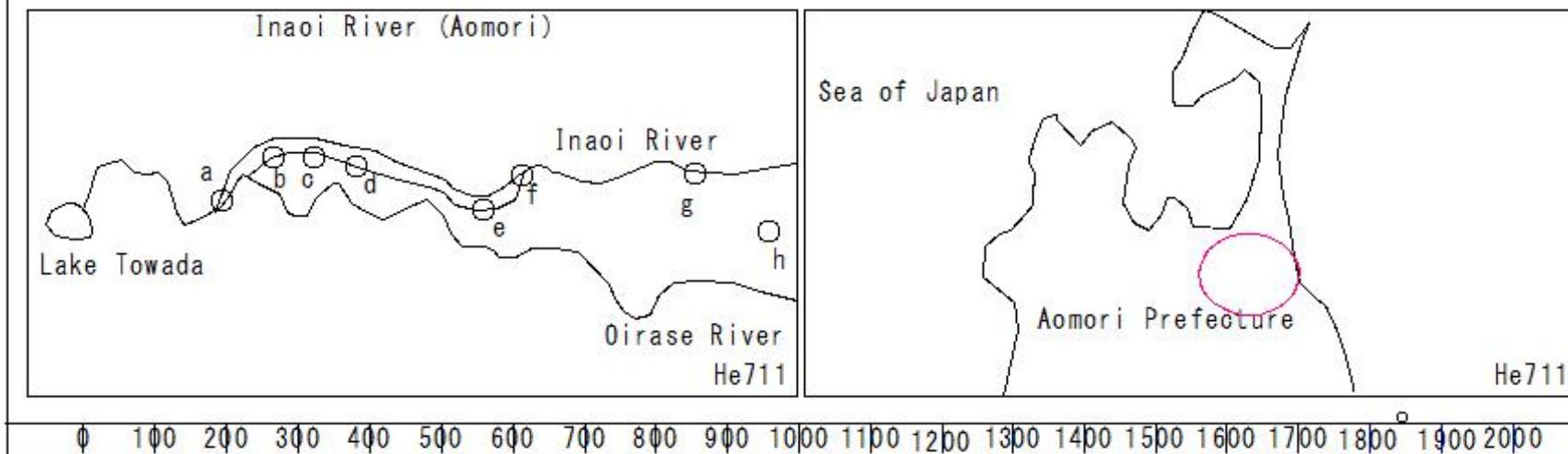
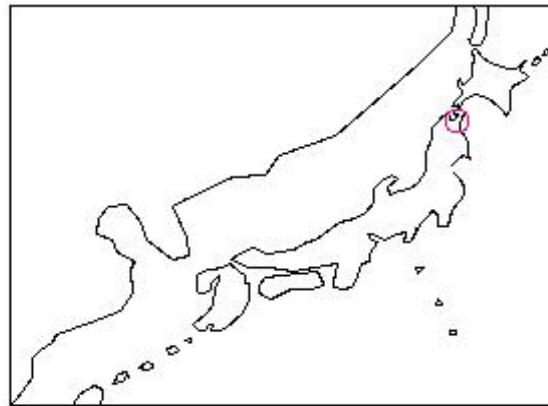
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(He1001)Genbegawa Irrigation Canal(Shizuoka)
(He1002)Genbegawa Irrigation Canal(Shizuoka)
(He1003)Genbegawa Irrigation Canal(Shizuoka)
(He1004)Genbegawa Irrigation Canal(Shizuoka)

(He711) Inaoi River (Aomori)

(He711) Inaoi River (Aomori)

- a Inaoi River Intake
- b Tenguyama Tunnel Exit
- c Phantom Canal
- d Yamagami Monument
- e Itako Mound
- f Kyo-no-yakata Confluence
- g Inaoi Bridge
- h Taiso Mound



(He712) Inaoi River (Aomori)

(He712) Inaoi River (Aomori)

- ① "Inaoi River" An agricultural waterway approximately 30km long, flowing from the former Towada Lake town to the Pacific Ocean.
- ② Approximately 150 years ago, Nitobe Den, a samurai of the Nanbu Morioka Domain, began water supply construction and completed approximately 10km of the upstream section.
- ③ The success of this waterway construction transformed the area into a rice paddy region.
- ④ The Inaoi River is an artificial river flowing in Towada City, Aomori Prefecture.
- ⑤ Total length: 70km, beneficiary area: 6,000ha across 2 cities and 4 towns.
- ⑥ Circumstances leading to the excavation
- ⑦ Wasteland created by pyroclastic flows from volcanic eruptions, etc.
- ⑧ It was said to be a "barren wilderness" due to the strong summer winds and the Hakkoda-oroshi winds
- ⑨ Nitobe Den of the Morioka Domain - Excavation of an artificial river
- ⑩ Planning the planting of windbreak forests to protect against the summer winds and Hakkoda-oroshi winds, and the construction of a new town.
- ⑪ This river was impossible with only a surface waterway (a waterway flowing above ground).
- ⑫ It included two tunnel waterways (what we would call tunnels today) in the upper reaches.
- ⑬ The total length from Lake Towada, the water source, and the intake point established in Horyo, Towada City, to the Pacific coast, the end point of the waterway plan, is 10 ri (approximately 40km).
- ⑭ The elevation difference between the Oirase River, which flows near the center of Sanbongi Plain (approximately 11km east of the intake point), where the new town was built, is 30m.
- ⑮ Surveying began in 1852 (Kaei 5).

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(He713) Inaoi River (Aomori)

(He713) Inaoi River (Aomori)

- ⑯ In 1854 (Ansei 1), volunteers began to gather for the start of construction.
- ⑰ Construction funds were raised by soliciting many investors, including Banzo Jaguchi from Hachinohe.
- ⑱ Construction began on October 4, 1855 (Ansei 2).
- ⑲ In 1856 (Ansei 3), the first tunnel waterway was completed.
- ⑳ The following year, 1857 (Ansei 4), the second tunnel waterway was also completed.

(He714) Inaoi River (Aomori)

(He714) Inaoi River (Aomori)

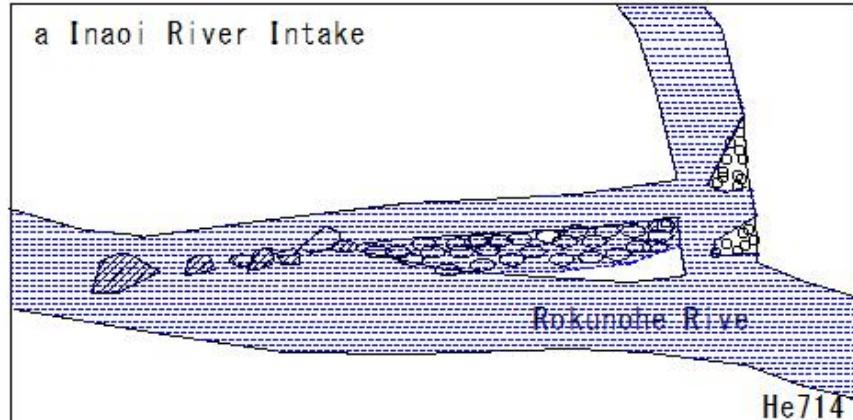
a Inaoi River Intake

- ① Original form of the headworks
- ② Around 1860 during the Edo period, when the Inaoi River was being constructed
- ③ At that time, the structure involved placing large stones in the river to dam it and divert water into the Inaoi River.

a Inaoi River Intake

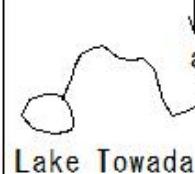
- b Tenguyama Tunnel Exit
- c Phantom Canal
- d Yamagami Monument
- e Itako Mound
- f Kyo-no-yakata Confluence
- g Inaoi Bridge
- h Taiso Mound

a Inaoi River Intake



Inaoi River (Aomori)

a Inaoi River Intake



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He715) Inaoi River (Aomori)

(He715) Inaoi River (Aomori)

a Inaoi River Intake

- ① A water gate that diverts water from the Oirase River to the Inaoi River.
② A headworks is a facility built to draw a large amount of water from a river to supply rice paddies.

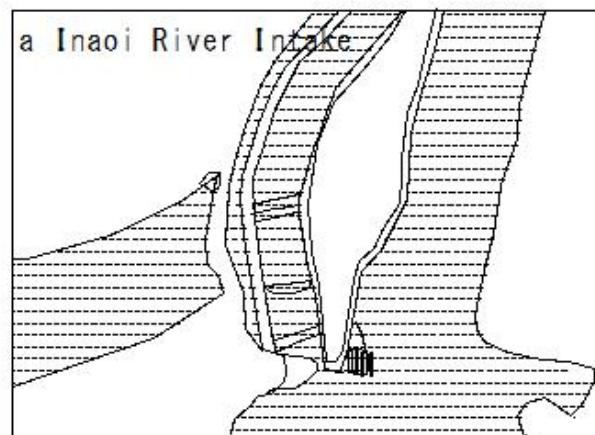
Fixed weir

Length: 52m

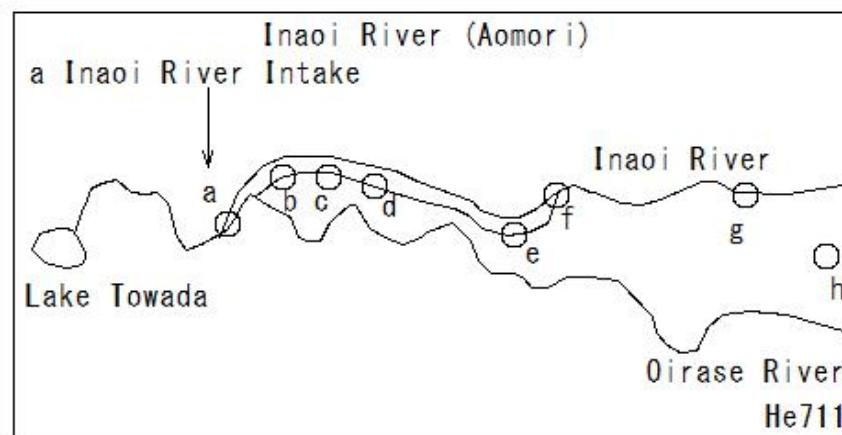
Beginning of the Inaoi River

a Inaoi River Intake

- b Tenguyama Tunnel Exit
c Phantom Canal
d Yamagami Monument
e Itako Mound
f Kyo-no-yakata Confluence
g Inaoi Bridge
h Taiso Mound



He715



He711

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(He716) Inaoi River (Aomori)

(He716) Inaoi River (Aomori)

a Inaoi River Intake

- ① A water gate that diverts water from the Oirase River to the Inaoi River.
- ② A headworks is a facility built to draw a large amount of water from a river to supply rice paddies.

Fixed weir

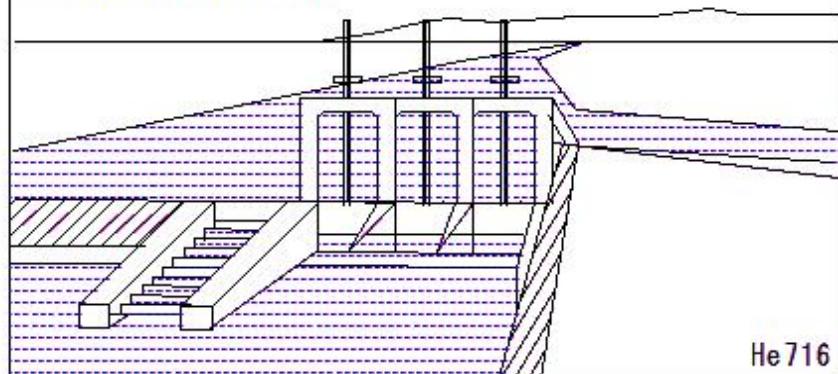
Length: 52m

Beginning of the Inaoi River

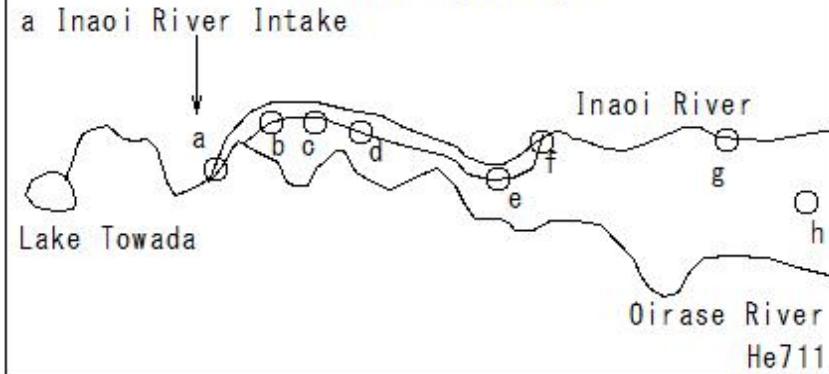
a Inaoi River Intake

- b Tenguyama Tunnel Exit
- c Phantom Canal
- d Yamagami Monument
- e Itako Mound
- f Kyo-no-yakata Confluence
- g Inaoi Bridge
- h Taiso Mound

a Inaoi River Intake



Inaoi River (Aomori)



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(He717) Inaoi River (Aomori)

(He717) Inaoi River (Aomori)

b Tenguyama Tunnel Exit

- ① The 1,620-meter "Tenguyama Tunnel (Anazeki)"
- ② The 2,540-meter "Kuradashi-yama Tunnel" - these are the two tunnels.
- ③ The tunnels were one of the most difficult parts of the construction.
- ④ A construction method using side tunnels was employed.

a Inaoi River Intake

b Tenguyama Tunnel Exit

c Phantom Canal

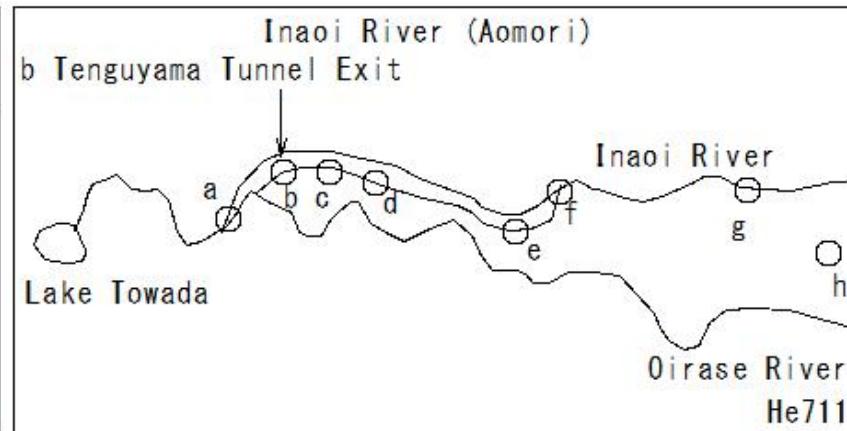
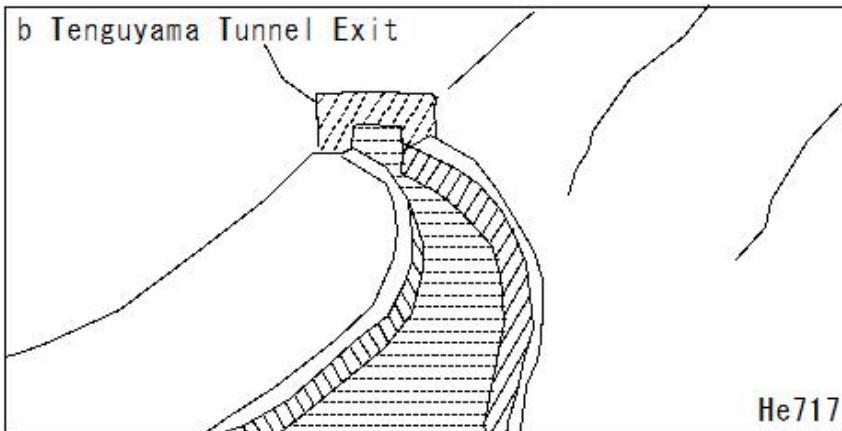
d Yamagami Monument

e Itako Mound

f Kyo-no-yakata Confluence

g Inaoi Bridge

h Taiso Mound



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(He718) Inaoi River (Aomori)

(He718) Inaoi River (Aomori)

b1 Tenguyama Tunnel Entrance

1950s

① Tunnel is a tunnel that passes through Mount Tengu, located on the upstream side of the Inaoi River.

② The tunnel for the irrigation canal is called the Tenguyama Tunnel.

③ It is also called the Tenguyama Tunnel or the Inaoi River First Aqueduct.

a Inaoi River Intake

b Tenguyama Tunnel Exit

c Phantom Canal

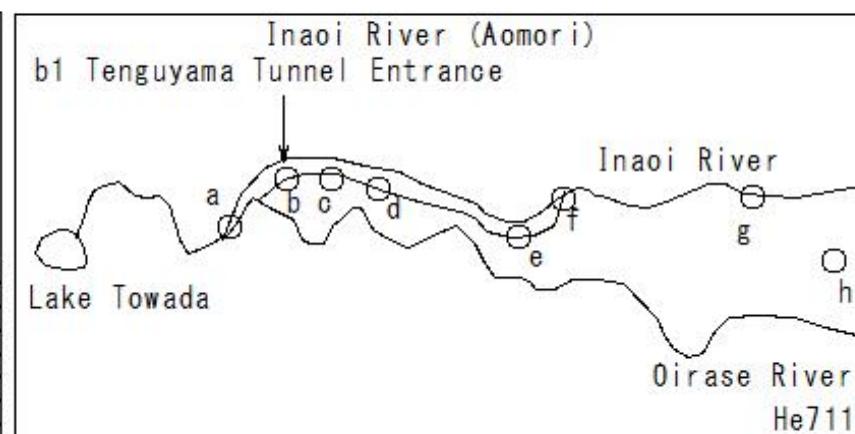
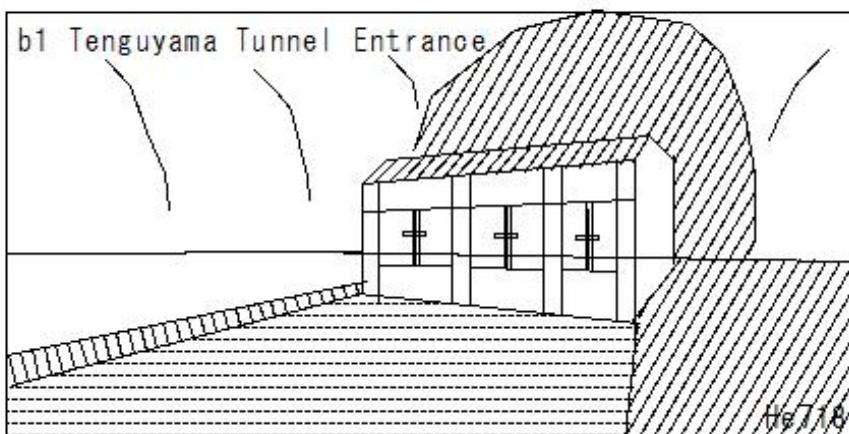
d Yamagami Monument

e Itako Mound

f Kyo-no-yakata Confluence

g Inaoi Bridge

h Taiso Mound



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He719) Inaoi River (Aomori)

(He719) Inaoi River (Aomori)

c Phantom Canal

- ① This is a tunnel (an irrigation channel) dug in 1866 during the second water supply project planned by Jujiro Nitobe.
- ② It was not completed because Jujiro passed away in 1867.
- ③ Traces of excavation by the tools used at the time remain on the inner walls.
- ④ Currently, the "phantom irrigation channel" is sealed off.

a Inaoi River Intake

b Tenguyama Tunnel Exit

c Phantom Canal

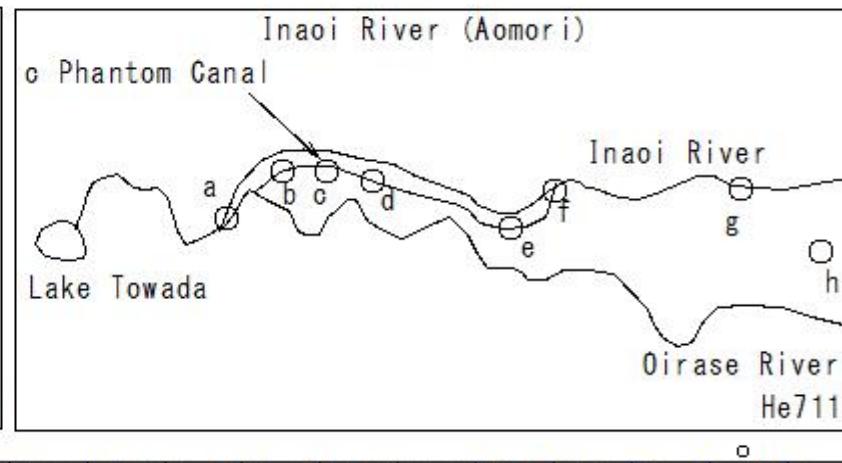
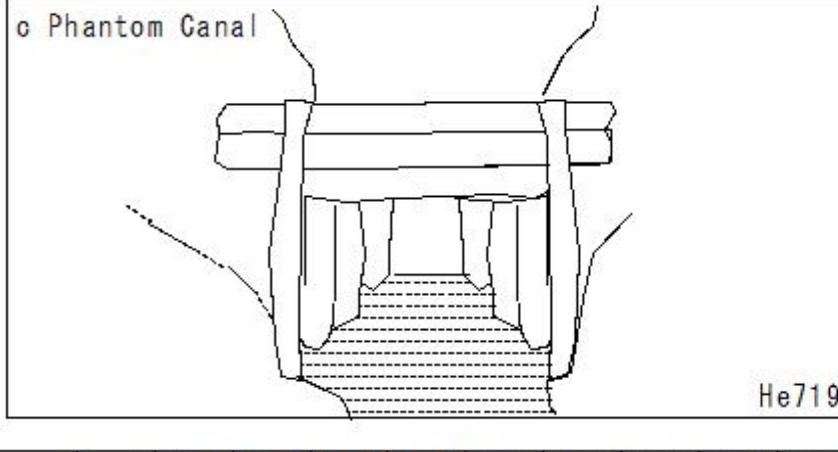
d Yamagami Monument

e Itako Mound

f Kyo-no-yakata Confluence

g Inaoi Bridge

h Taiso Mound



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(He720) Inaoi River (Aomori)

(He720) Inaoi River (Aomori)

d Yamagami Monument

- ① This is a stone monument erected in 1856 during the Ansei era by the engineers working on the Ino River canal project to pray for the safety of the construction work.
② Below the inscription "Yama-no-kami" (mountain god), the names of the engineers, including the foreman Yoshisuke, are engraved.

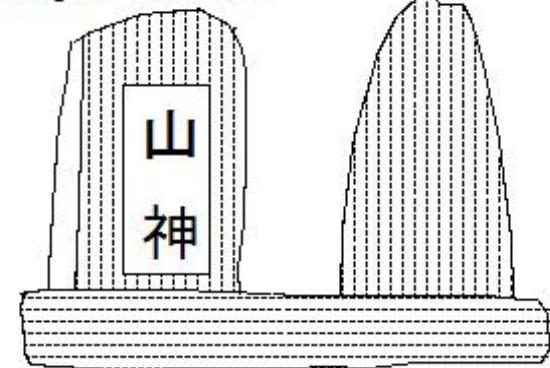
a Inaoi River Intake e Itako Mound

b Tenguyama Tunnel Exit f Kyo-no-yakata Confluence

c Phantom Canal g Inaoi Bridge

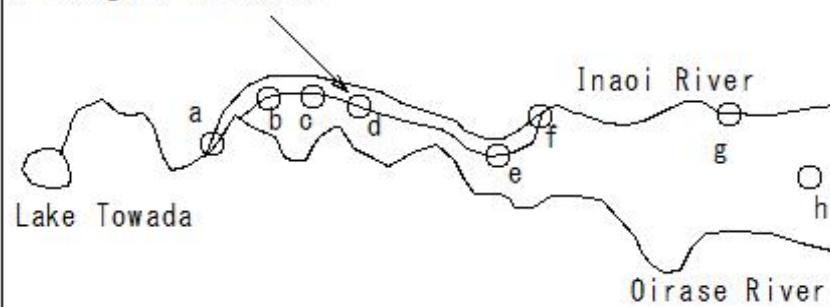
d Yamagami Monument h Taiso Mound

d Yamagami Monument



He720

Inaoi River (Aomori)
d Yamagami Monument



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(He721) Inaoi River (Aomori)

(He721) Inaoi River (Aomori)

e Itako Mound

①This is an area that resembles a mountain.

②but because the land is made of volcanic ash, like Mount Tengu and Mount Kuradashi, digging a tunnel would cause it to collapse, making the work very dangerous.

Therefore, it was impossible to dig a tunnel.

③For this reason, piles were driven into the ground and the soil was piled up to a height of over 10 meters, resulting in this elevated waterway.

a Inaoi River Intake

e Itako Mound

b Tenguyama Tunnel Exit

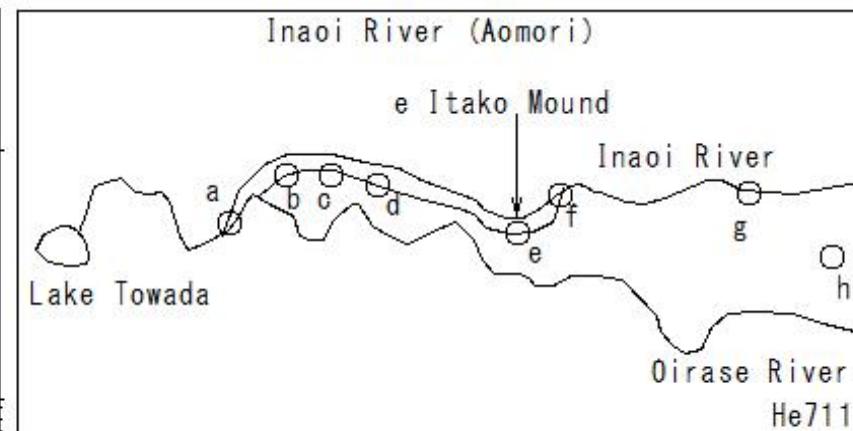
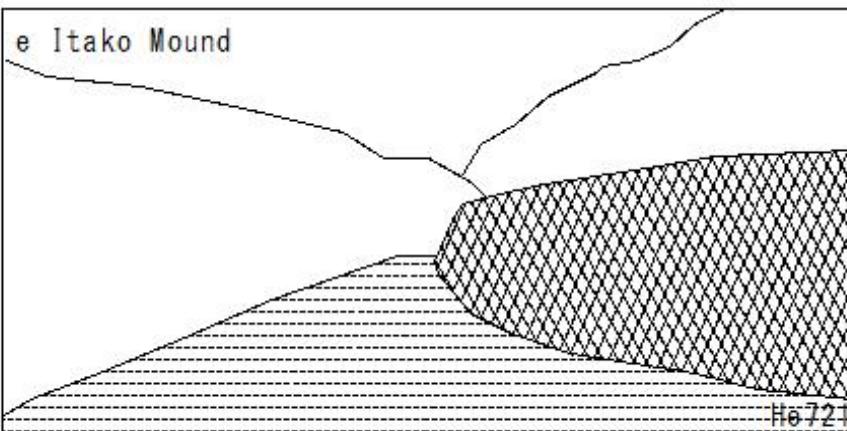
f Kyo-no-yakata Confluence

c Phantom Canal

g Inaoi Bridge

d Yamagami Monument

h Taiso Mound



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He722) Inaoi River (Aomori)

(He722) Inaoi River (Aomori)

f Kyo-no-yakata Confluence

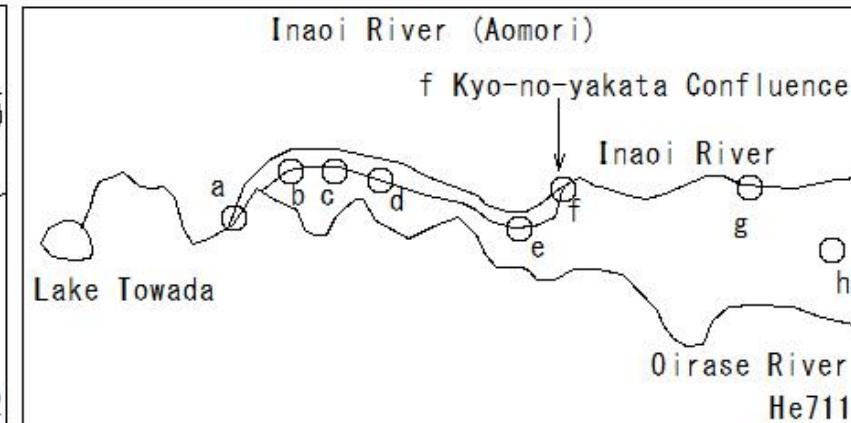
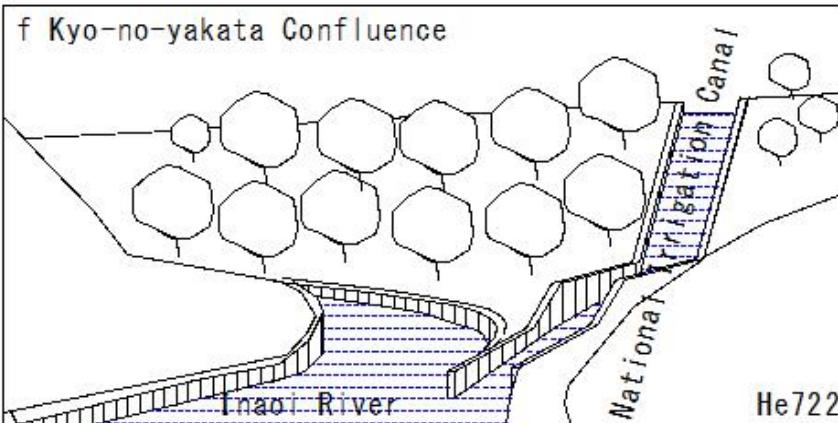
- ① The point at the entrance to the Sanbonhara Plateau.
- ② The Inaoi River flows through a section where it has carved out a channel 10 meters deep in the suddenly elevated ground.
- ③ At this location, the national irrigation canal (right) merges with the Inaoi River.

a Inaoi River Intake e Itako Mound

b Tenguyama Tunnel Exit f Kyo-no-yakata Confluence

c Phantom Canal g Inaoi Bridge

d Yamagami Monument h Taiso Mound



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(He723) Inaoi River (Aomori)

(He723) Inaoi River (Aomori)

g Inaoi Bridge

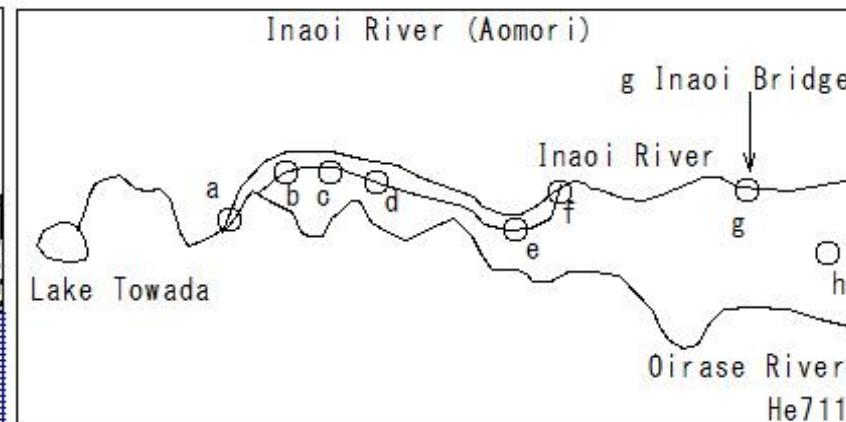
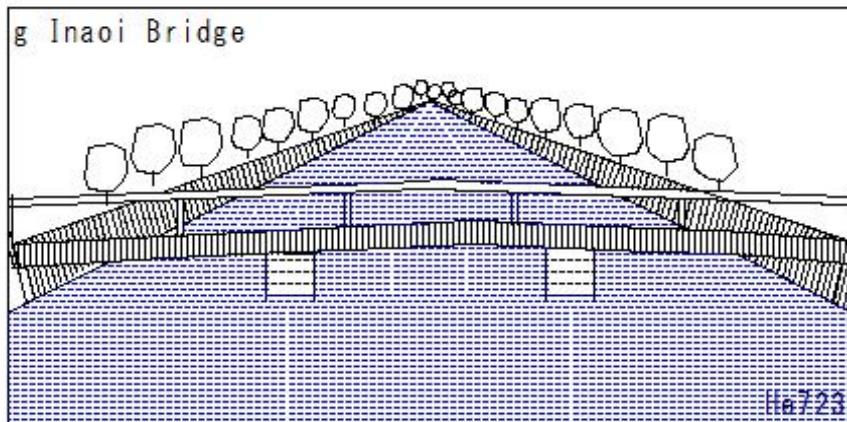
- ① In 1860, Lord Toshiyuki Nanbu, the feudal lord of the Morioka domain, visited to inspect the development of the Sanbongihara area.
- ② He gave the name "Inaoi" to the newly constructed irrigation canal, bridge, and town.

a Inaoi River Intake e Itako Mound

b Tenguyama Tunnel Exit f Kyo-no-yakata Confluence

c Phantom Canal g Inaoi Bridge

d Yamagami Monument h Taiso Mound



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He724) Inaoi River (Aomori)

(He724) Inaoi River (Aomori)

h Taiso Mound

① This is a burial site dedicated to the pioneers of the development of Sanbongi-hara, including the three generations of the Nitobe family (Den, Jujiro, and Shichiro), who constructed the artificial river Inaoi River to supply water and implemented a grid-pattern urban planning.

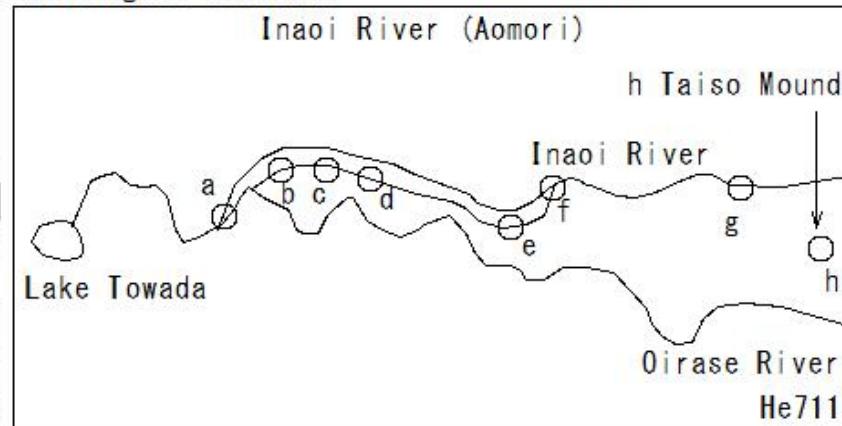
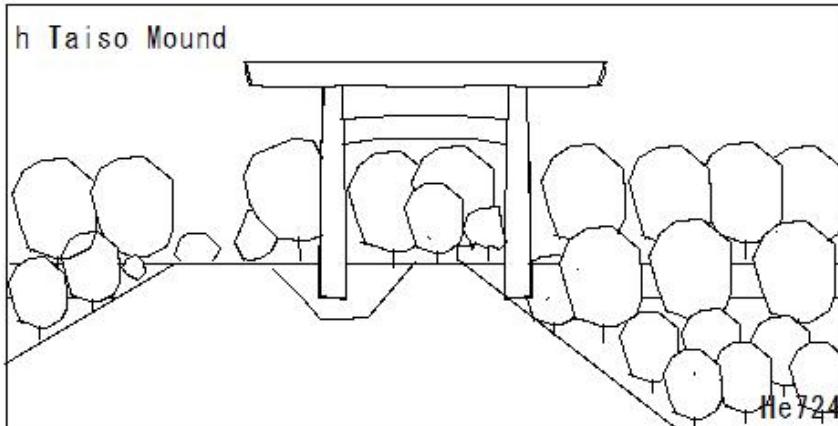
② It also commemorates Dr. Inazo Nitobe (Jujiro's third son), who inherited the pioneering spirit and achieved success on the world stage.

a Inaoi River Intake e Itako Mound

b Tenguyama Tunnel Exit f Kyo-no-yakata Confluence

c Phantom Canal g Inaoi Bridge

d Yamagami Monument h Taiso Mound



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He725) Inaoi River (Aomori)

(He725) Inaoi River (Aomori)

i. Nitobe Memorial Museum

① The Nitobe Memorial Museum houses approximately 8,000 books donated by Inazo Nitobe, a doctor of agriculture and law.

for the cultural advancement of Sanbongi (present-day Towada City).

② It was established in 1965, evolving from its predecessor, the "Private Nitobe Library" (founded in 1925).

a Inaoi River Intake e Itako Mound

b Tenguyama Tunnel Exit f Kyo-no-yakata Confluence

c Phantom Canal g Inaoi Bridge

d Yamagami Monument h Taiso Mound

i. Nitobe Memorial Museum

j. Ippongizawa Biotope

i. Nitobe Memorial Museum

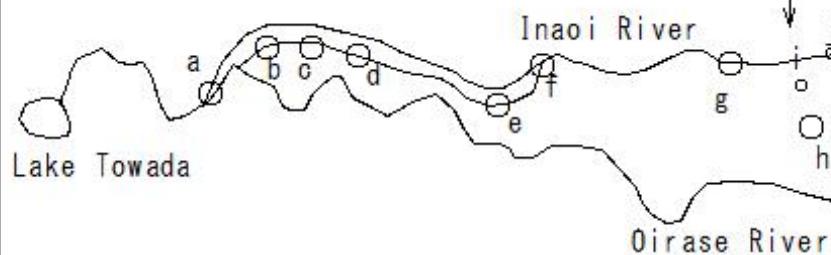


Nitobe Inazo

He725

Inaoi River (Aomori)

i. Nitobe Memorial Museum



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(He726) Inaoi River (Aomori)

(He726) Inaoi River (Aomori)

j. Ippongizawa Biotope

- ① The Ippongizawa Biotope, which utilizes an agricultural reservoir on the Inaoi River, serves as a habitat for a diverse range of organisms.

a Inaoi River Intake

b Tenguyama Tunnel Exit

c Phantom Canal

d Yamagami Monument

e Itako Mound

f Kyo-no-yakata Confluence

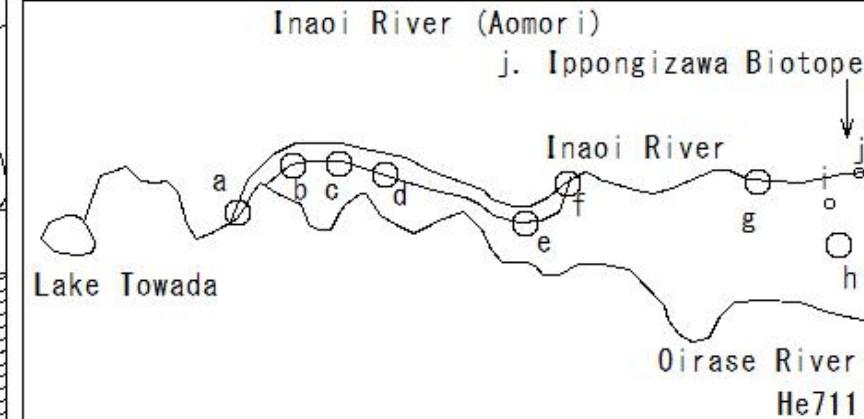
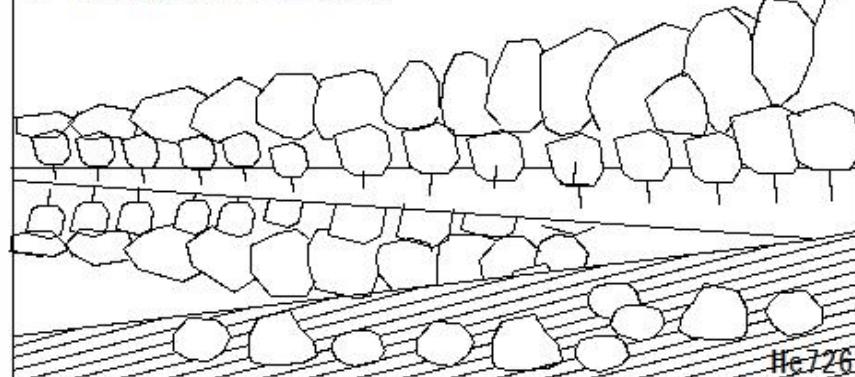
g Inaoi Bridge

h Taiso Mound

i. Nitobe Memorial Museum

j. Ippongizawa Biotope

j. Ippongizawa Biotope



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He727) Inaoi River (Aomori)

(He727) Inaoi River (Aomori)

○Construction Method of the Tunnel Weir

Group of Civil Engineers

Southern Construction Workers

Oirase River - Sanbongi Plain, 30m elevation difference

Excavating two tunnel weirs and a land weir from the upstream side

a Inaoi River Intake

b Tenguyama Tunnel Exit

c Phantom Canal

d Yamagami Monument

e Itako Mound

f Kyo-no-yakata

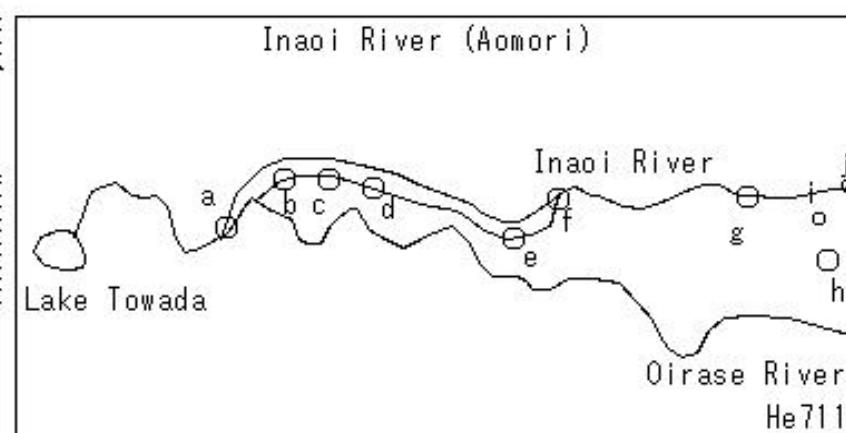
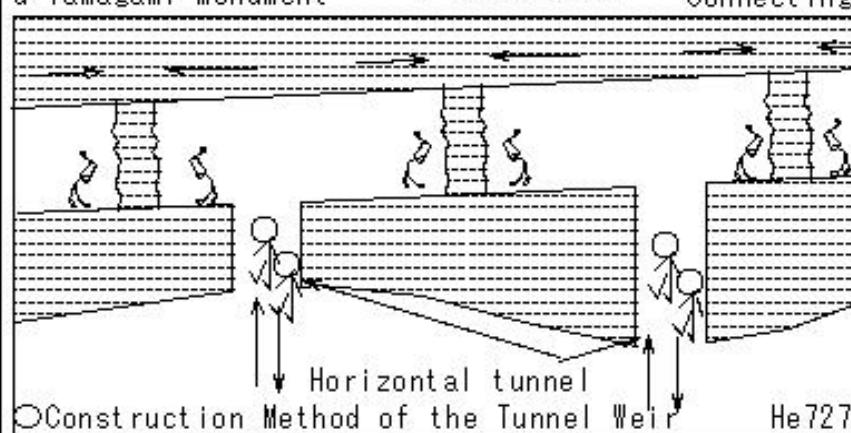
g

h Taiso Mound

i. Nitobe Memorial Museum

j. Ippongizawa Biotope

Connecting



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(He728) Inaoi River (Aomori)

(He728) Inaoi River (Aomori)

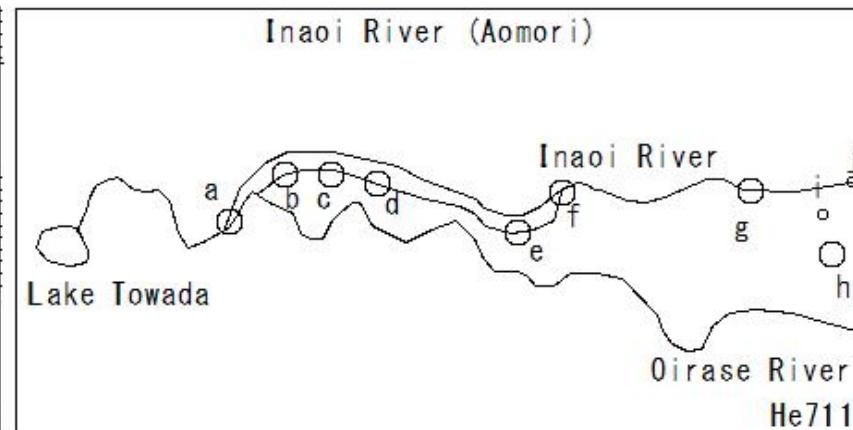
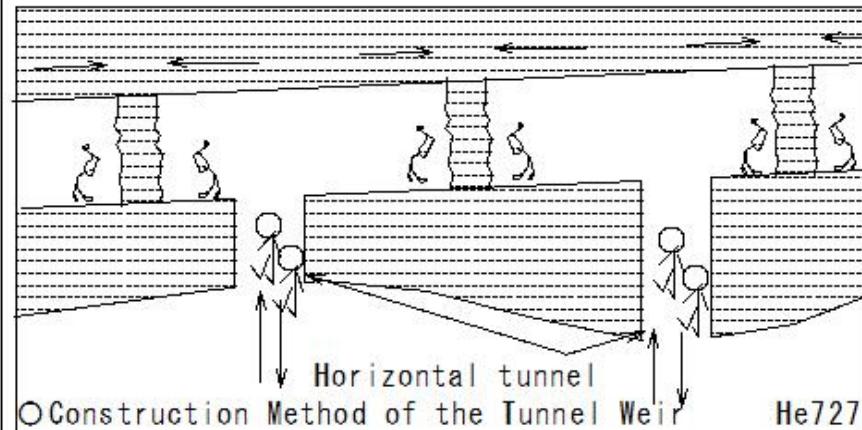
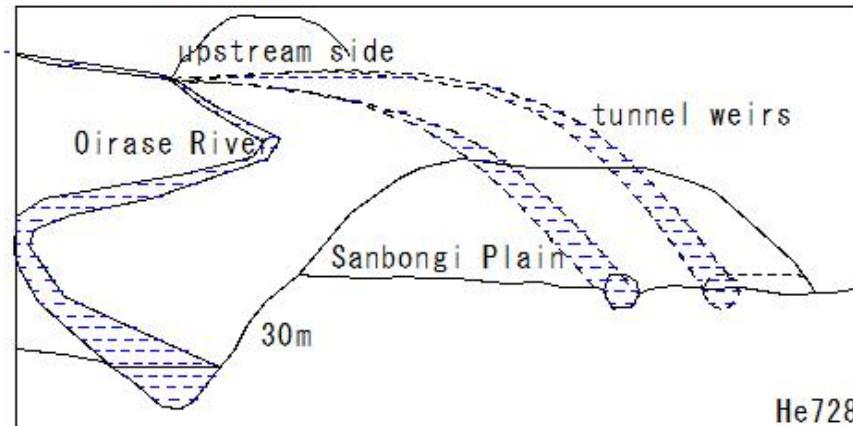
○ Construction Method of the Tunnel Weir

Group of Civil Engineers

Southern Construction Workers

Oirase River - Sanbongi Plain,
30m elevation difference

Excavating two tunnel weirs and a land weir
from the upstream side



Ø 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

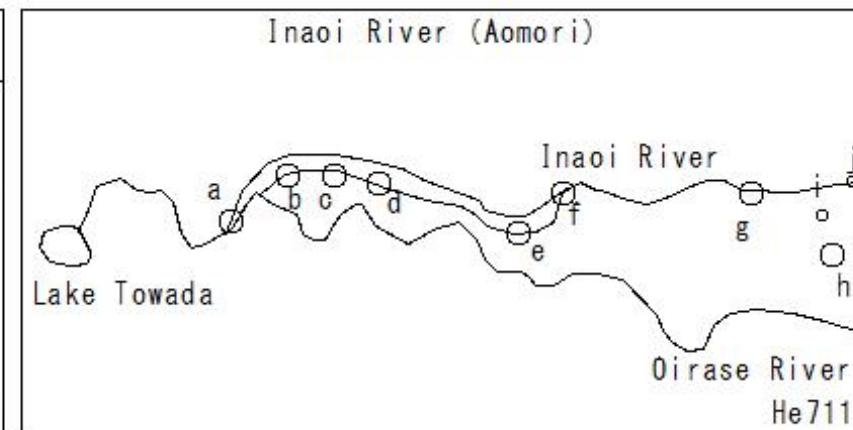
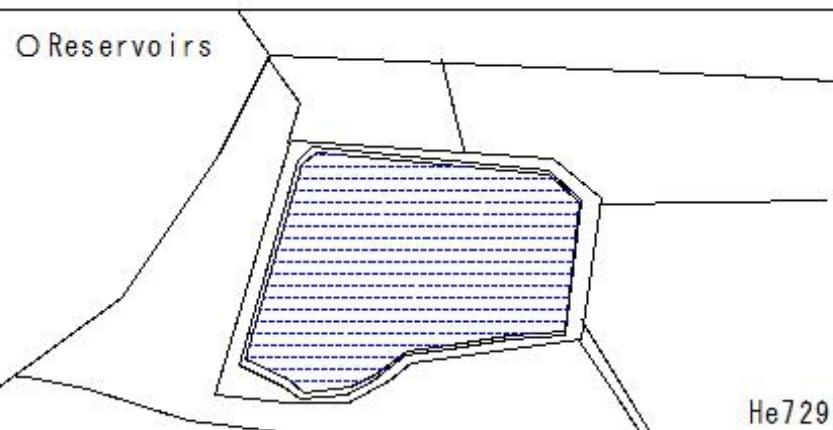
(He729) Inaoi River (Aomori)

(He729) Inaoi River (Aomori)

○ Reservoirs

- ① Facilities for storing water in order to effectively utilize limited water resources.
- ② At the "Rokunohe Regulating Reservoir" located on the Inaoi River, the topography is cleverly utilized to allow water to be released from and added to the reservoir without the use of power.

a Inaoi River Intake e Itako Mound i. Nitobe Memorial Museum
b Tenguyama Tunnel Exit f Kyo-no-yakata Confluence j. Ippongizawa Biotope
c Phantom Canal g Inaoi Bridge
d Yamagami Monument h Taiso Mound



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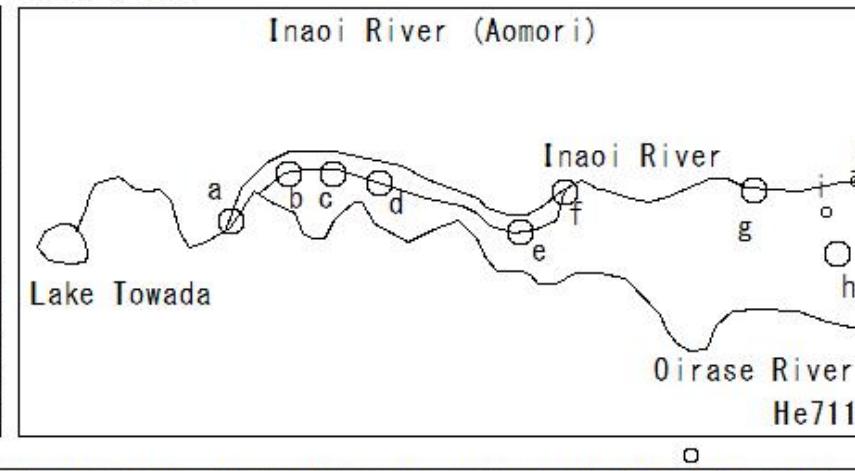
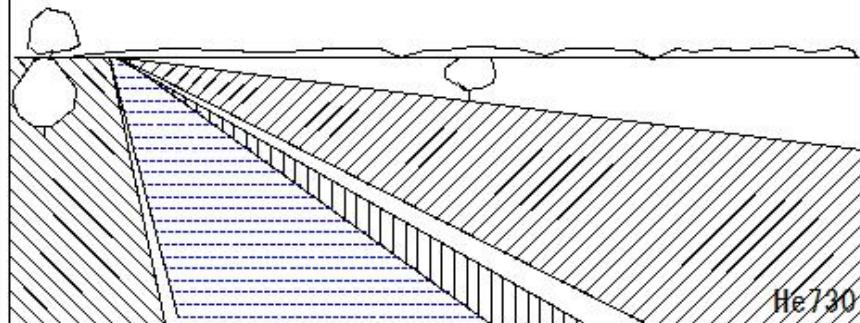
(He730) Inaoi River (Aomori)

(He730) Inaoi River (Aomori)

○Community Waterways

- ① Waterways have various functions, such as providing water for firefighting, moderating the climate, and creating relaxing spaces.
- ② A movement has begun to treat waterways as a community asset, "community water," and to cherish them.
- ③ By working together on maintenance, such as mowing grass and picking up trash, and using them carefully, clean water will continue to flow in the future.
a Inaoi River Intake e Itako Mound i. Nitobe Memorial Museum
b Tenguyama Tunnel Exit f Kyo-no-yakata Confluence j. Ippongizawa Biotope
c Phantom Canal g Inaoi Bridge
d Yamagami Monument h Taiso Mound

○Community Waterways



(He731) Inaoi River (Aomori)

(He731) Inaoi River (Aomori)

k Kumanosawa Aqueduct (as of 1944)

- ① An aqueduct where the national irrigation canal crosses the Kumanosawa River.
- ② The national irrigation canal flows 12 meters higher than the Inaoi River, crossing over the Kumanosawa River via the aqueduct.
- ③ The Inaoi River flows under the Kumanosawa River via a siphon.

a Inaoi River Intake

b Tenguyama Tunnel Exit

c Phantom Canal

d Yamagami Monument

e Itako Mound

f Kyo-no-yakata Confluence

g Inaoi Bridge

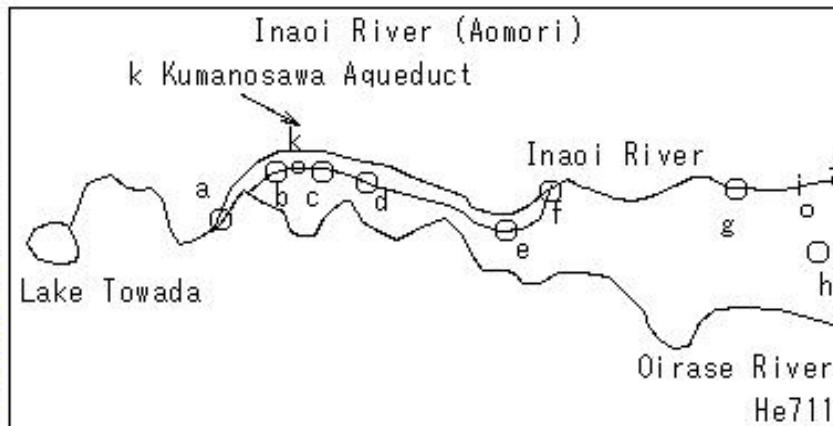
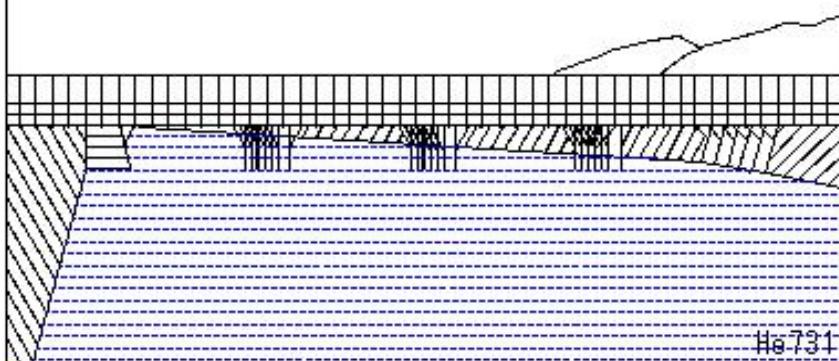
h Taiso Mound

i. Nitobe Memorial Museum

j. Ippongizawa Biotope

k Kumanosawa Aqueduct

k Kumanosawa Aqueduct (as of 1944)



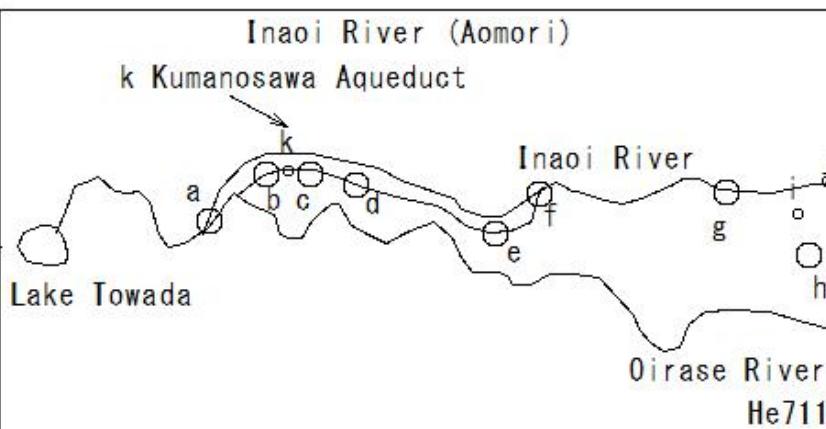
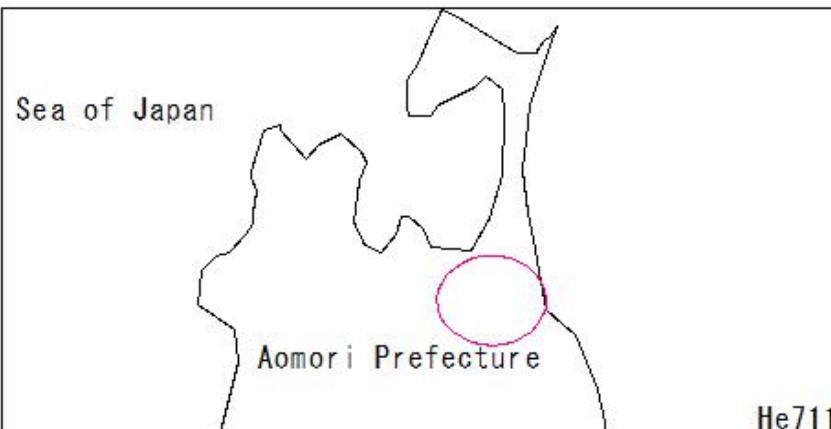
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(He732) Inaoi River (Aomori)

(He732) Inaoi River (Aomori)



- | | |
|----------------------------|--------------------------|
| a Inaoi River Intake | g Inaoi Bridge |
| b Tenguyama Tunnel Exit | h Taiso Mound |
| c Phantom Canal | i Nitobe Memorial Museum |
| d Yamagami Monument | j Ippongizawa Biotope |
| e Itako Mound | k Kumanosawa Aqueduct |
| f Kyo-no-yakata Confluence | |

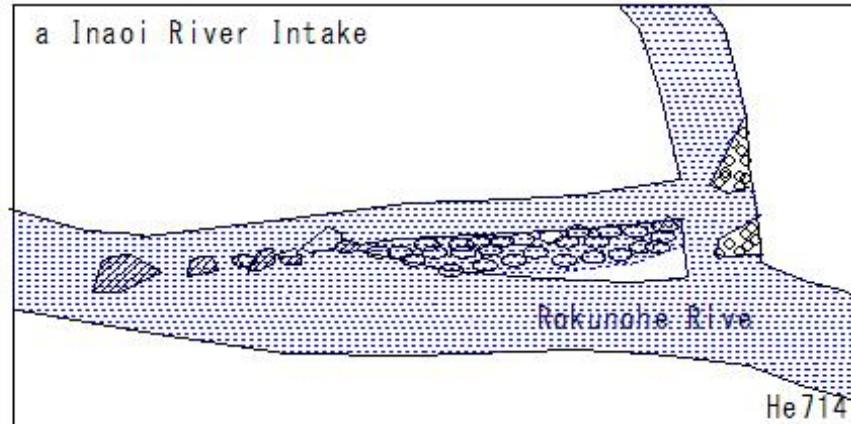


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(He733) Inaoi River (Aomori)

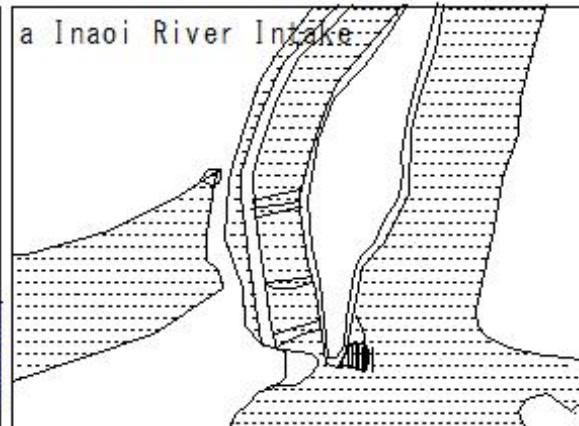
(He733) Inaoi River (Aomori)

a Inaoi River Intake



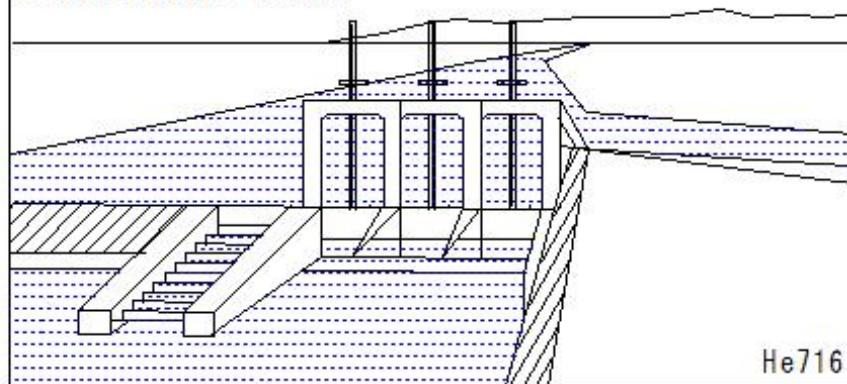
He714

a Inaoi River Intake



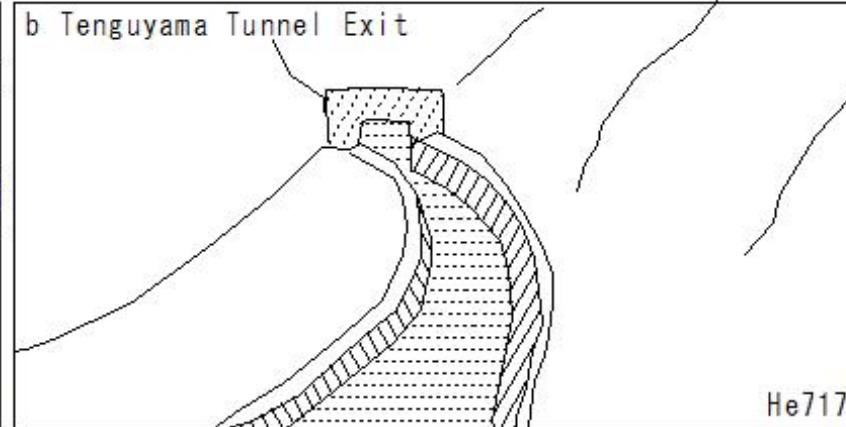
He715

a Inaoi River Intake



He716

b Tenguyama Tunnel Exit

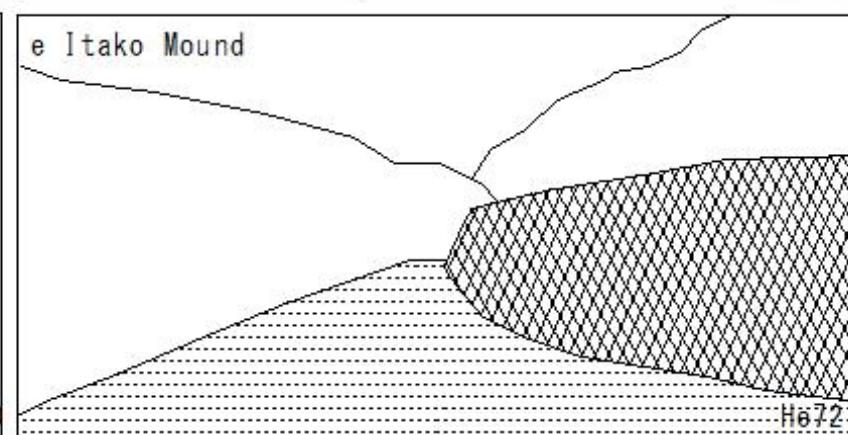
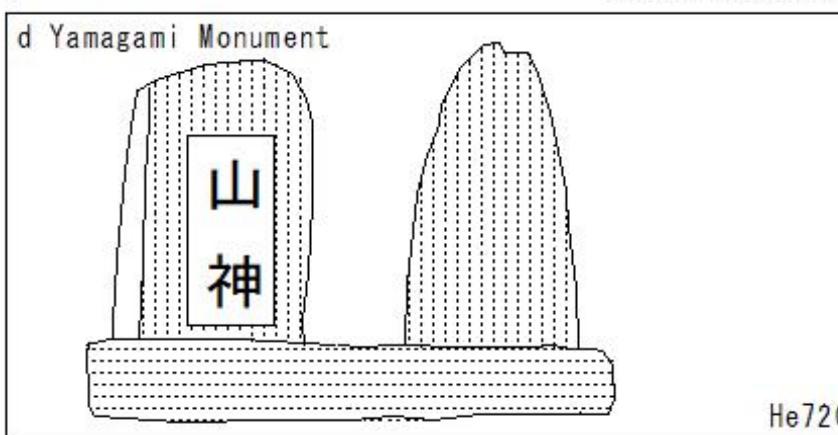
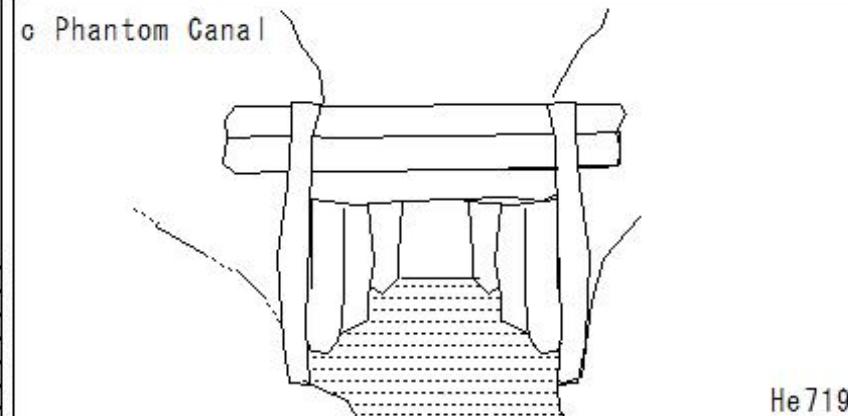
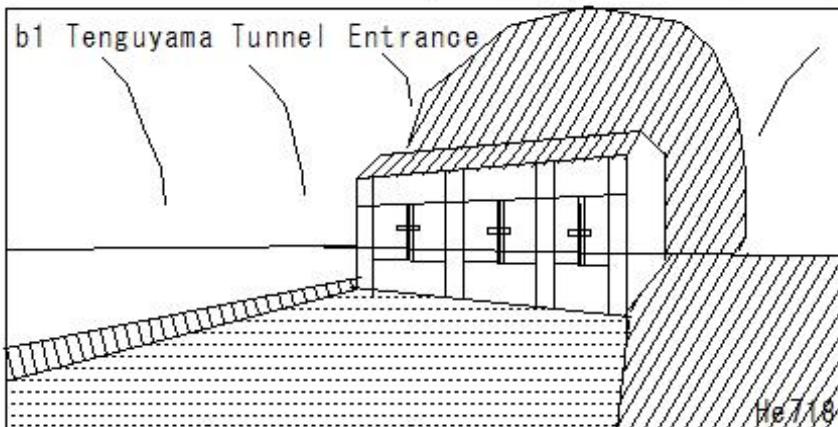


He717

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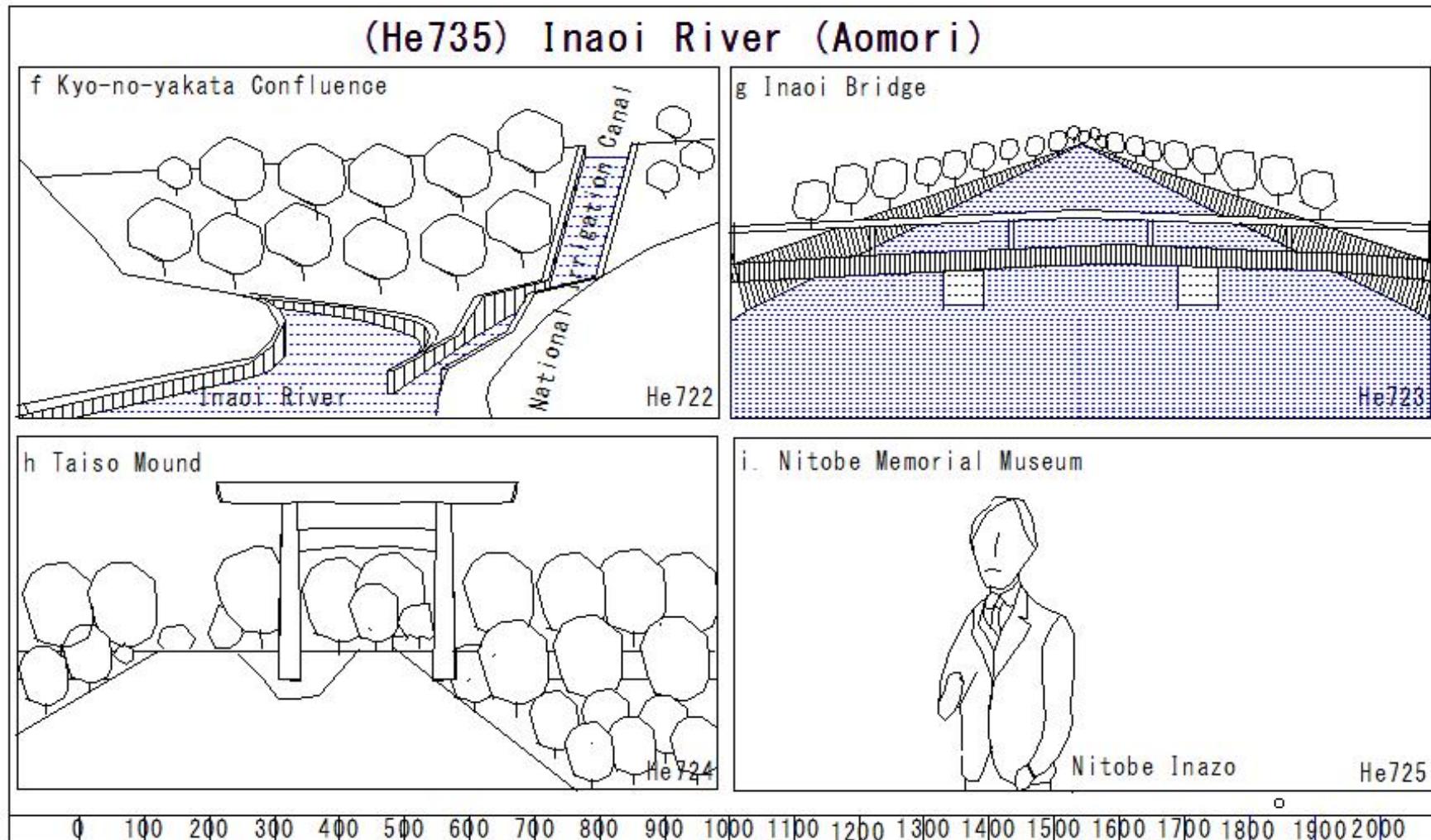
(He734) Inaoi River (Aomori)

(He734) Inaoi River (Aomori)

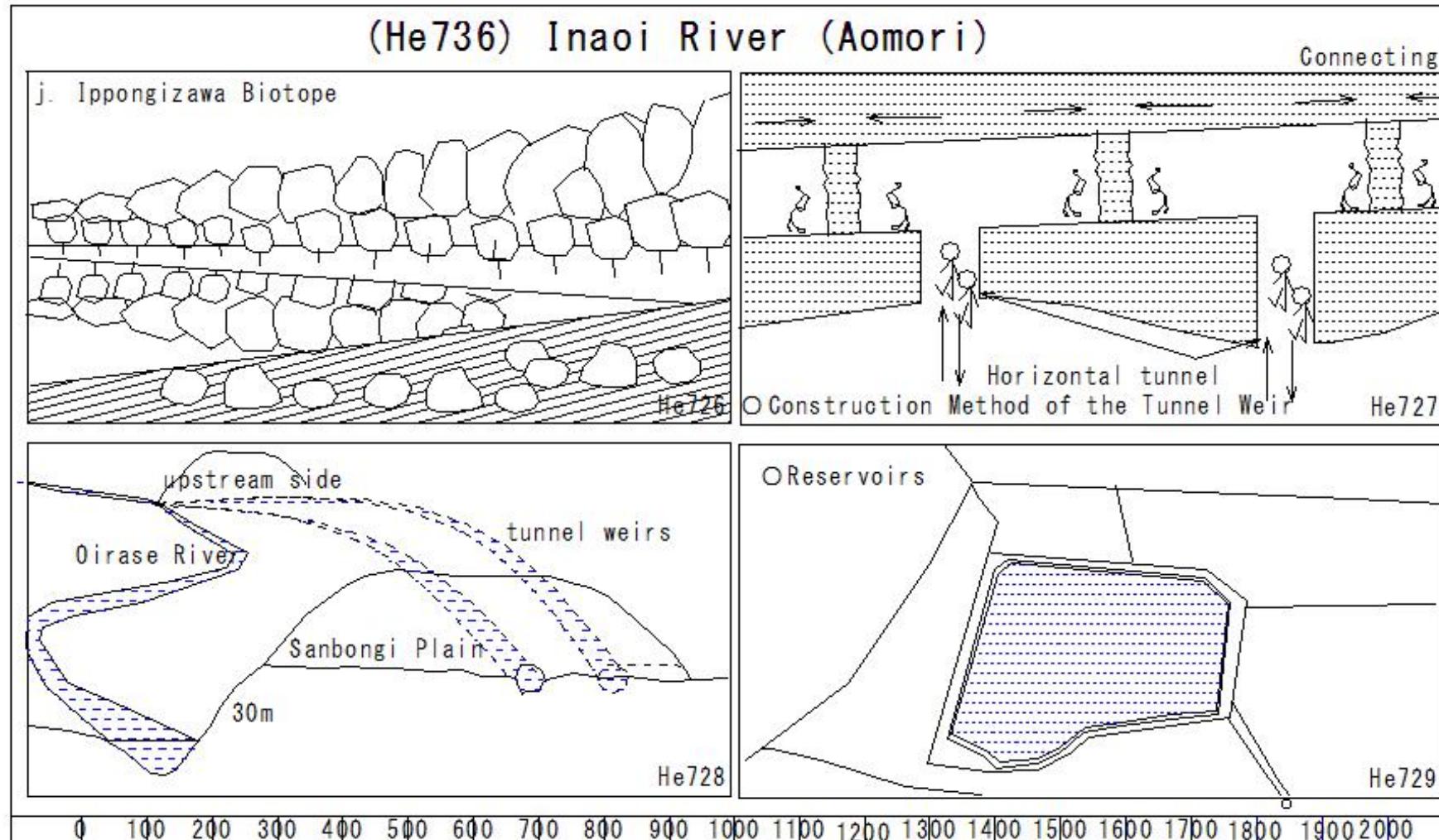


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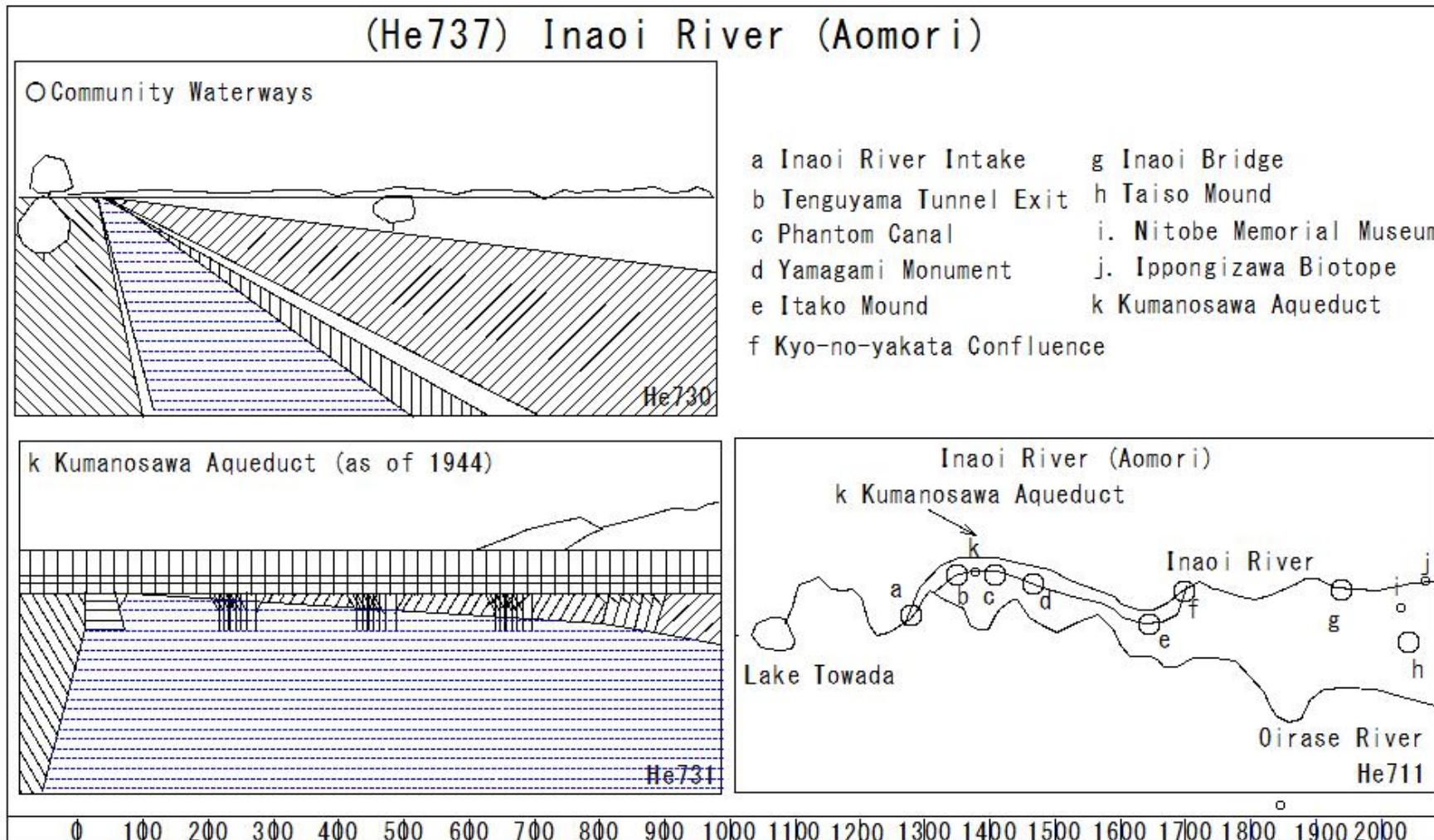
(He735) Inaoi River (Aomori)



(He736) Inaoi River (Aomori)

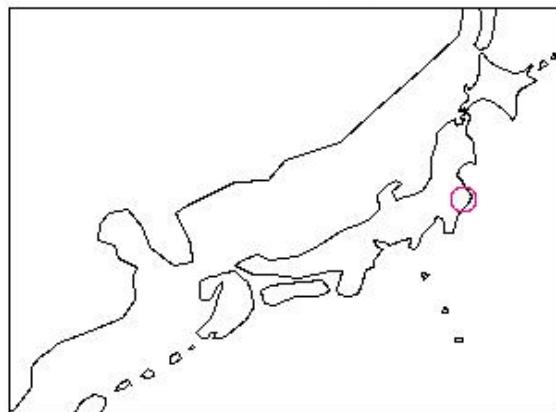


(He737) Inaoi River (Aomori)



(He738) Jukkoku-bori (Ibaraki)

(He738) Jukkoku-bori (Ibaraki)



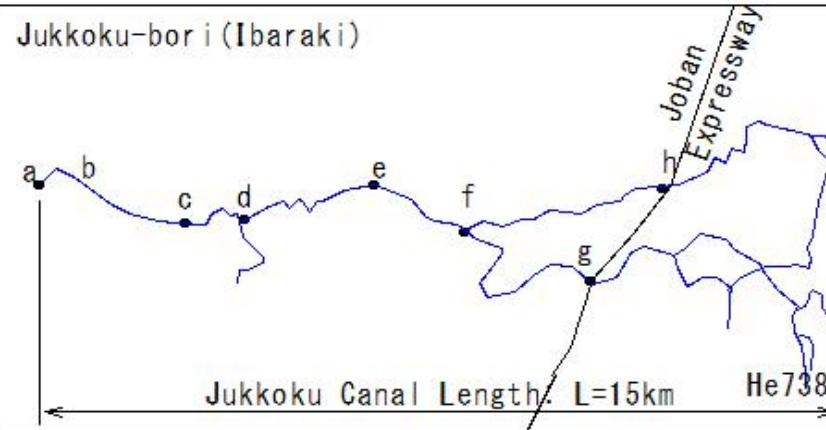
Jukkoku-bori (Ibaraki)

He738

- a Water intake (Karosawa Sluice Gate)
- b Excavation
- c Takinosawa Sluice Gate
- d Hinatana Diversion Weir
- e Waterfront Park
- f Matsui Diversion Weir
- g Dodaira Bridge
- h Jukkoku Canal Aqueduct Bridge

Jukkoku-bori (Ibaraki)

Joban
Expressway



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He739) Jukkoku-bori (Ibaraki)

(He739) Jukkoku-bori (Ibaraki)

- ① Initiated and planned by the farmers themselves.
- ② an irrigation system was constructed in 1669.
- ③ The irrigation canal is approximately 15 km long, with two intake gates, two diversion structures, a maximum water intake of 0.36 m³ per second, and a beneficiary area of 78 hectares.
- ④ The section of the canal approximately 2 km from the water source is still in use today, 350 years after its construction, retaining its original form.
- ⑤ Kitaibaraki City, where the Jikkoku Canal is located, is bordered by the Pacific Ocean to the east.
- ⑥ Because mountains and plateaus occupy 85% of the city area, the mountains and plateaus extend close to the coast.
- ⑦ Farmlands on this plateau suffered from crop failures due to water shortages almost every year, as their only water source was rainwater.
- ⑧ The farmers were in great distress. Therefore, in 1668, Numata Kazue, the village headman at the time, planned the construction of an irrigation canal to alleviate the water shortage and develop new farmland, and petitioned the lord who governed the region.
- ⑨ At the technological level of the time, it was impossible to draw water from the Okita River and send it to the plateau.
- ⑩ the farmers cooperated and searched for a water source in a tributary of the Okita River, located 6 km away in a deep mountainous area at an altitude of 300 meters.
- ⑪ From there, they devised an innovative plan for the time: to construct an irrigation canal approximately 13 km long along the steep mountain slopes, skillfully utilizing the natural terrain.

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(He740) Jukkoku-bori (Ibaraki)

(He740) Jukkoku-bori (Ibaraki)

- ⑫ Initially, the lord did not approve the construction because of the expected difficulty of the project.
- ⑬ However, the lord was moved by the unwavering determination of Numata Kazue, the planner, and approved the construction.
- ⑭ Construction began in August 1668 and, thanks to the cooperation of the farmers, was completed in just about six months, in March 1669.
- ⑮ The construction materials were sourced by the farmers from their own mountains, which allowed them to reduce the construction costs to about one-tenth of the amount estimated by the lord.
- ⑯ The water from the Jukkoku-bori Canal was used in three areas: the Matsui area, the Hitana area, and the Awano area.

(He741) Jukkoku-bori (Ibaraki)

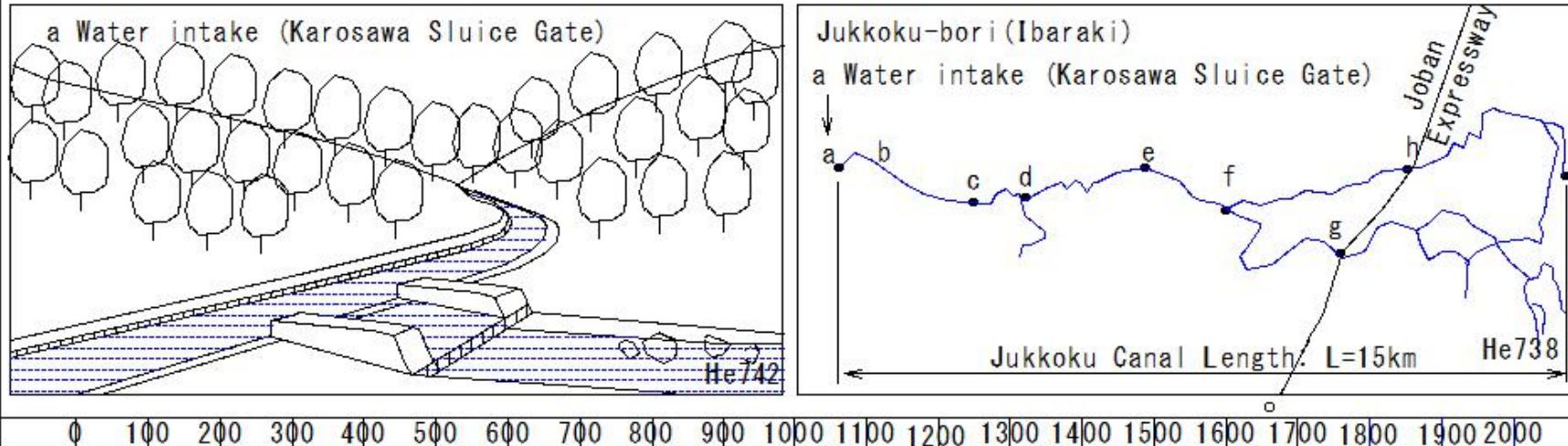
(He741) Jukkoku-bori (Ibaraki)

- ① This region, located on a plateau, suffered from chronic water shortages.
- ② In 1669, led by Numata Kazue, the farmers themselves initiated and planned the project, constructing an irrigation canal approximately 13 km long in just six months.
- ③ The "canal," built as a water conduit connecting two streams with different catchment areas for water source development, was excavated using the outstanding of "gold miners" (mining engineers).
- ④ By utilizing the natural topography of the stream valleys and granite formations, they achieved excellent durability and efficient maintenance, while the farmers

(He742) Jukkoku-bori (Ibaraki)

(He742) Jukkoku-bori (Ibaraki)

- ⑨ At the technological level of the time, it was impossible to draw water from the Okita River and send it to the plateau.
- ⑩ the farmers cooperated and searched for a water source in a tributary of the Okita River, located 6 km away in a deep mountainous area at an altitude of 300 meters.
- ⑪ From there, they devised an innovative plan for the time: to construct an irrigation canal approximately 13 km long along the steep mountain slopes, skillfully utilizing the natural terrain.



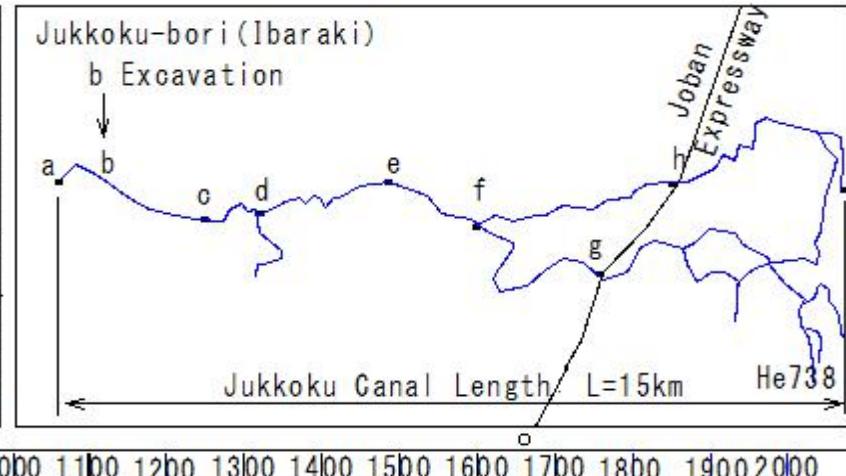
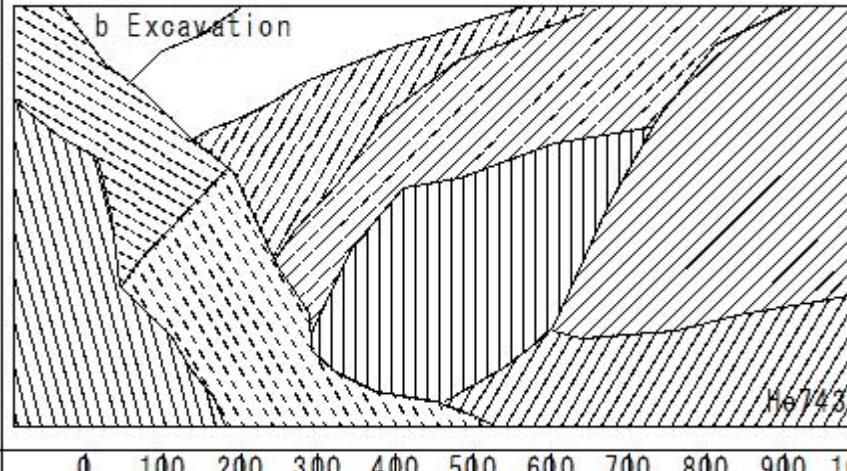
(He743) Jukkoku-bori (Ibaraki)

(He743) Jukkoku-bori (Ibaraki)

b Excavation

A canal dug by gold miners

③ The "canal," built as a water conduit connecting two streams with different catchment areas for water source development, was excavated using the outstanding techniques of "gold miners" (mining engineers).

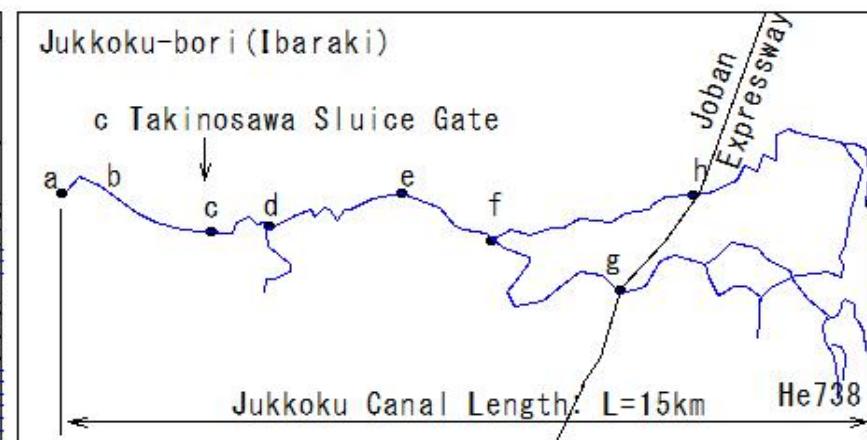
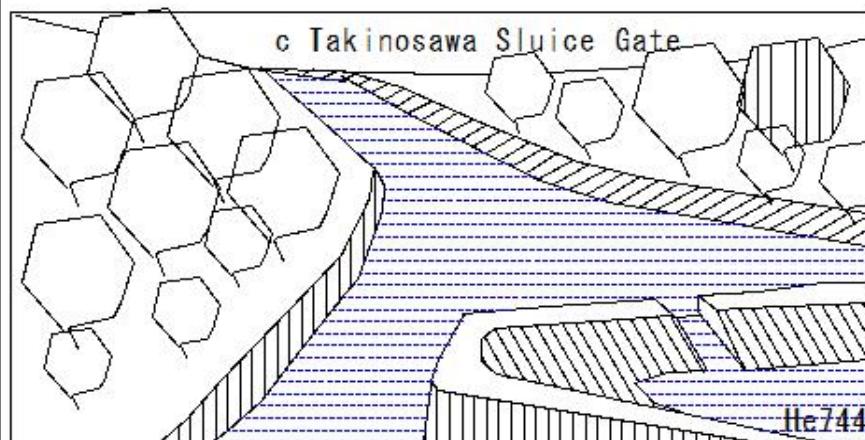


(He744) Jukkoku-bori (Ibaraki)

(He744) Jukkoku-bori (Ibaraki)

c Takinosawa Sluice Gate

⑪ From there, they devised an innovative plan for the time: to construct an irrigation canal approximately 13 km long along the steep mountain slopes, skillfully utilizing the natural terrain.



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He745) Jukkoku-bori (Ibaraki)

(He745) Jukkoku-bori (Ibaraki)

d Hinatana Diversion Weir

At the point where the water branches off to the former Matsui Village and Hitana Village, the water volume is divided in a 6:4 ratio.

a Water intake (Karosawa Sluice Gate)

b Excavation

c Takinosawa Sluice Gate

d Hinatana Diversion Weir

e Waterfront Park

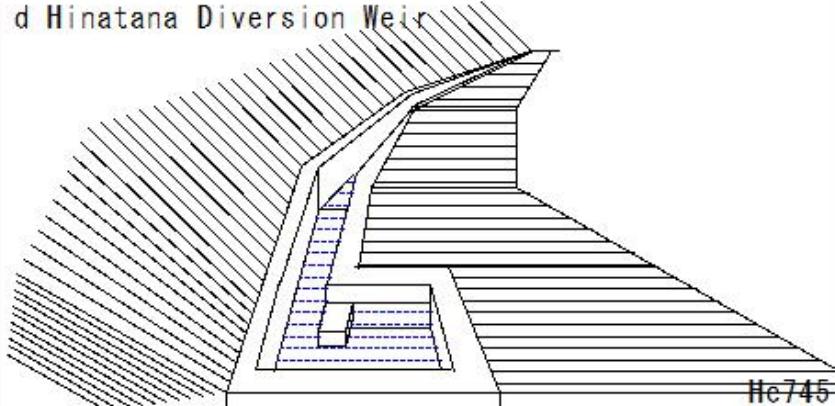
f Matsui Diversion Weir

g Dodaira Bridge

h Jukkoku Canal Aqueduct Bridge

He738

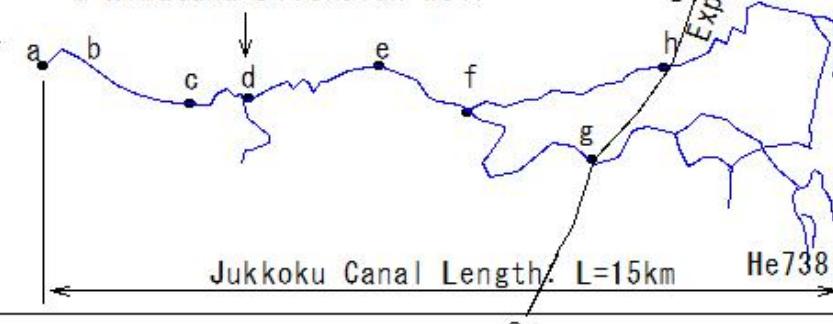
d Hinatana Diversion Weir



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

Jukkoku-bori (Ibaraki)

d Hinatana Diversion Weir



Jukkoku Canal Length: L=15km

(He746) Jukkoku-bori (Ibaraki)

(He746) Jukkoku-bori (Ibaraki)

e Waterfront Park

It is located approximately in the center of the Jukkoku-bori Canal and is popular as a place for relaxation.

a Water intake (Karosawa Sluice Gate)

b Excavation

c Takinosawa Sluice Gate

d Hinatana Diversion Weir

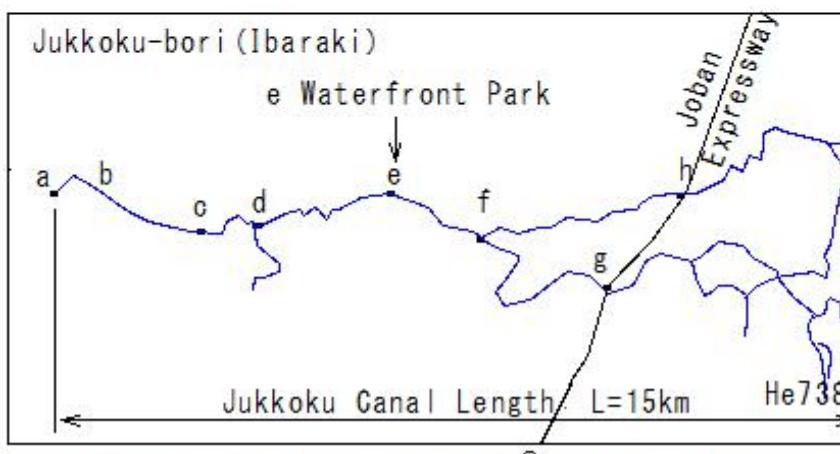
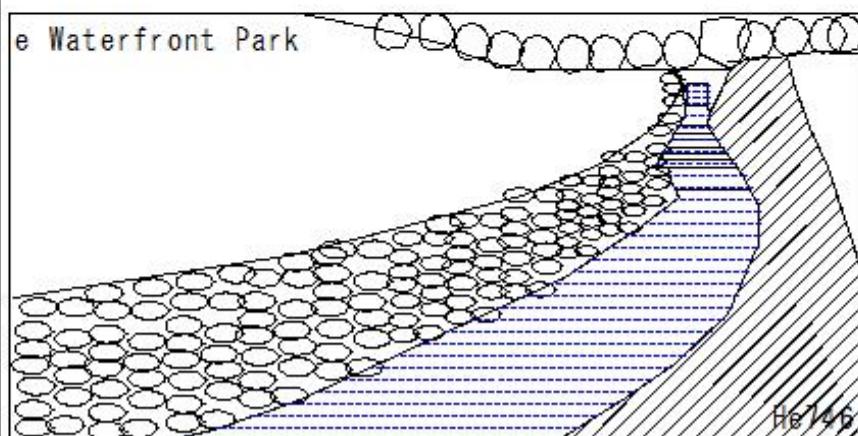
e Waterfront Park

f Matsui Diversion Weir

g Dodaira Bridge

h Jukkoku Canal Aqueduct Bridge

He738



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He747) Jukkoku-bori (Ibaraki)

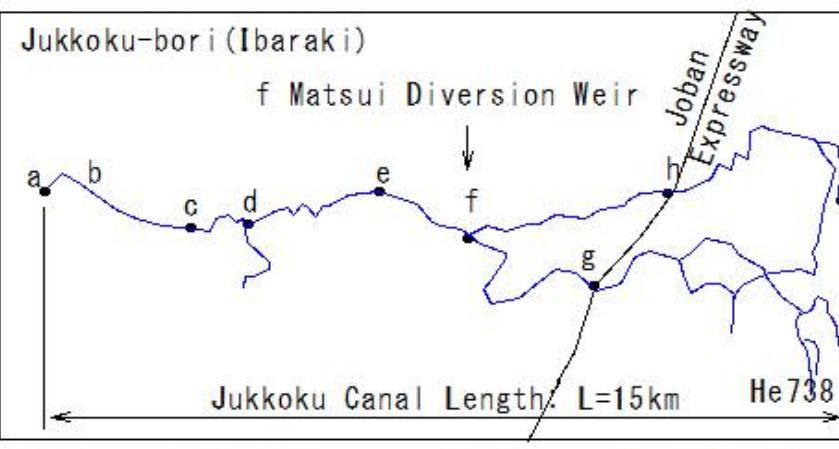
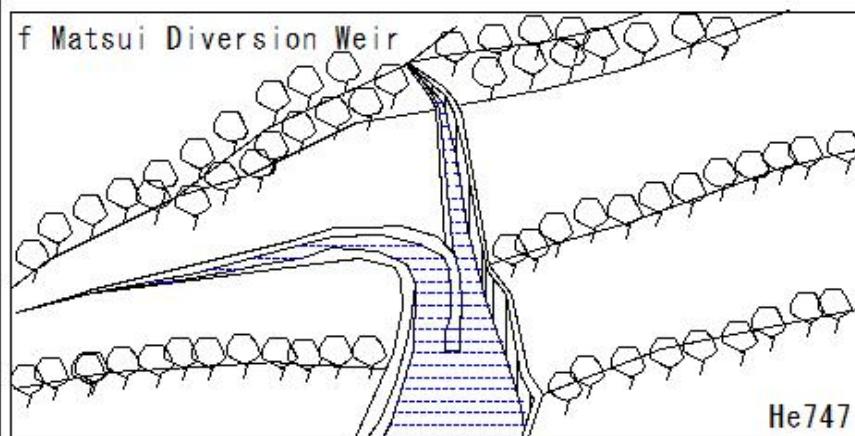
(He747) Jukkoku-bori (Ibaraki)

f Matsui Diversion Weir

At the point where the water branches off to the former Matsui Village and Kurino Village, the water volume is divided in a 4:6 ratio.

The channel leading towards Matsui has a thousand-step waterway.

The channel leading towards Kurino has an old iron bridge.



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(He748) Jukkoku-bori (Ibaraki)

(He748) Jukkoku-bori (Ibaraki)

h Jukkoku Canal Aqueduct Bridge

The Jukkoku Canal, which branches off from the Joban Expressway,

The Jukkoku Canal Aqueduct Bridge has an aqueduct built over it.

a Water intake (Karosawa Sluice Gate)

b Excavation

c Takinosawa Sluice Gate

d Hinatana Diversion Weir

e Waterfront Park

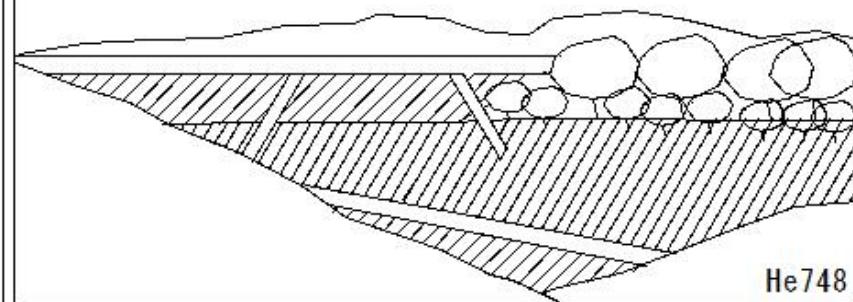
f Matsui Diversion Weir

g Dodaira Bridge

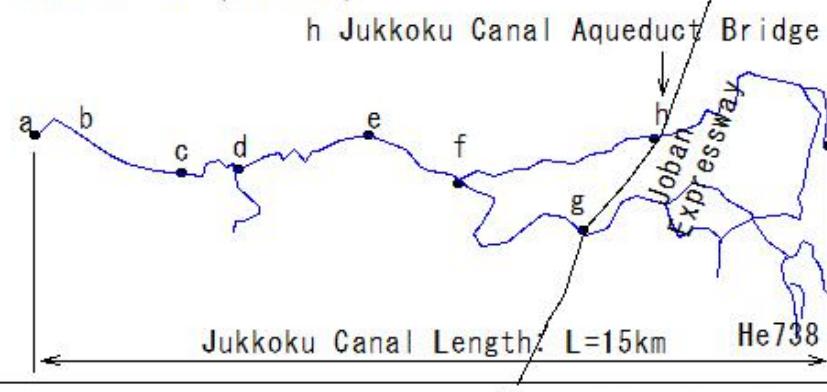
h Jukkoku Canal Aqueduct Bridge

He738

h Jukkoku Canal Aqueduct Bridge



Jukkoku-bori (Ibaraki)



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(He749) Jukkoku-bori (Ibaraki)

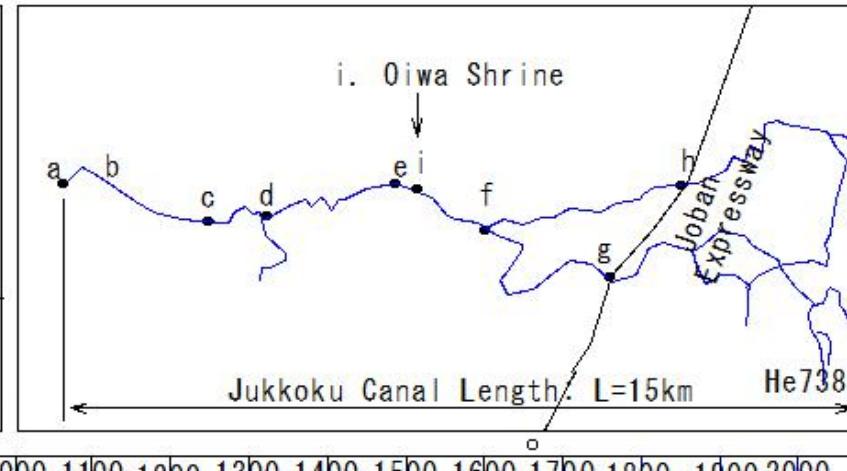
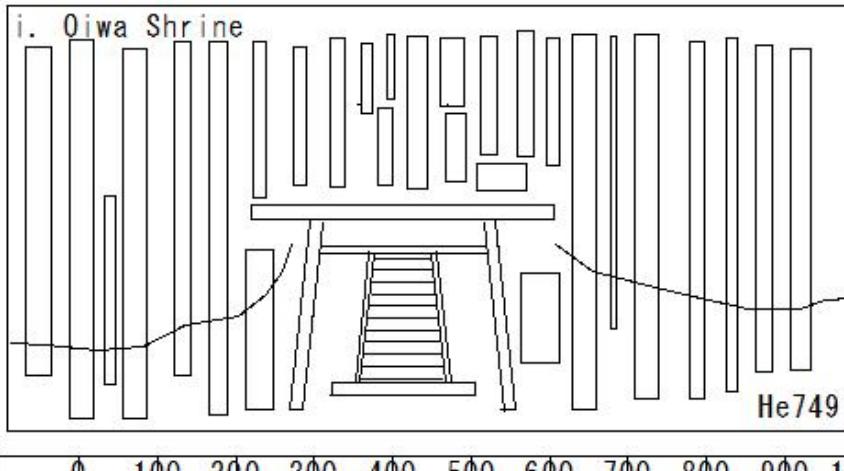
(He749) Jukkoku-bori (Ibaraki)

i. Oiwa Shrine

A shrine with a legend that Numata Kazue, the key figure in the construction of the Jikkoku Canal, risked his life to make a request to the lord.

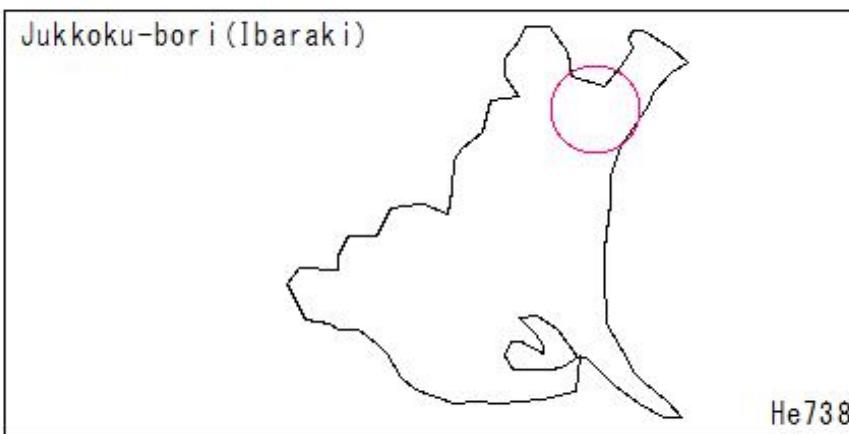
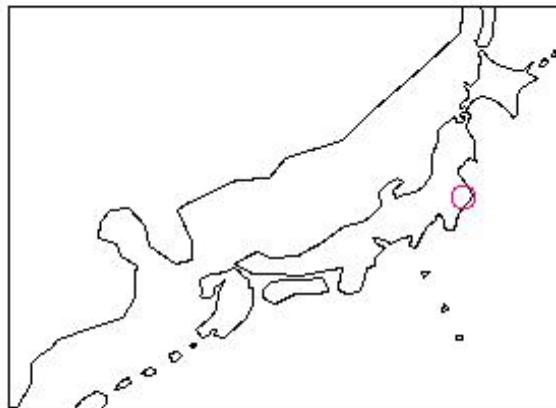
- a Water intake (Karosawa Sluice Gate)
- b Excavation
- c Takinosawa Sluice Gate
- d Hinatana Diversion Weir
- e Waterfront Park
- f Matsui Diversion Weir
- g Dodaira Bridge
- h Jukkoku Canal Aqueduct Bridge
- i. Oiwa Shrine

He738



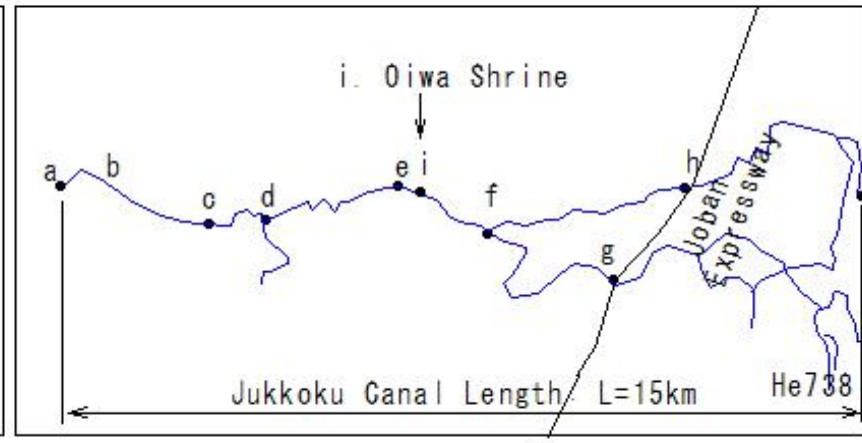
(He750) Jukkoku-bori (Ibaraki)

(He750) Jukkoku-bori (Ibaraki)



- a Water intake (Karosawa Sluice Gate)
- b Excavation
- c Takinosawa Sluice Gate
- d Hinatana Diversion Weir
- e Waterfront Park
- f Matsui Diversion Weir
- g Dodaira Bridge
- h Jukkoku Canal Aqueduct Bridge
- i Oiwa Shrine

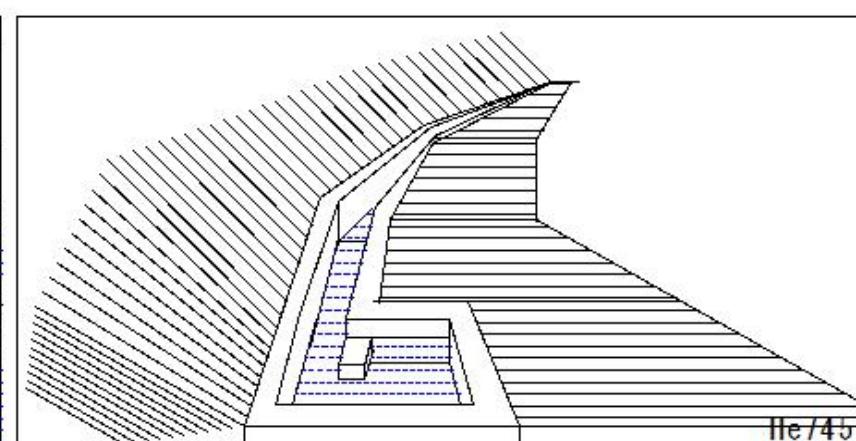
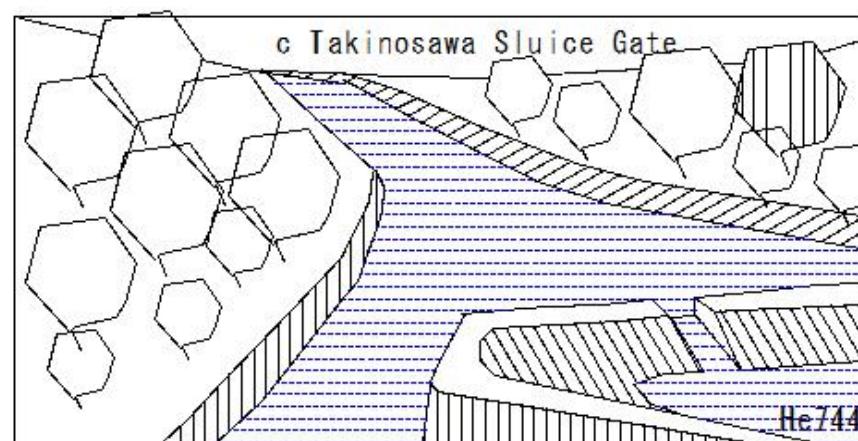
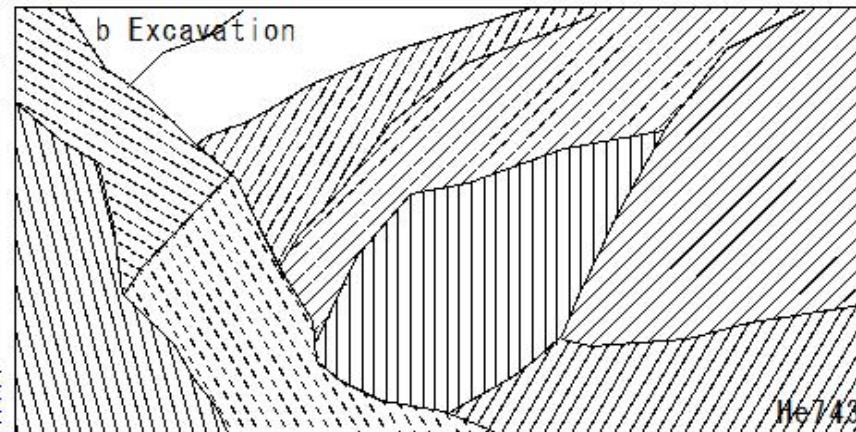
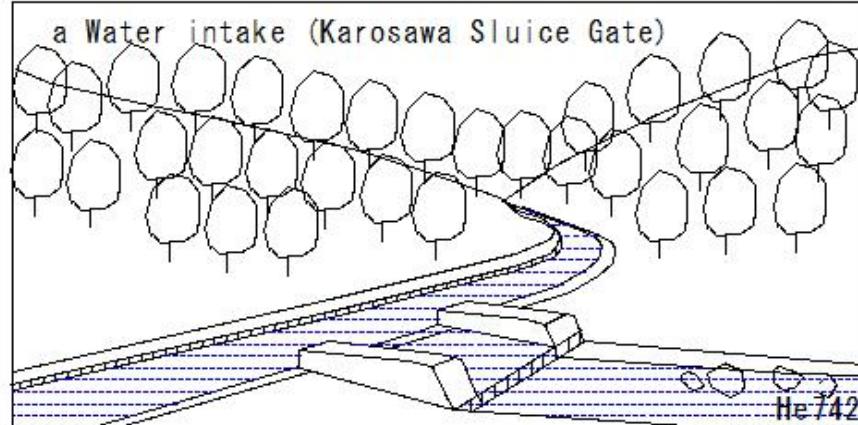
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(He751) Jukkoku-bori (Ibaraki)

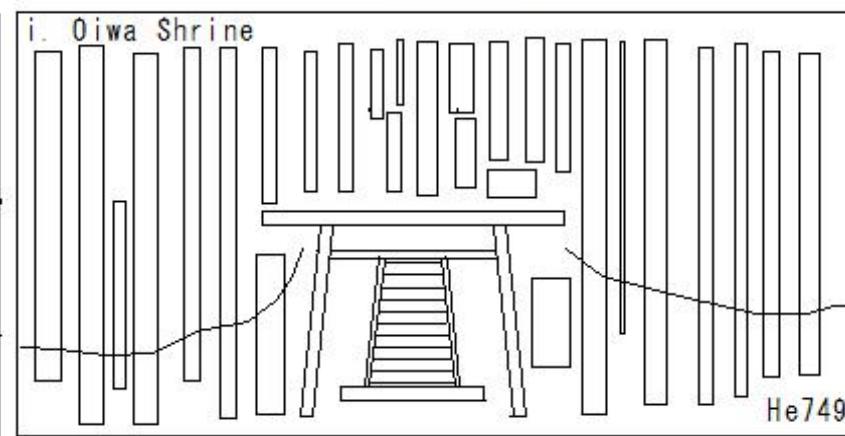
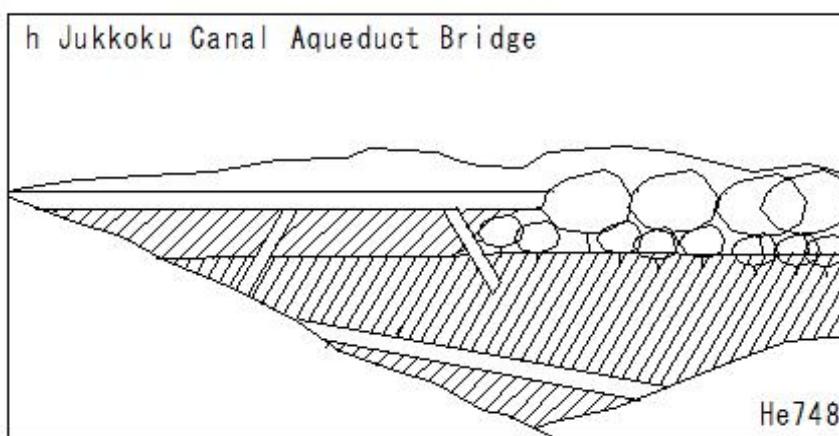
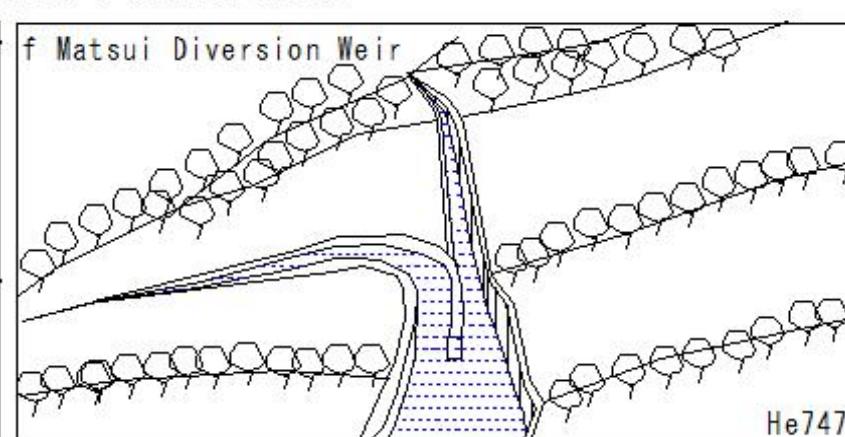
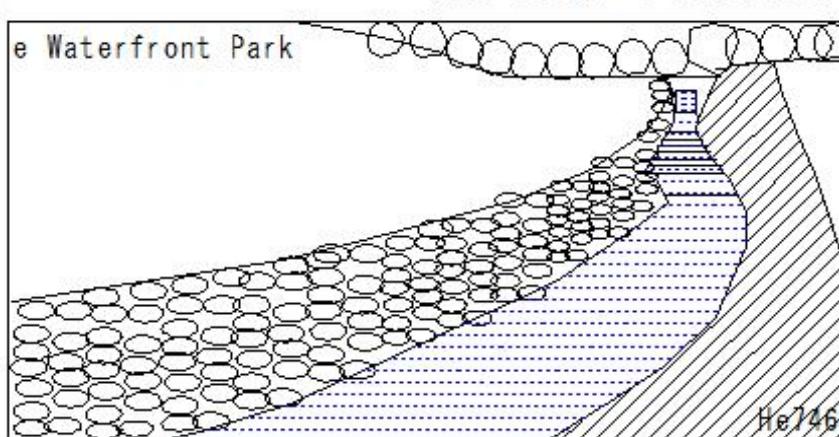
(He751) Jukkoku-bori (Ibaraki)



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(He752) Jukkoku-bori (Ibaraki)

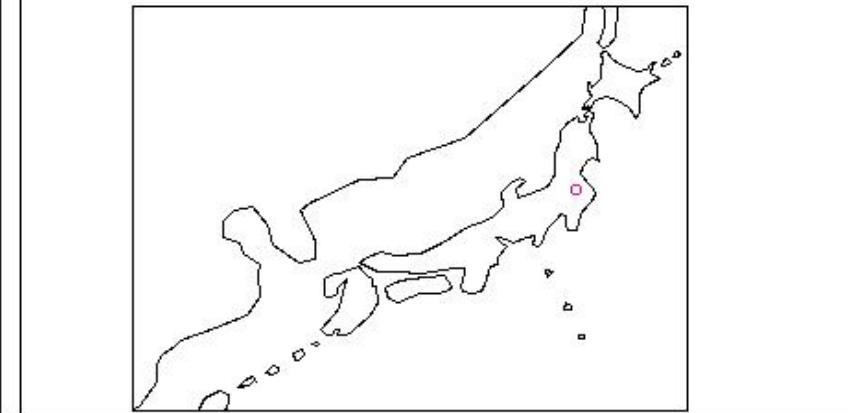
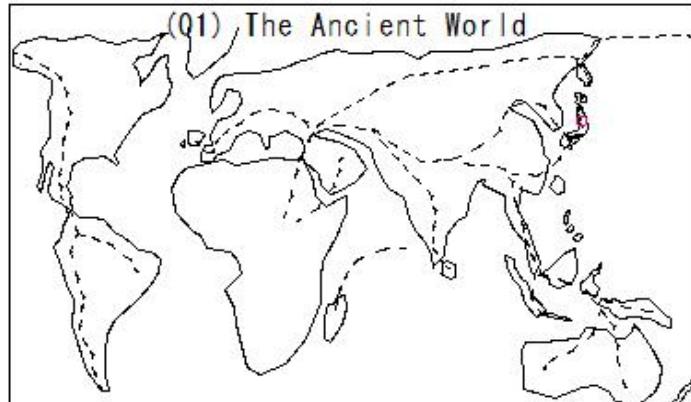
(He752) Jukkoku-bori (Ibaraki)



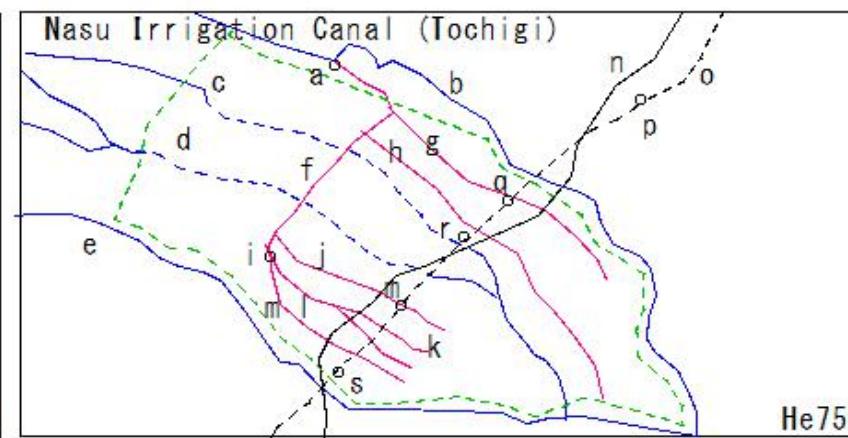
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(He753) Nasu Irrigation Canal (Tochigi)

(He753) Nasu Irrigation Canal (Tochigi)



a Nishi-Iwasaki Intake	k Fourth Branch Canal
b Naka River	l Tatebori Canal
c Kumagawa River	m Nishibori Canal
d Sabigawa River	n National Route 4
e Houkigawa River	o Tohoku Main Line
f Main Canal of Nasu Irrigation Canal	
g First Branch Canal	p JR Utsunomiya Station
h Second Branch Canal	q Kuroiso Station
i Senbonmatsu	r Nasushiobara Station
j Third Branch Canal	s Nozaki Station



Ø 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He754) Nasu Irrigation Canal (Tochigi)

(He754) Nasu Irrigation Canal (Tochigi)

Chronology of the Nasu Irrigation Canal]

- Meiji 9 (1876) Jo saku Inami and Takeshi Yaita resolve to construct an irrigation canal.
- Meiji 12 (1879) Jo saku Inami and Takeshi Yaita request Hirobumi Ito and Masayoshi Matsukata to open an irrigation canal at Karasugamori.
- Meiji 13 (1880) Michitsune Mishima establishes the Chō kō sha (Mishima Farm).
Jo saku Inami and Takeshi Yaita establish the Nasu Kaikonsha (Nasu Reclamation Company).
- Meiji 15 (1882) The drinking water canal is completed.
- Meiji 18 (1885) The main canal (approximately 16.3 km) of the Nasu Irrigation Canal is completed.
- Meiji 19 (1886) Four branch canals of the Nasu Irrigation Canal are constructed.
- Meiji 38 (1905) The intake of the Nasu Irrigation Canal is relocated upstream.
- Taisho 4 (1915) The intake of the Nasu Irrigation Canal is relocated downstream.
- Showa 4 (1929) A roof is added to the intake of the Nasu Irrigation Canal, and it is renovated into a gate that can be opened and closed.
- Showa 43 (1968) The National Nasunogahara Comprehensive Development Project begins.
- Showa 48 (1973) The Miyama Dam is completed.
- 1976 (Showa 51) A new intake for the Nasu Irrigation Canal, the Nishi-Iwasaki Headworks, is completed.
- 1980 (Showa 55) The Akada regulating reservoir is completed.
- 1992 (Heisei4) The Toda regulating reservoir is completed.

(He755) Nasu Irrigation Canal (Tochigi)

(He755) Nasu Irrigation Canal (Tochigi)

People Involved in the Development of Nasunogahara

○ Inami Josaku (1831-1888)

Born in Nikko City, he was involved in the development of Nasunogahara and constructed the Nasu Canal, one of Japan's three major irrigation canals.

He also established the Nasu Reclamation Company and became its first president.

○ Yaita Takeshi (1849-1922)

Born in Yaita City, he worked with Inami Josaku to construct the Nasu Canal and became the second president of the Nasu Reclamation Company.

He also served as a prefectural assembly member and dedicated himself not only to Nasunogahara but also to Tochigi Prefecture.

(He756) Nasu Irrigation Canal (Tochigi)

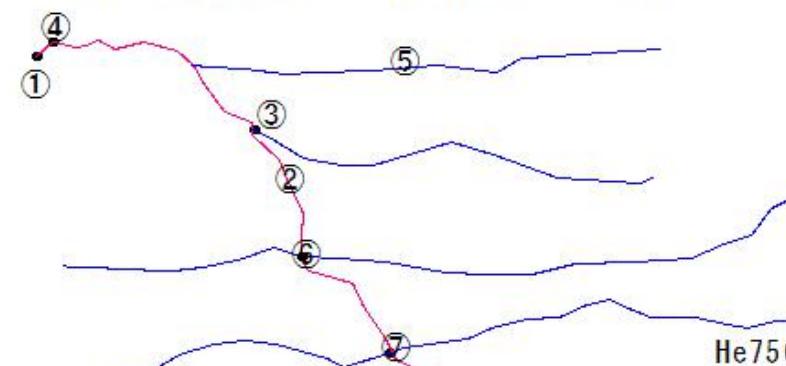
(He756) Nasu Irrigation Canal (Tochigi)

Nasu Plain and Nasu Irrigation Canal in 1886

- ① Nishi-Iwasaki Water Intake
- ② Nasu Irrigation Canal (Main Canal)
- ③ Second Branch Canal
- ④ Iwasaki Tunnel
- ⑤ Branch Canal
- ⑥ Kumagawa Aqueduct
- ⑦ Sabigawa River Aqueduct

He756

Nasu Plain and Nasu Irrigation Canal in 1886



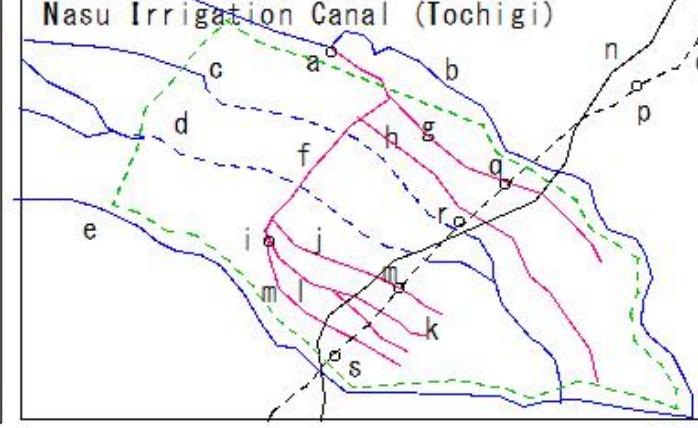
He756

a Nishi-Iwasaki Intake k Fourth Branch Canal

- | | |
|---------------------------------------|-------------------------|
| b Naka River | i Tatebori Canal |
| c Kumagawa River | m Nishibori Canal |
| d Sabigawa River | n National Route 4 |
| e Houkigawa River | o Tohoku Main Line |
| f Main Canal of Nasu Irrigation Canal | p JR Utsunomiya Station |
| g First Branch Canal | q Kuroiso Station |
| h Second Branch Canal | r Nasushiobara Station |
| i Senbonmatsu | s Nozaki Station |
| j Third Branch Canal | t |

He753

Nasu Irrigation Canal (Tochigi)



He753

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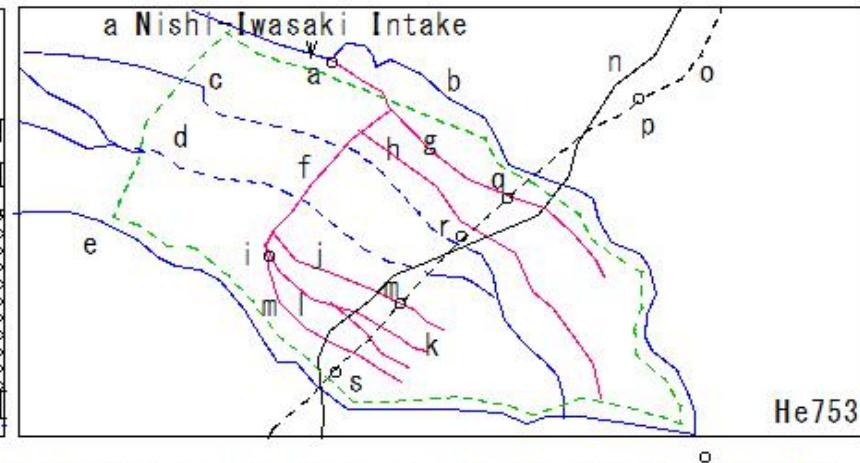
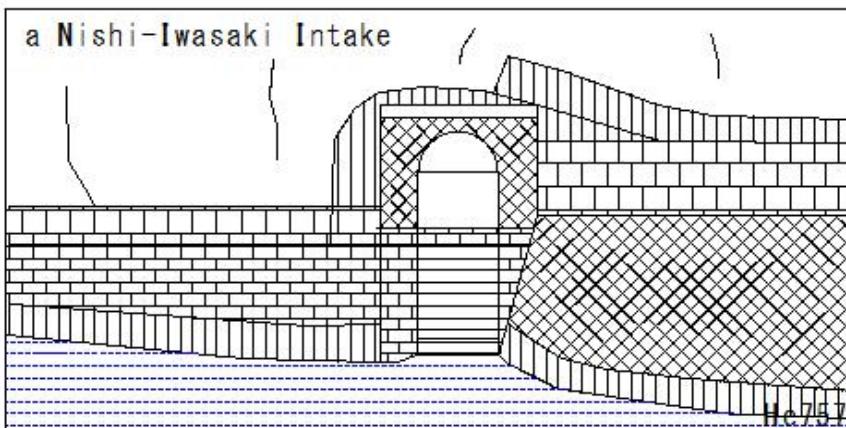
(He757) Nasu Irrigation Canal (Tochigi)

(He757) Nasu Irrigation Canal (Tochigi)

a Nishi-Iwasaki Intake

Former Nasu Irrigation Canal Intake: East Water Gate (First and Third Intake)

and Embankment No. 3 (East and West) Designated as a National Important Cultural Property



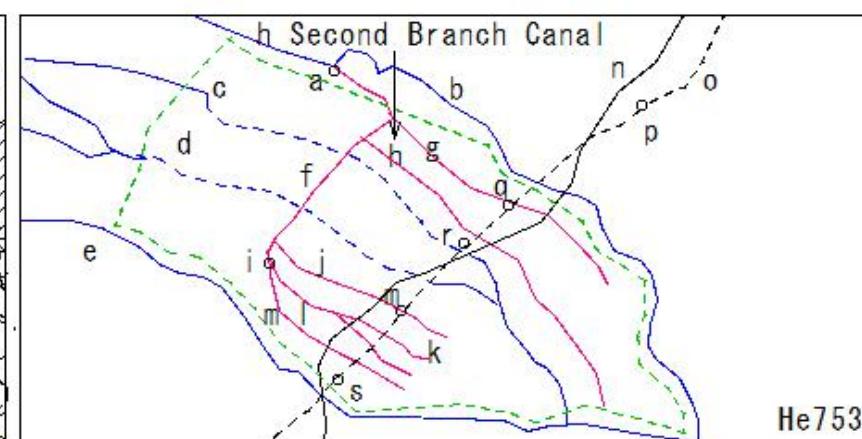
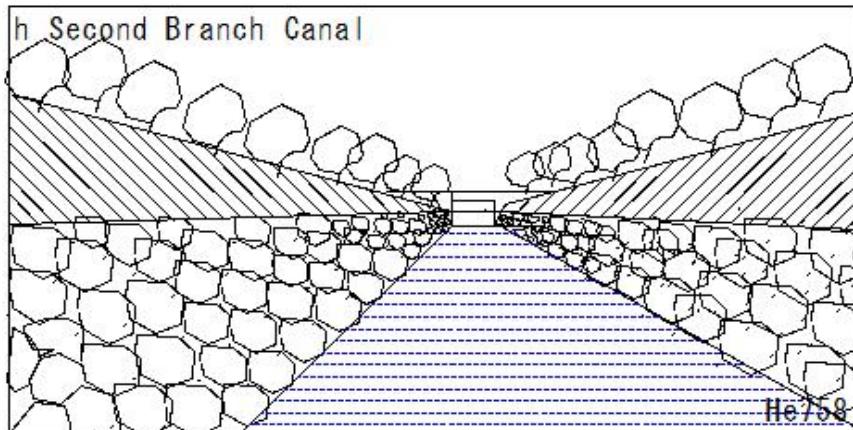
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(He758) Nasu Irrigation Canal (Tochigi)

(He758) Nasu Irrigation Canal (Tochigi)

h Second Branch Canal

Stone-lined waterway: Iwasaki Second Tunnel entrance / Water conduit and West water gate



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(He759) Nasu Irrigation Canal (Tochigi)

(He759) Nasu Irrigation Canal (Tochigi)

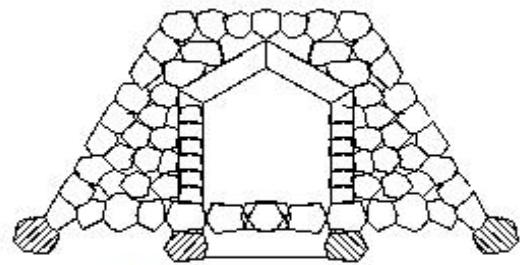
⑥ Kumagawa Aqueduct

⑦ Sabigawa River Aqueduct

○ The cross-section is a pentagonal stone structure (136 cm wide and 167 cm high), and it is quite deep, measuring 5 meters at the entrance and 7 meters at the exit.

○ The construction involved excavating the riverbed, building the culvert structure, and then backfilling it. Cut stones were used for the culvert, and pine resin and cement were used as adhesives.

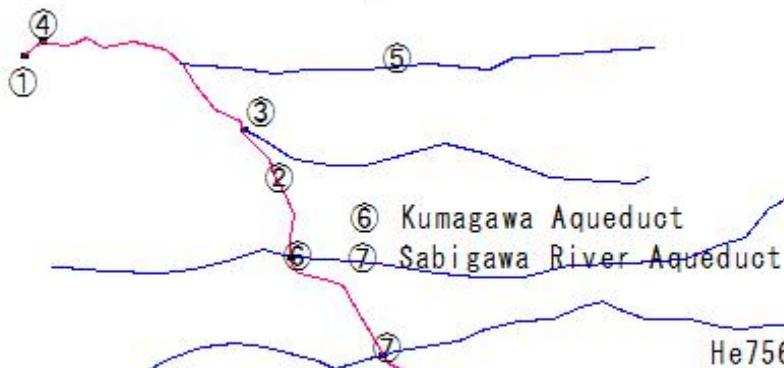
⑥ Kumagawa Aqueduct
⑦ Sabigawa River Aqueduct



Siphon cross section

He759

Nasu Plain and Nasu Irrigation Canal in 1886



He756

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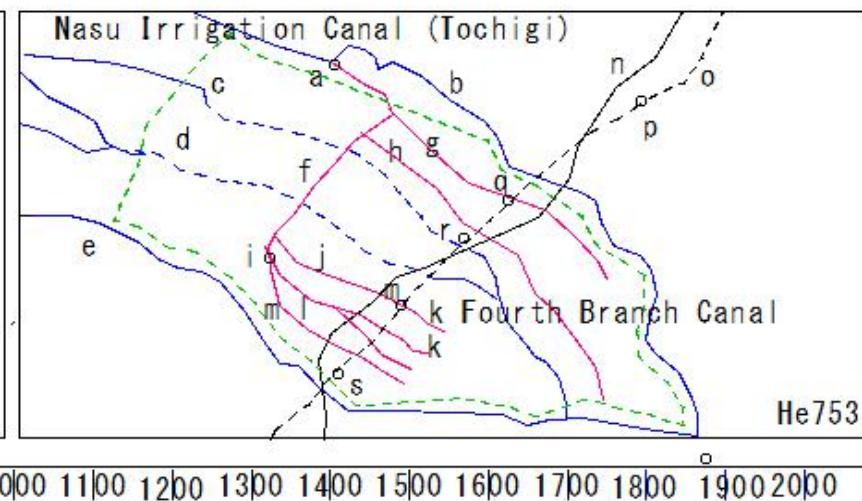
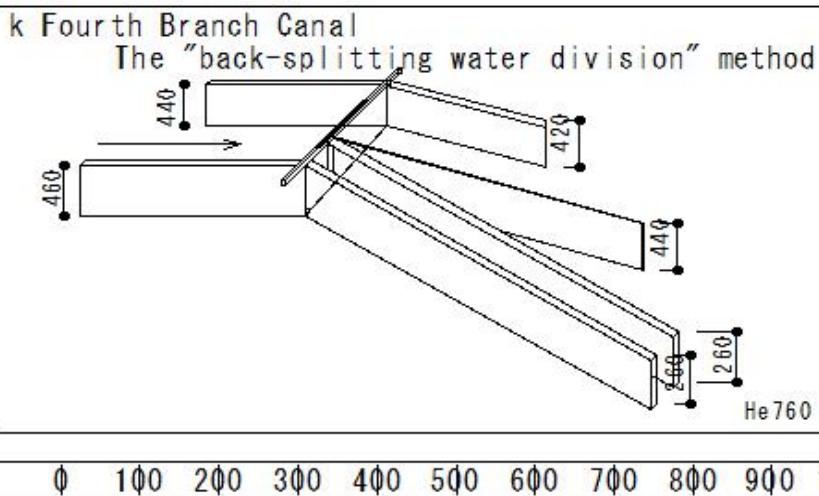
(He760) Nasu Irrigation Canal (Tochigi)

(He760) Nasu Irrigation Canal (Tochigi)

k Fourth Branch Canal

The "back-splitting water division" method

○ The "back-splitting water division" method, an exceptional water distribution system devised at the fourth branch canal located at the very end of the Nasu Irrigation Canal.



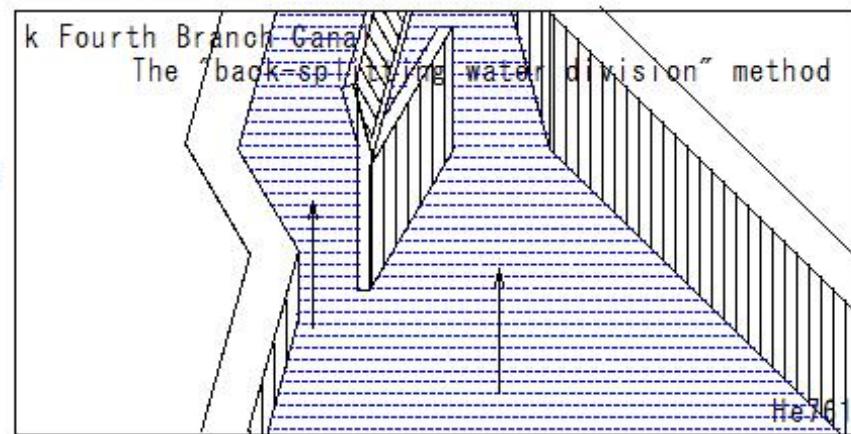
(He761) Nasu Irrigation Canal (Tochigi)

(He761) Nasu Irrigation Canal (Tochigi)

k Fourth Branch Canal

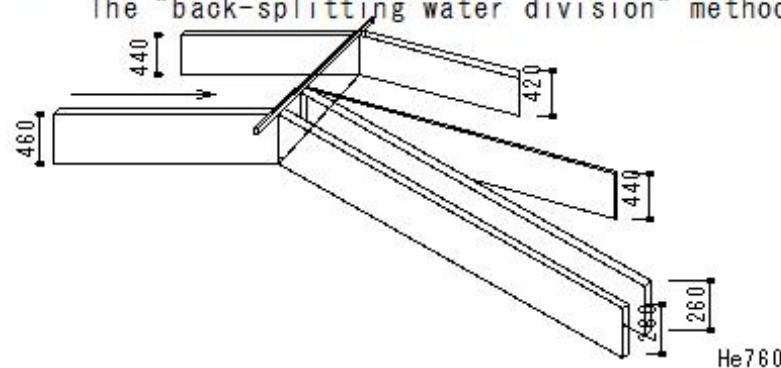
The "back-splitting water division" method

○ The "back-splitting water division" method,
an exceptional water distribution system devised
at the fourth branch canal located at the very
end of the Nasu Irrigation Canal.

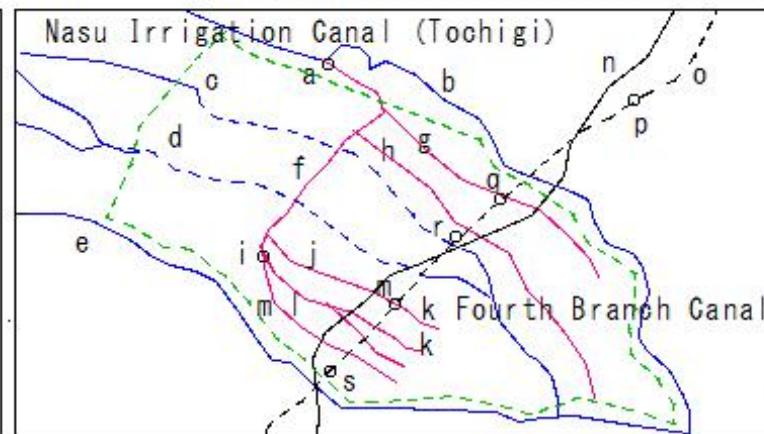


k Fourth Branch Canal

The "back-splitting water division" method



Nasu Irrigation Canal (Tochigi)



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(He762) Nasu Irrigation Canal (Tochigi)

(He762) Nasu Irrigation Canal (Tochigi)

Ichirobei Minami

Ichirobei Minami, who was involved in Japan's three major irrigation canals:

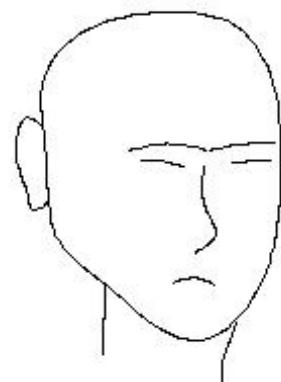
1878 (Meiji 11): Directed on-site preparations for the construction of the Asaka Irrigation Canal.

1881 (Meiji 14): Received a request from Kyoto Prefectural Governor Kunitomo Kitagaki to conduct an on-site survey for the Lake Biwa Canal project.

1882 (Meiji 15): Submitted an opinion paper and a water utilization plan for the Lake Biwa Canal.

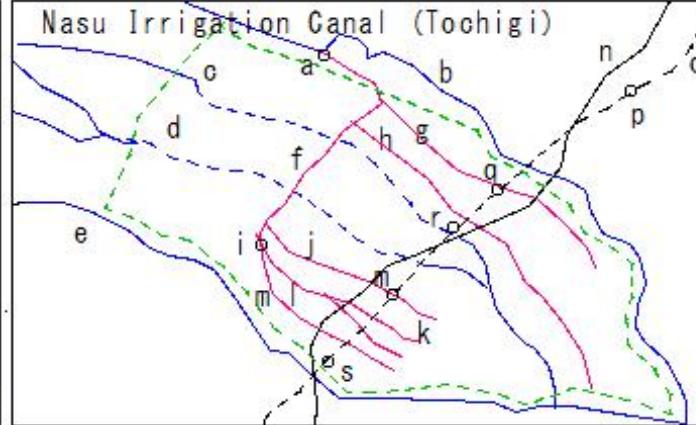
1883 (Meiji 16): Conducted surveying for the excavation of the Nasu Irrigation Canal.

Ichirobei Minami



He762

Nasu Irrigation Canal (Tochigi)



He753

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(He763) Nasu Irrigation Canal (Tochigi)

(He763) Nasu Irrigation Canal (Tochigi)

Inami Josaku

Born on July 16, 1831, in Nikko City. In 1850, at the age of 19, Jozaku was adopted by Jō shichi Inami of Sakuyama-juku.

In 1876, inspired by the grand canal project conceived by Governor Motoki Nabeshima, which aimed to connect the upper reaches of the Naka River to the Kinugawa River, he conducted on-site surveys of the planned canal route.

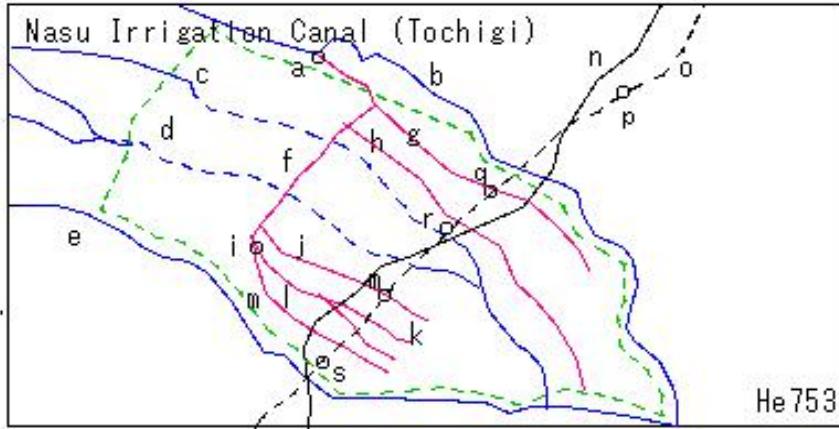
In 1880, he established the Nasu Reclamation Company with 11 other founders. While the canal project was abandoned due to various circumstances, he shifted his focus to the construction of the Nasu Irrigation Canal.

He spent a total of 236 days lobbying government officials to make the project a reality.

Inami Josaku



He763



He753

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He764) Nasu Irrigation Canal (Tochigi)

(He764) Nasu Irrigation Canal (Tochigi)

Takeshi Yaita

Born on November 14, 1849, in Yaita City.

In 1866 (Keio 2), at the young age of 17, he became the headman of Yaita Village, and in 1879 (Meiji 12), he became the first member of the Tochigi Prefectural Assembly.

He worked alongside Jozaku Inami in the construction of waterways.

The petition movement for the construction of canals and large irrigation waterways

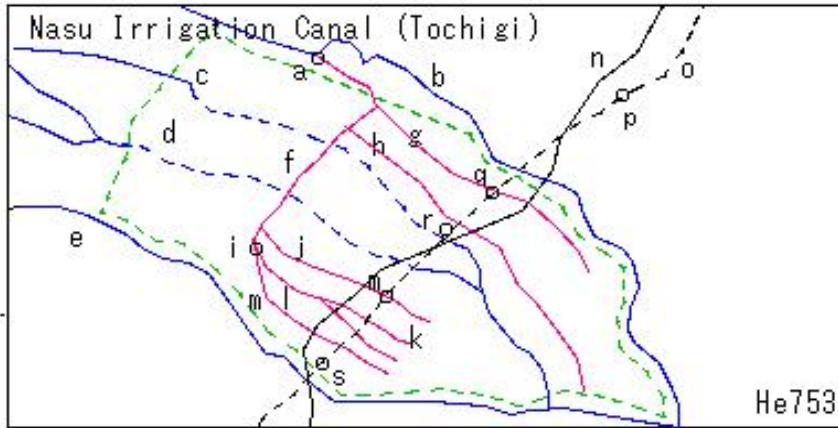
lasted for over 200 days.

Although Inami and Yaita were nearly 20 years apart in age, their actions were always in perfect harmony. After Inami's death in 1888 (Meiji 21), he became the president of the Nasu Reclamation Company.

Takeshi Yaita



He764

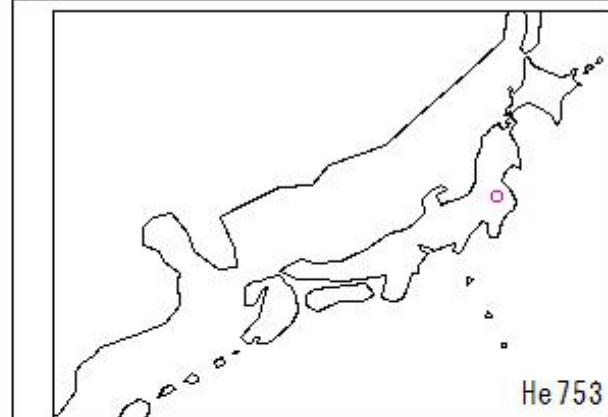


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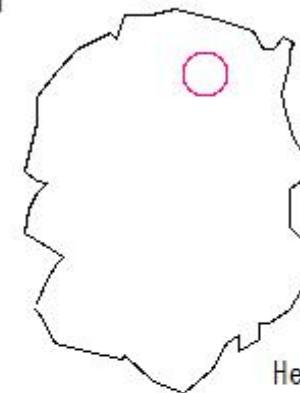
(He765) Nasu Irrigation Canal (Tochigi)

(He765) Nasu Irrigation Canal (Tochigi)

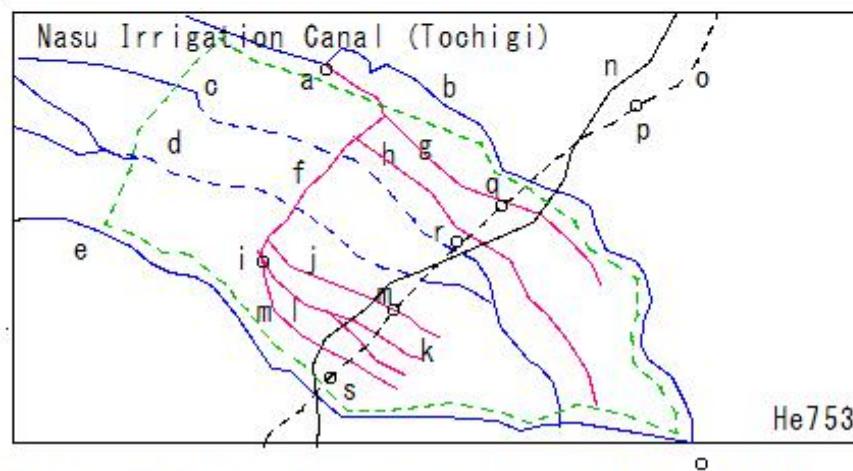
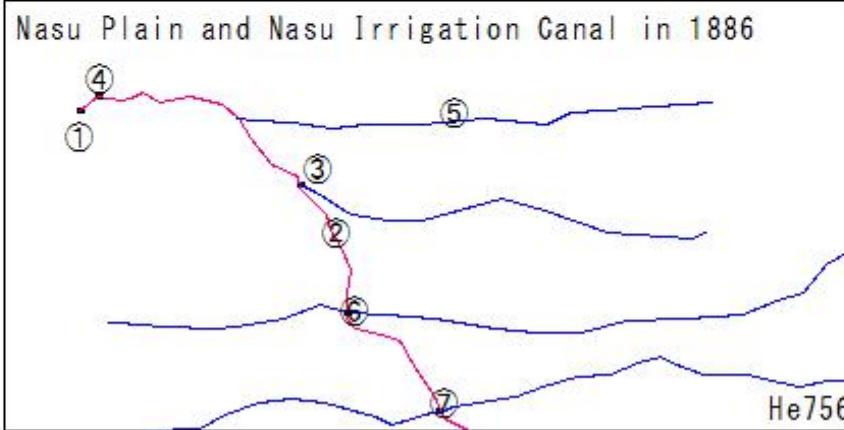


He753

Nasu-sosui Irrigation Canal
Barren land
Nasu Plain
Bringing the water of life



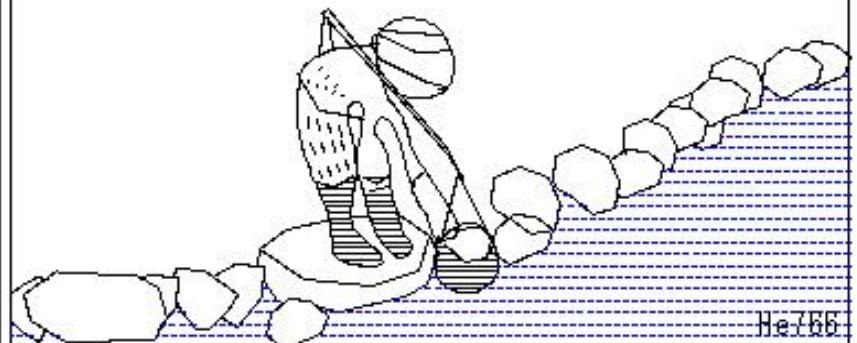
He765



(He766) Nasu Irrigation Canal (Tochigi)

(He766) Nasu Irrigation Canal (Tochigi)

Drawing water

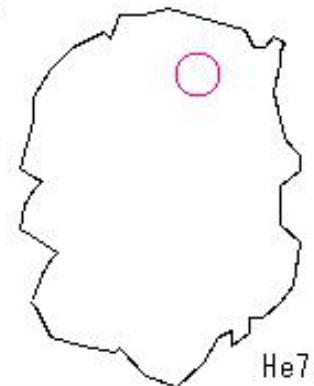


Nasu-sosui Irrigation Canal

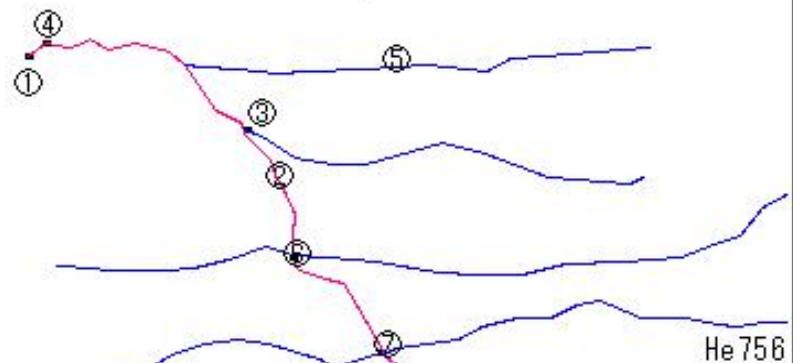
Barren land

Nasu Plain

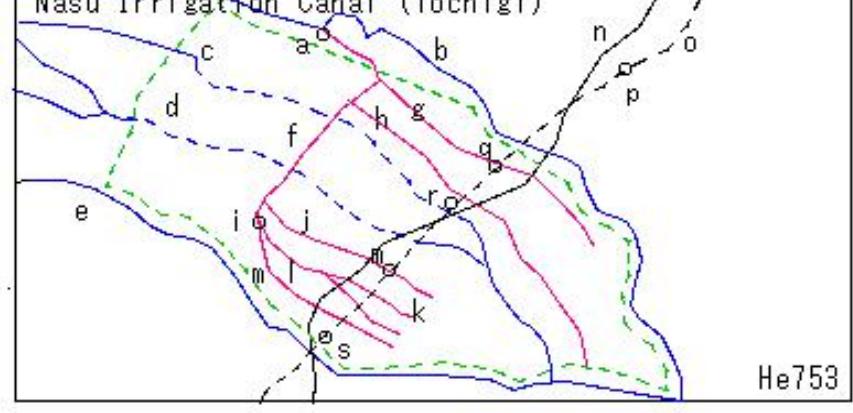
Bringing the water of life



Nasu Plain and Nasu Irrigation Canal in 1886



Nasu Irrigation Canal (Tochigi)



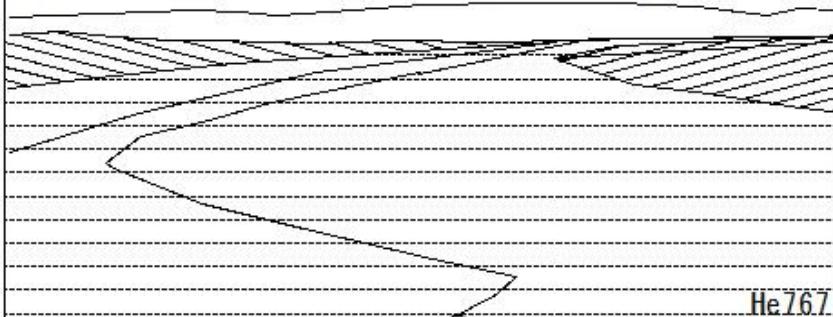
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He767) Nasu Irrigation Canal (Tochigi)

(He767) Nasu Irrigation Canal (Tochigi)

The Sabigawa River, which has no water.

d Sabigawa River ⑦ Sabigawa River Aqueduct

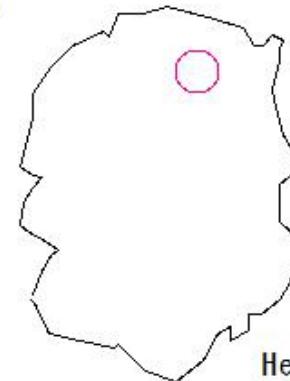


Nasu-sosui Irrigation Canal

Barren land

Nasu Plain

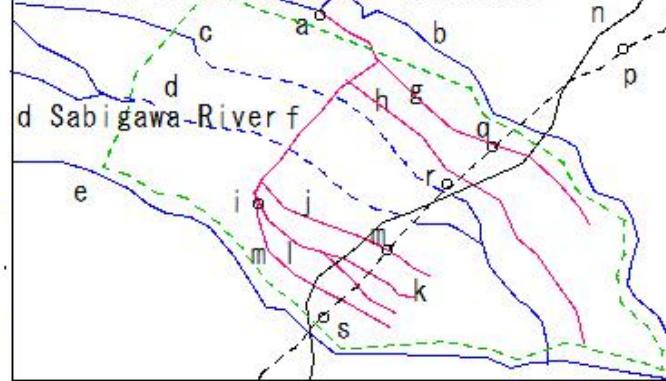
Bringing the water of life



Nasu Plain and Nasu Irrigation Canal in 1886



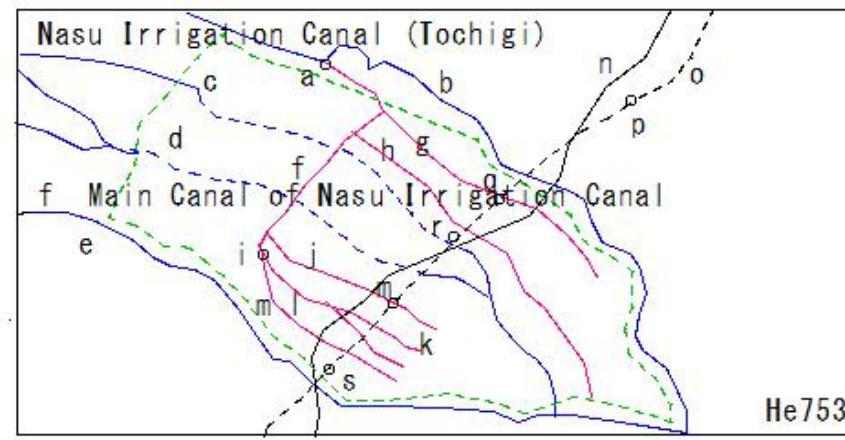
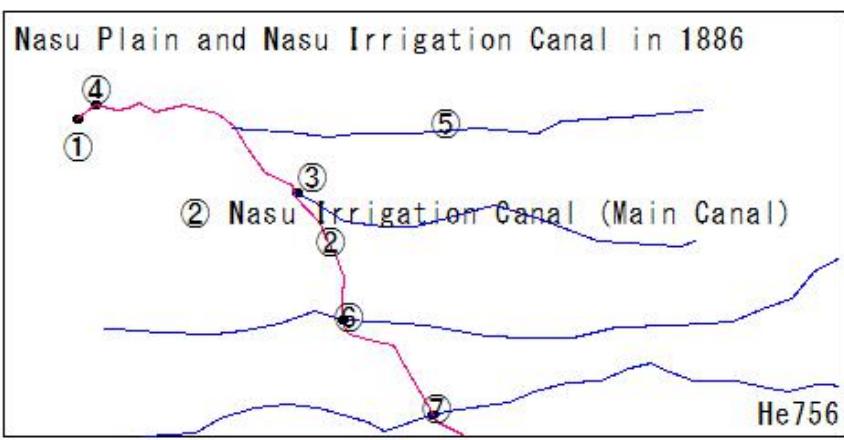
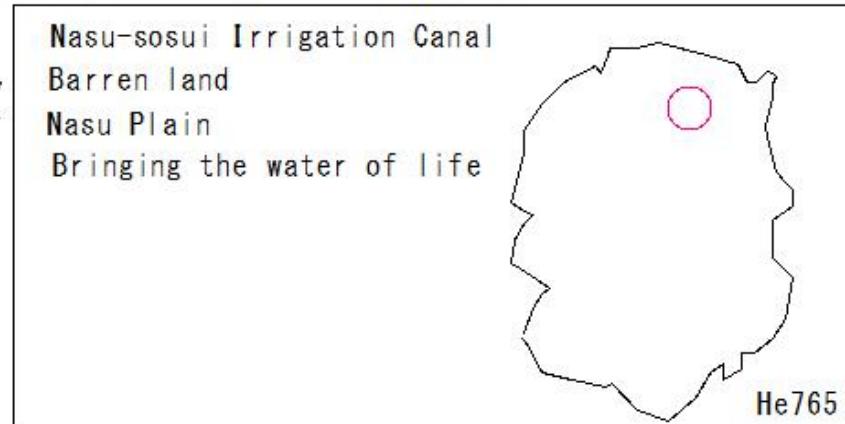
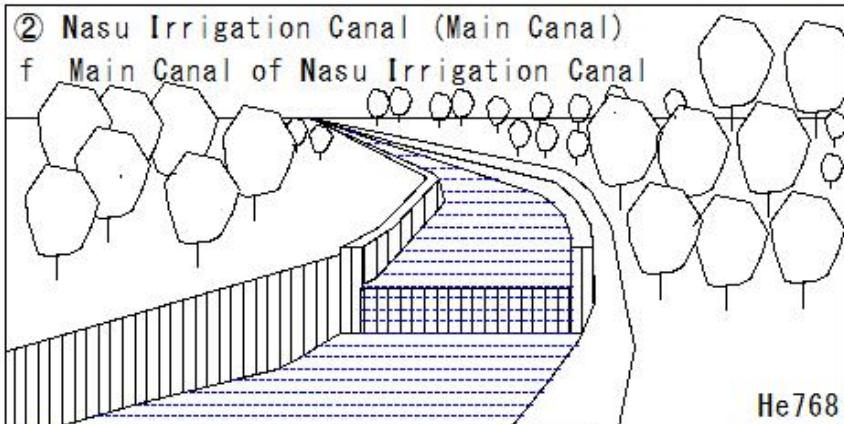
Nasu Irrigation Canal (Tochigi)



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He768) Nasu Irrigation Canal (Tochigi)

(He768) Nasu Irrigation Canal (Tochigi)



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

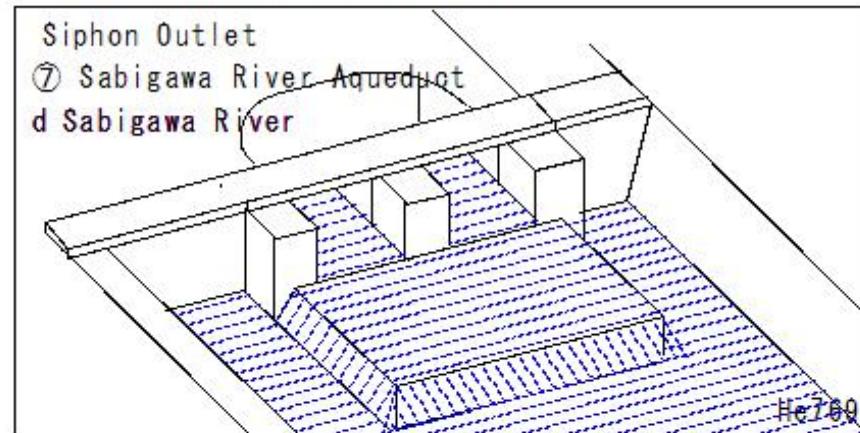
(He769) Nasu Irrigation Canal (Tochigi)

(He769) Nasu Irrigation Canal (Tochigi)

Siphon Outlet

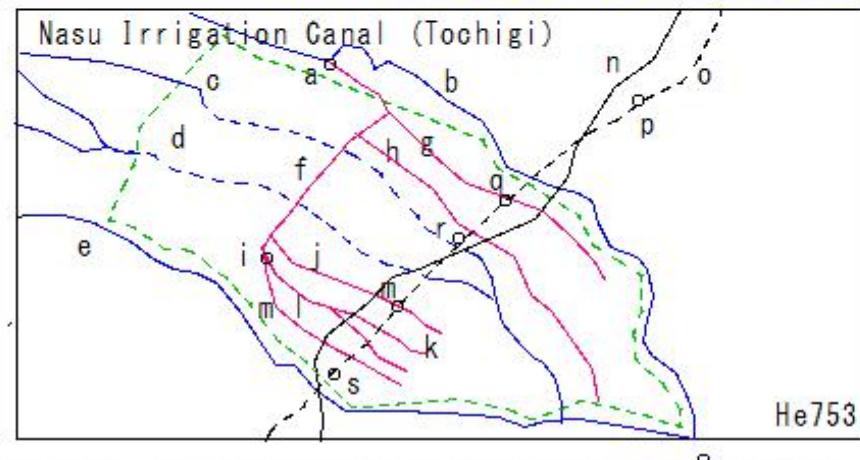
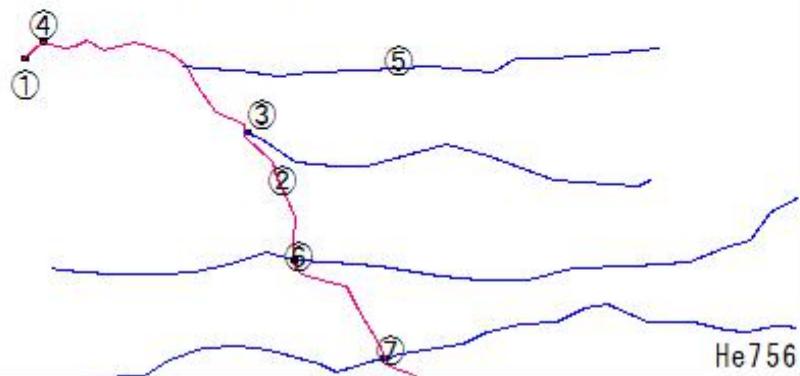
The Sabi River siphon outlet is located where the Nasu Irrigation Canal crosses the Sabi River.

Water gushes out from the outlet due to the siphon principle.



⑦ Sabigawa River Aqueduct
d Sabigawa River

Nasu Plain and Nasu Irrigation Canal in 1886



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He770) Nasu Irrigation Canal (Tochigi)

(He770) Nasu Irrigation Canal (Tochigi)

Siphon Outlet

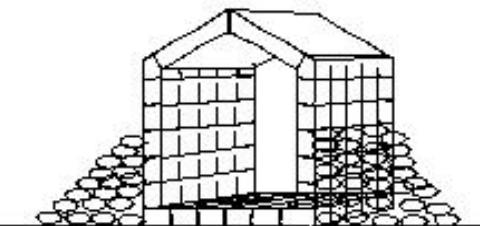
The former Nasu Irrigation Canal crossed the river by constructing a pentagonal stone-built tunnel beneath the riverbed.

⑦ Sabigawa River Aqueduct

d Sabigawa River

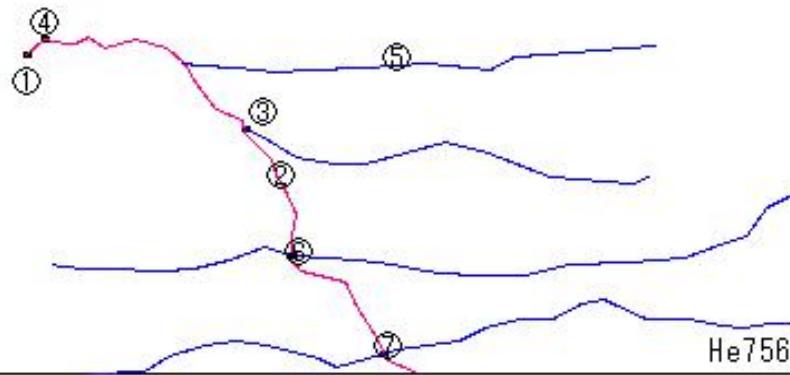
Siphon Outlet

⑦ Sabigawa River Aqueduct
d Sabigawa River

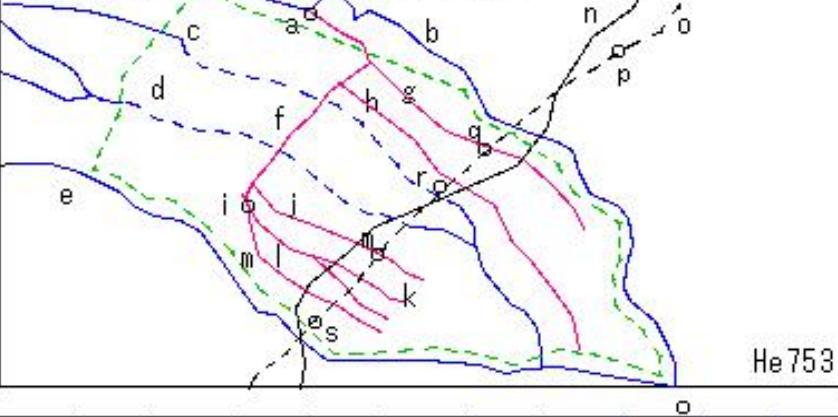


He770

Nasu Plain and Nasu Irrigation Canal in 1886



Nasu Irrigation Canal (Tochigi)



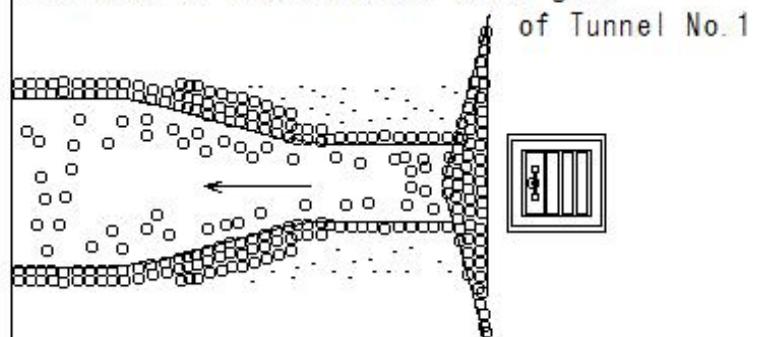
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(He771) Nasu Irrigation Canal (Tochigi)

(He771) Nasu Irrigation Canal (Tochigi)

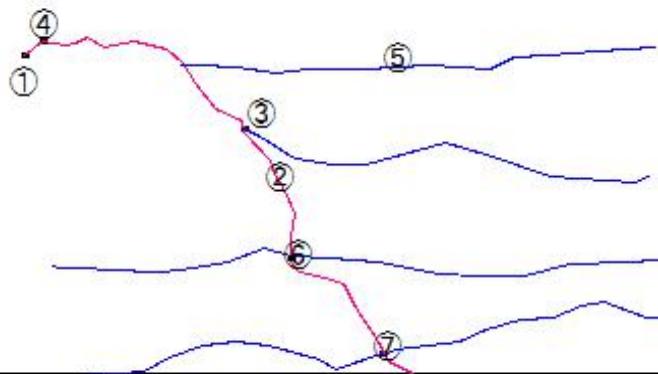
Plan view of the exit and water gate of Tunnel No.1

Plan view of the exit and water gate
of Tunnel No.1



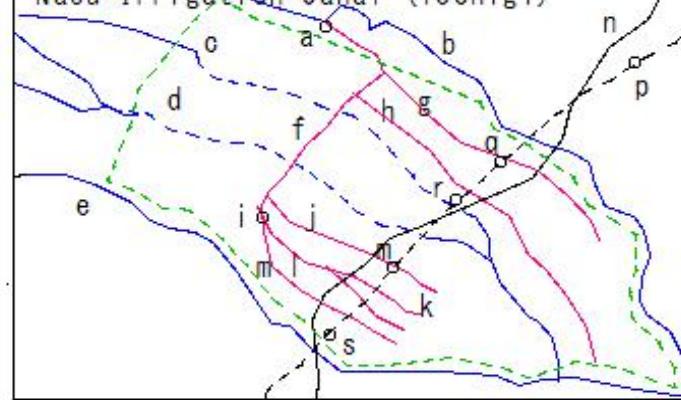
He771

Nasu Plain and Nasu Irrigation Canal in 1886



He756

Nasu Irrigation Canal (Tochigi)



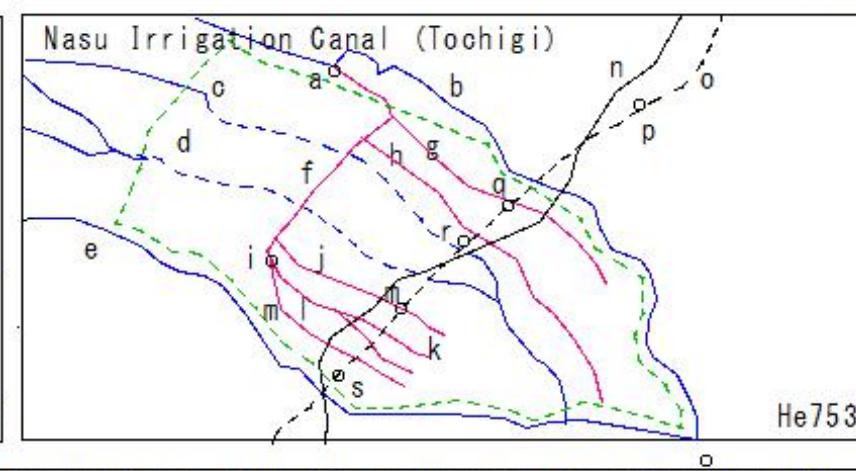
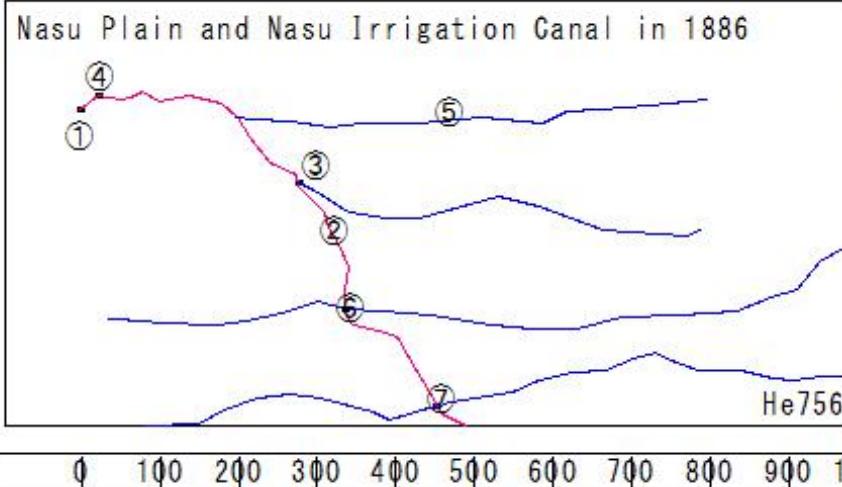
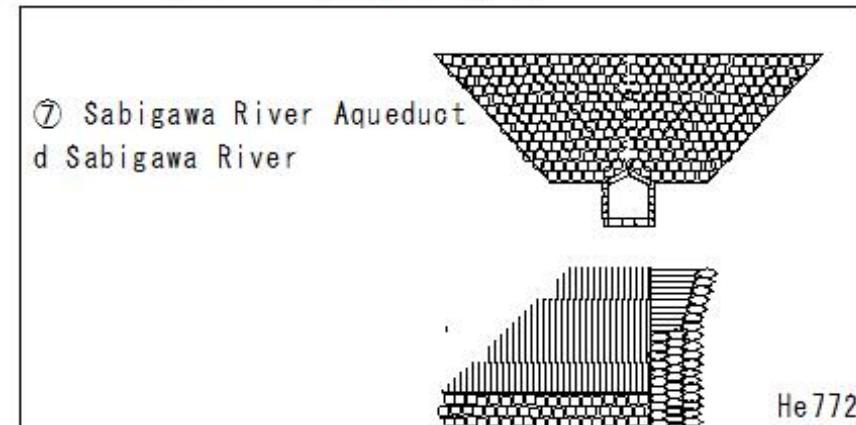
He753

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He772) Nasu Irrigation Canal (Tochigi)

(He772) Nasu Irrigation Canal (Tochigi)

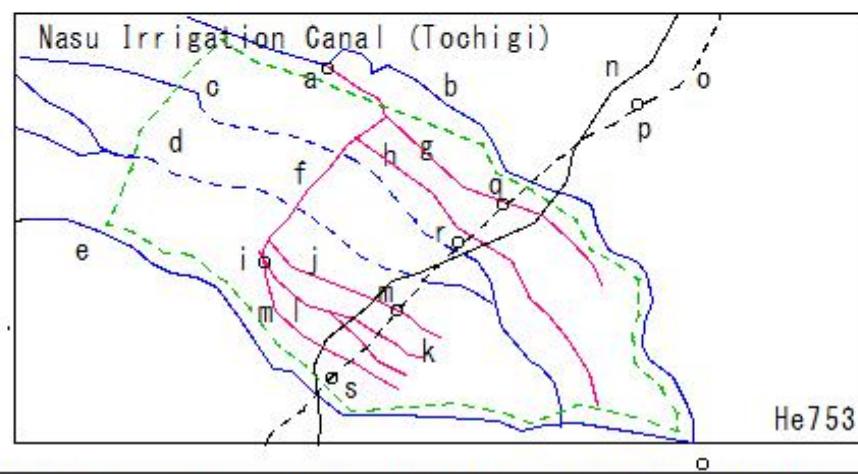
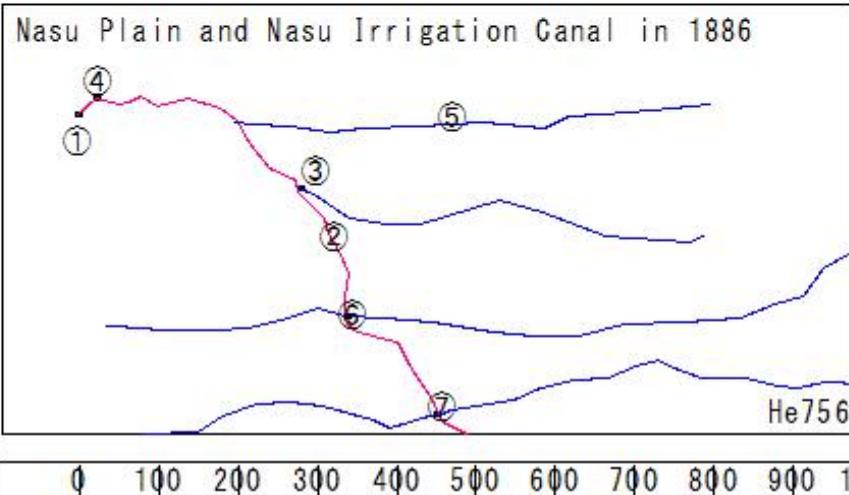
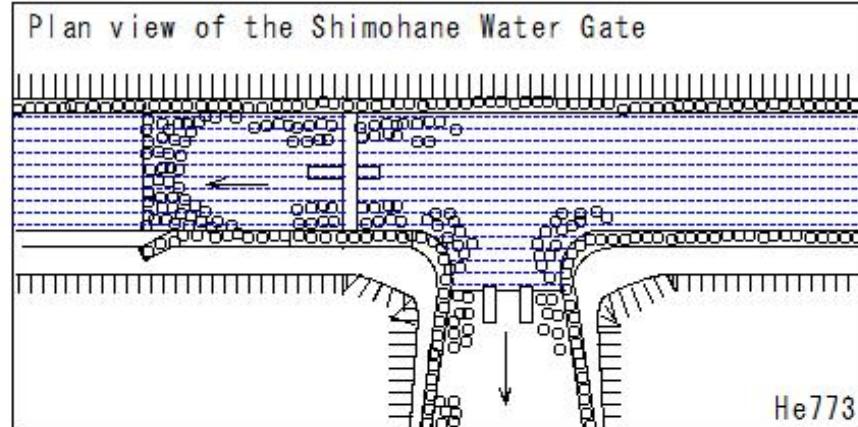
○ Sabigawa River Aqueduct
Cross-sectional view
⑦ Sabigawa River Aqueduct
d Sabigawa River



(He773) Nasu Irrigation Canal (Tochigi)

(He773) Nasu Irrigation Canal (Tochigi)

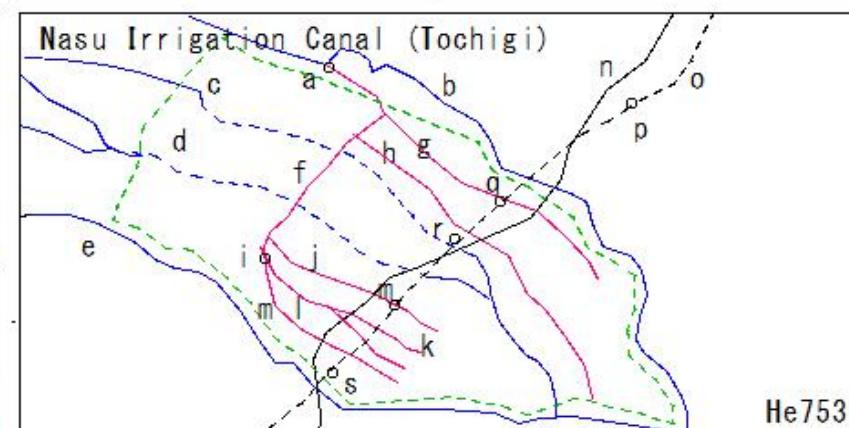
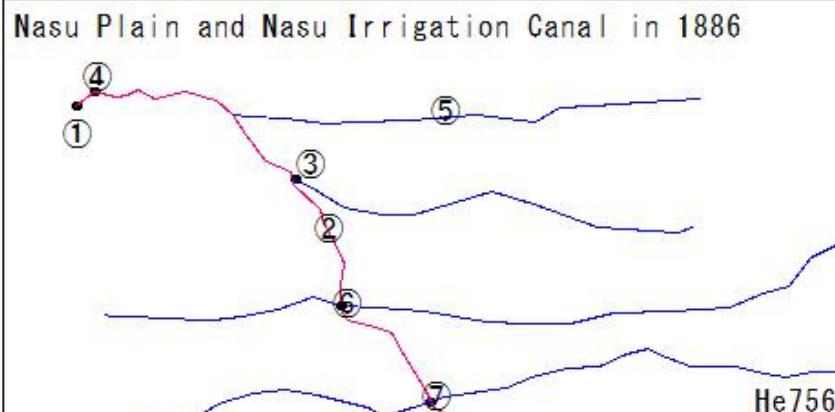
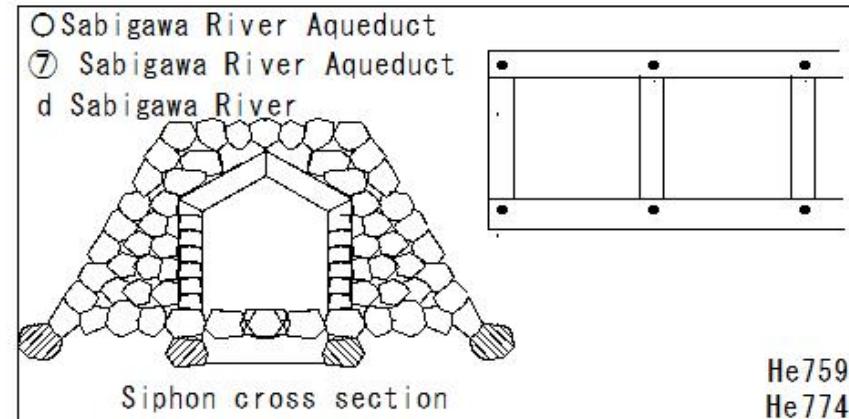
- Sabigawa River Aqueduct
- Plan view of the Shimohane Water Gate
- ⑦ Sabigawa River Aqueduct
- d Sabigawa River



(He774) Nasu Irrigation Canal (Tochigi)

(He774) Nasu Irrigation Canal (Tochigi)

- Sabigawa River Aqueduct
- Cross Section
- ⑦ Sabigawa River Aqueduct



(He775) Nasu Irrigation Canal (Tochigi)

(He775) Nasu Irrigation Canal (Tochigi)

○ Sabigawa River Aqueduct

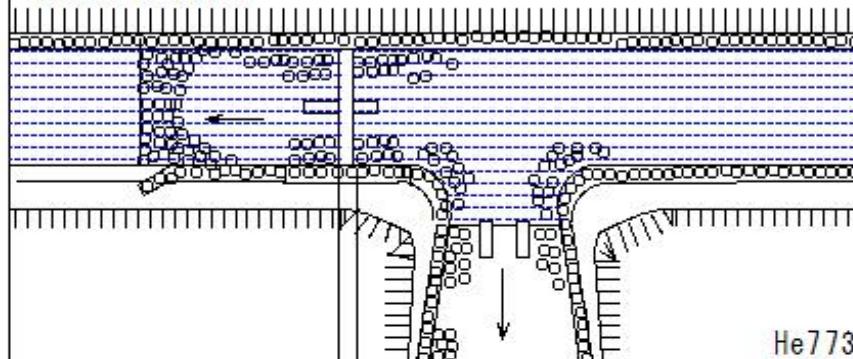
Shimohane Water Gate

Cross Section

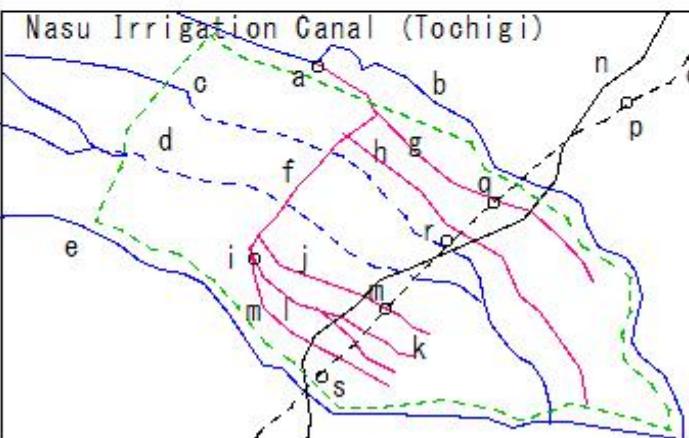
⑦ Sabigawa River Aqueduct

d Sabigawa River

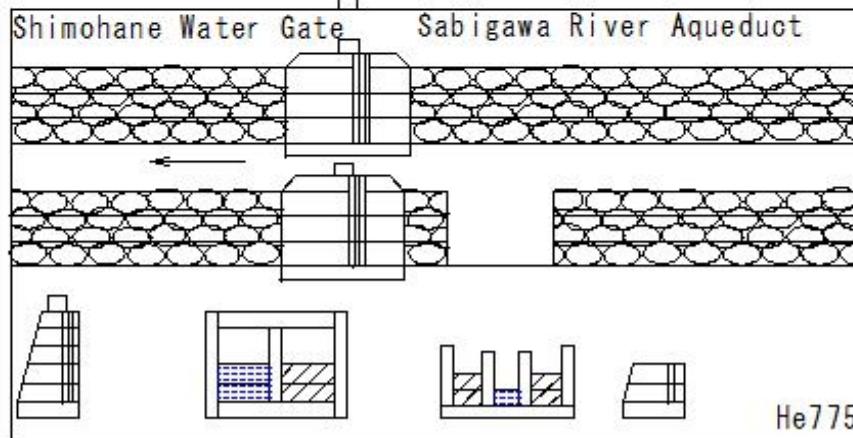
Plan view of the Shimohane Water Gate Cross Section



He773



He753



He775

∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

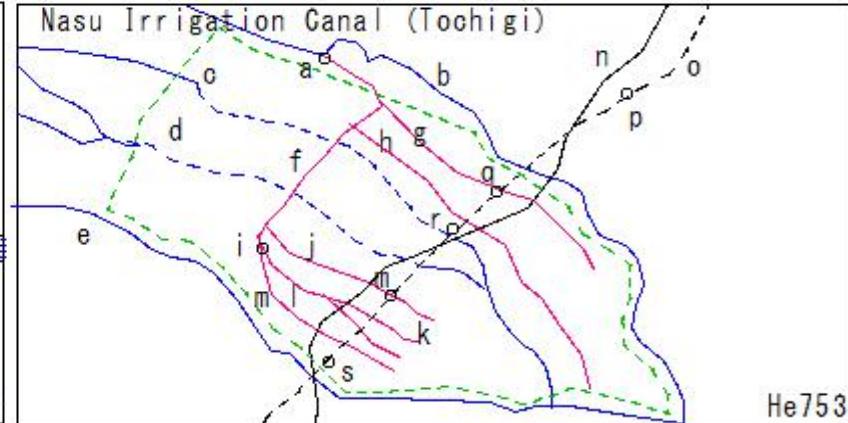
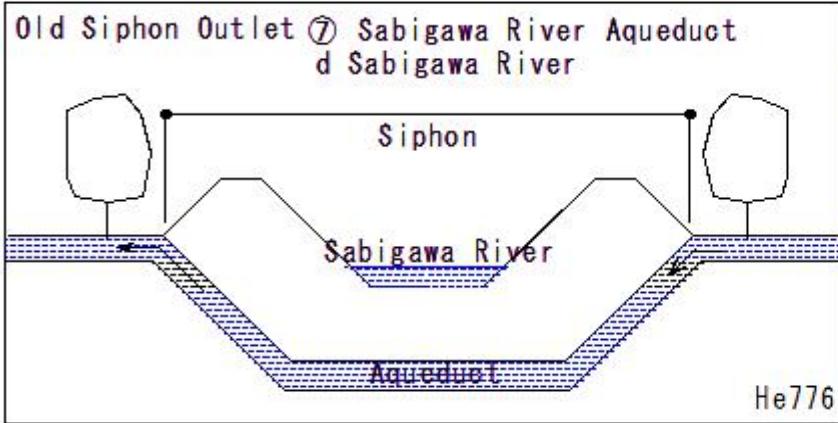
(He776) Nasu Irrigation Canal (Tochigi)

(He776) Nasu Irrigation Canal (Tochigi)

Old Siphon Outlet ⑦ Sabigawa River Aqueduct d Sabigawa River

Right bank of the Sabigawa River (downstream side of the irrigation canal)

- The siphon was constructed by removing the stones from the riverbed, building a stone tunnel, and then covering it again with the riverbed stones.
- The stone material used is Hyakumura stone. The pentagonal stonework is called "shihotome" (four-sided joint), with the bottom serving as the base stone, a double-layered stone wall built on both sides, and the ceiling secured with gassho stones (stones joined together like clasped hands).
- The dimensions of the siphon are: width 4 feet 5 inches (approximately 136 cm), height 5 feet 5 inches (approximately 167 cm), and length 146.7 ken (approximately 267 m).



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He777) Nasu Irrigation Canal (Tochigi)

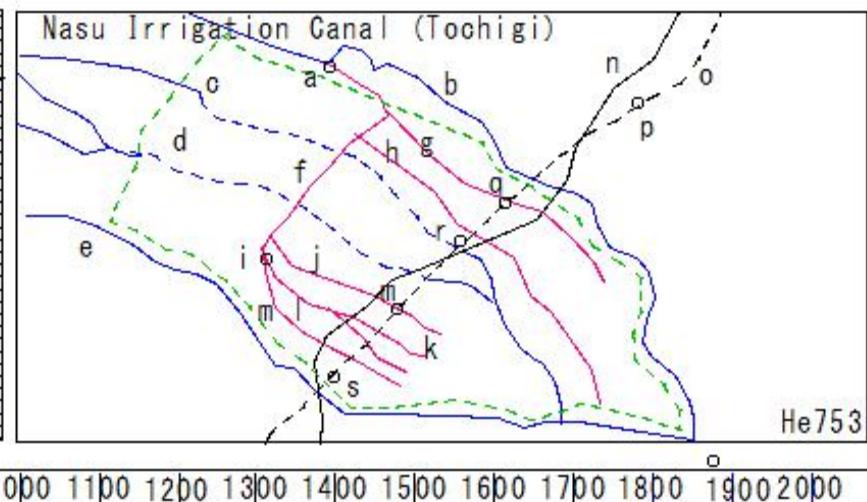
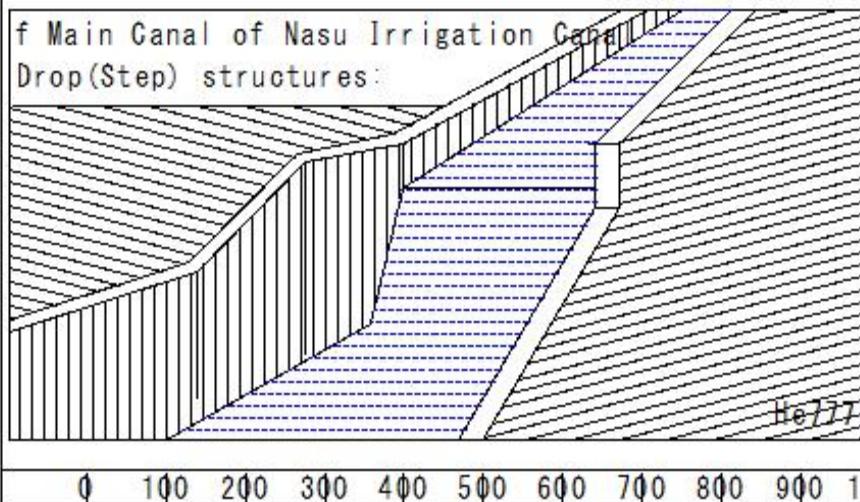
(He777) Nasu Irrigation Canal (Tochigi)

f Main Canal of Nasu Irrigation Canal

Drop(Step) structures:

The Nasu Irrigation Canal is not designed to flow down a slope.

Instead, embankments and step structures like these are installed at key points, to prevent the water flow from becoming too fast.



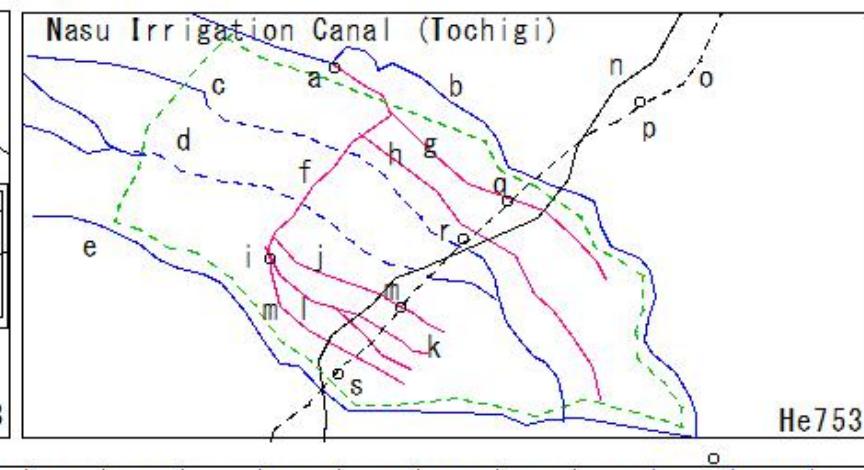
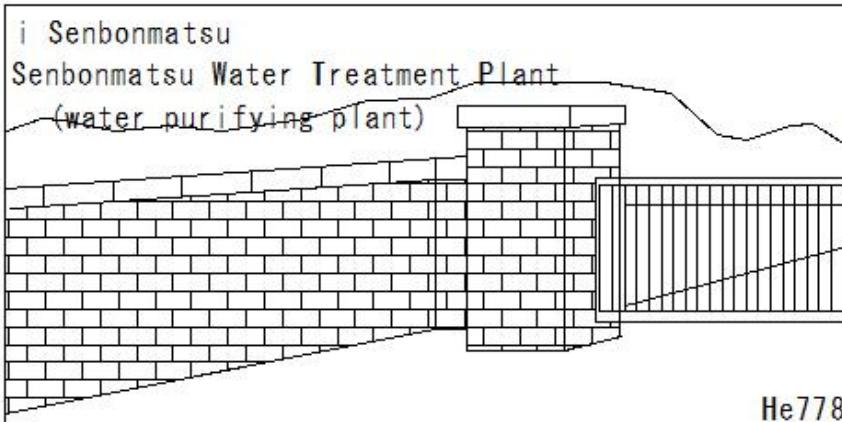
(He778) Nasu Irrigation Canal (Tochigi)

(He778) Nasu Irrigation Canal (Tochigi)

i Senbonmatsu

Senbonmatsu Water Treatment Plant(water purifying plant)

The Nasu Irrigation Canal is used not only for irrigating fields, but also as a source of drinking water for Nasushiobara City, Otawara City, and Yaita City.



Ø 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He779) Nasu Irrigation Canal (Tochigi)

(He779) Nasu Irrigation Canal (Tochigi)

Diversion works

j Third Branch Canal

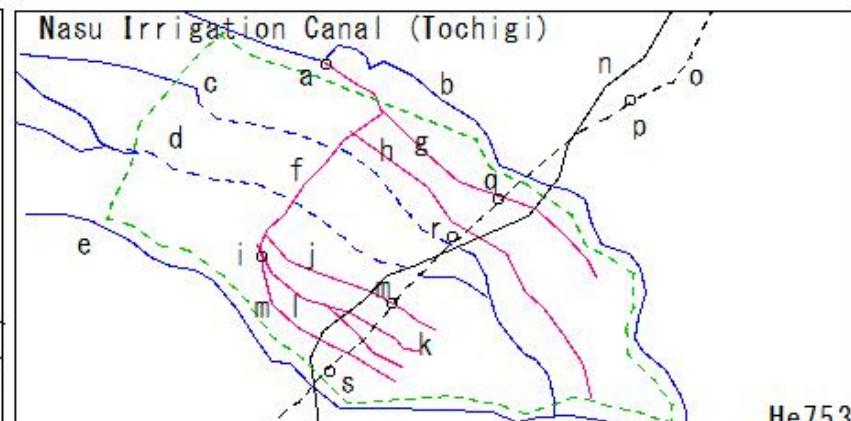
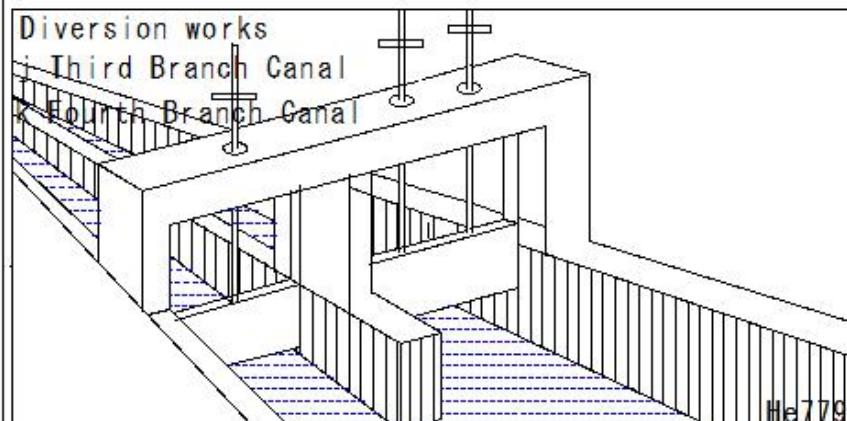
k Fourth Branch Canal

Third and Fourth Diversion Channels

The Nasu Irrigation Canal is divided into the third and fourth diversion channels.

Current modern facilities (gate raising and lowering are electrically operated)

Left : The smaller gate is the third diversion channel.



Φ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 °

(He780) Nasu Irrigation Canal (Tochigi)

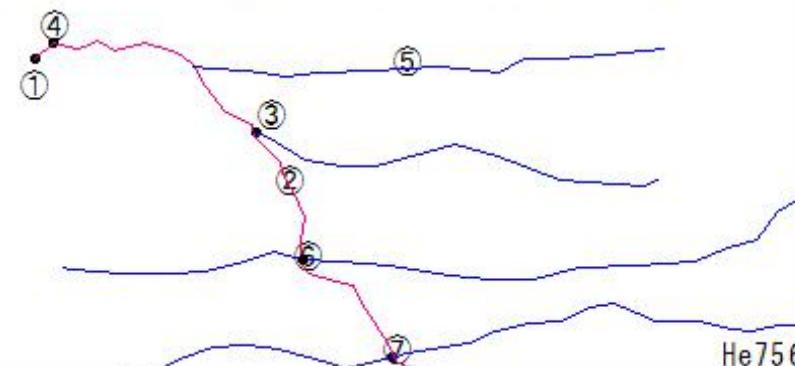
(He780) Nasu Irrigation Canal (Tochigi)

Nasu Plain and Nasu Irrigation Canal in 1886

- ① Nishi-Iwasaki Water Intake
- ② Nasu Irrigation Canal (Main Canal)
- ③ Second Branch Canal
- ④ Iwasaki Tunnel
- ⑤ Branch Canal
- ⑥ Kumagawa Aqueduct
- ⑦ Sabigawa River Aqueduct

He756

Nasu Plain and Nasu Irrigation Canal in 1886



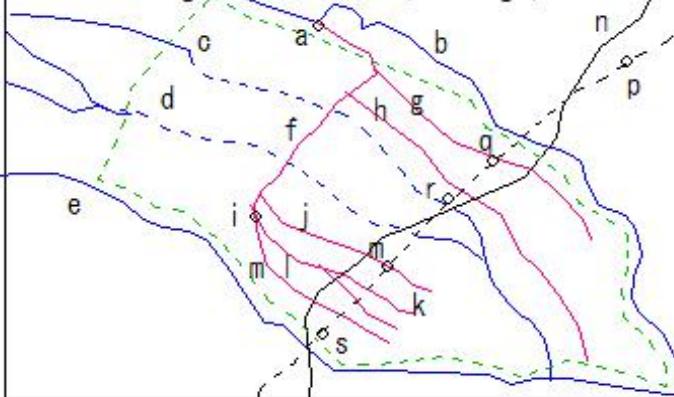
He756

a Nishi-Iwasaki Intake k Fourth Branch Canal

- | | |
|---------------------------------------|-------------------------|
| b Naka River | l Tatebori Canal |
| c Kumagawa River | m Nishibori Canal |
| d Sabigawa River | n National Route 4 |
| e Houkigawa River | o Tohoku Main Line |
| f Main Canal of Nasu Irrigation Canal | |
| g First Branch Canal | p JR Utsunomiya Station |
| h Second Branch Canal | q Kuroiso Station |
| i Senbonmatsu | r Nasushiobara Station |
| j Third Branch Canal | s Nozaki Station |

He753

Nasu Irrigation Canal (Tochigi)

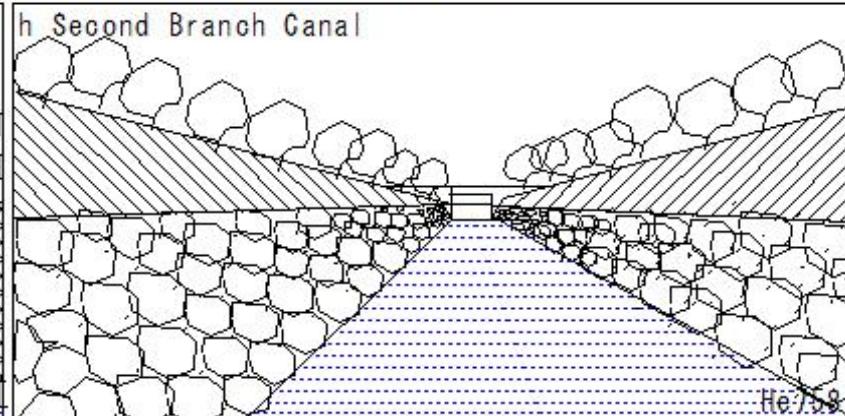
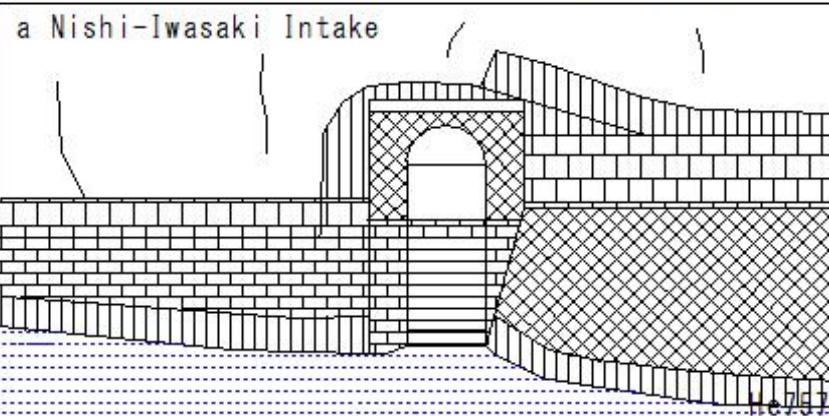


He753

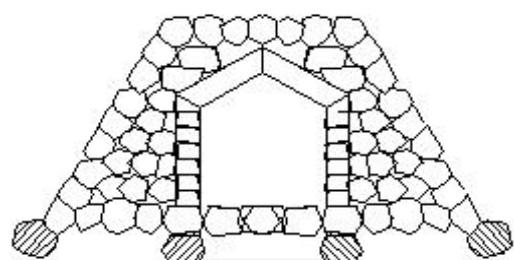
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(He781) Nasu Irrigation Canal (Tochigi)

(He781) Nasu Irrigation Canal (Tochigi)



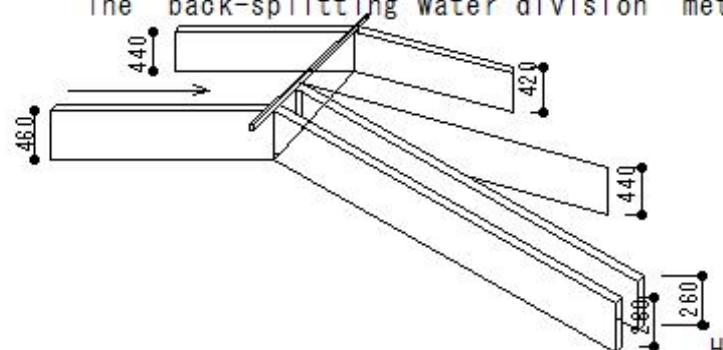
- ⑥ Kumagawa Aqueduct
⑦ Sabigawa River Aqueduct



Siphon cross section

He759

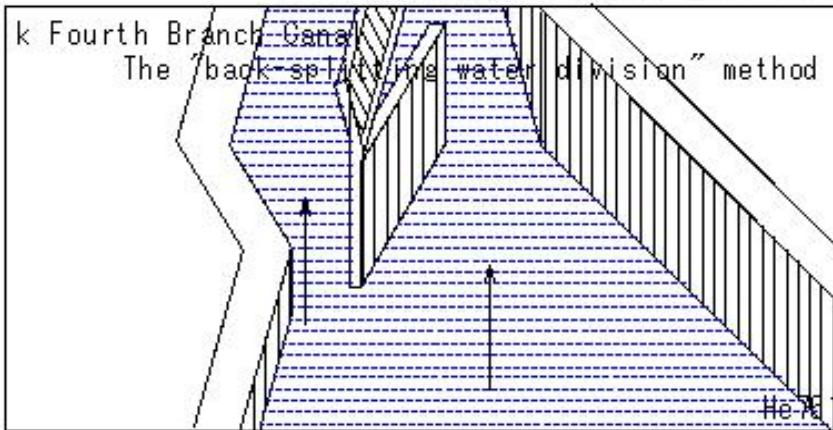
- k Fourth Branch Canal
The "back-splitting water division" method



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He782) Nasu Irrigation Canal (Tochigi)

(He782) Nasu Irrigation Canal (Tochigi)



Ichirobei Minami



Inami Josaku



Takeshi Yaita

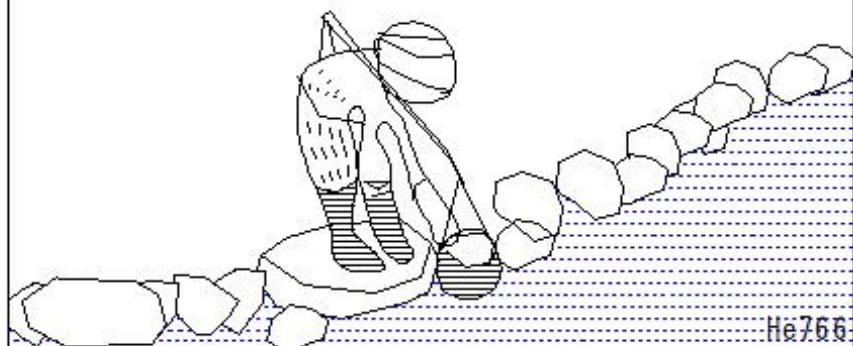


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(He783) Nasu Irrigation Canal (Tochigi)

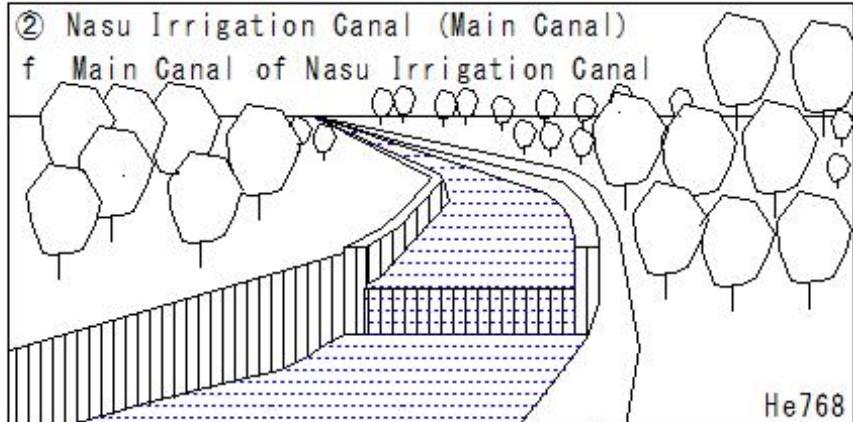
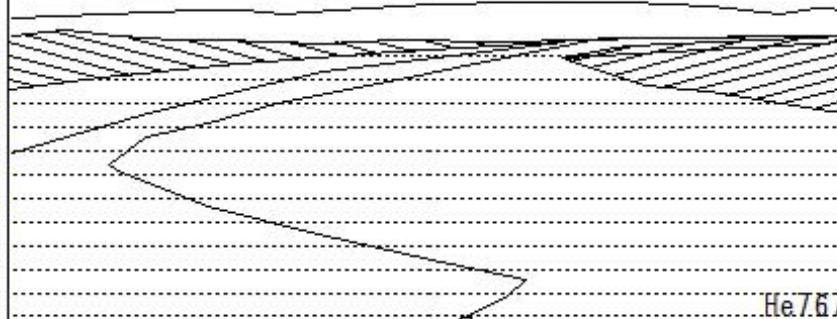
(He783) Nasu Irrigation Canal (Tochigi)

Drawing water



The Sabigawa River, which has no water.

d Sabigawa River ⑦ Sabigawa River Aqueduct

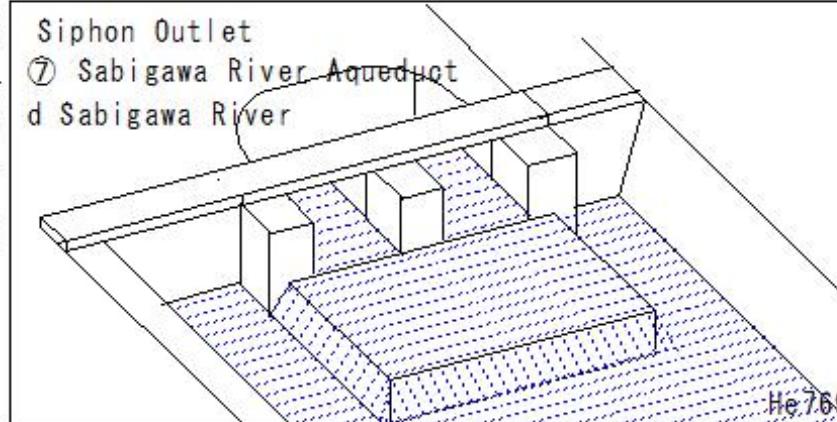


② Nasu Irrigation Canal (Main Canal)
f Main Canal of Nasu Irrigation Canal

Siphon Outlet

⑦ Sabigawa River Aqueduct

d Sabigawa River



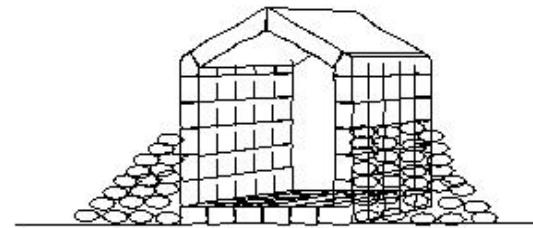
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(He784) Nasu Irrigation Canal (Tochigi)

(He784) Nasu Irrigation Canal (Tochigi)

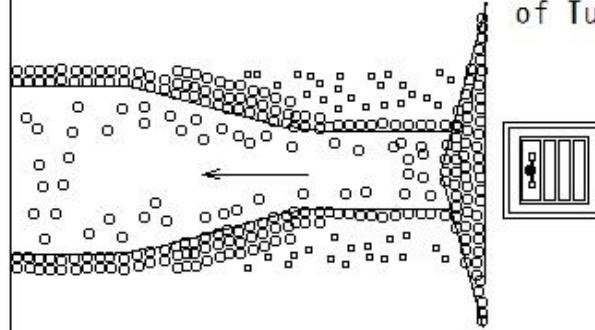
Siphon Outlet

⑦ Sabigawa River Aqueduct
d Sabigawa River



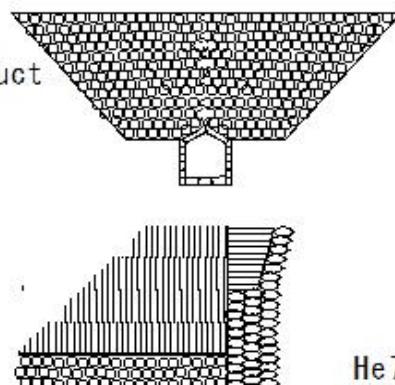
He770

Plan view of the exit and water gate
of Tunnel No.1



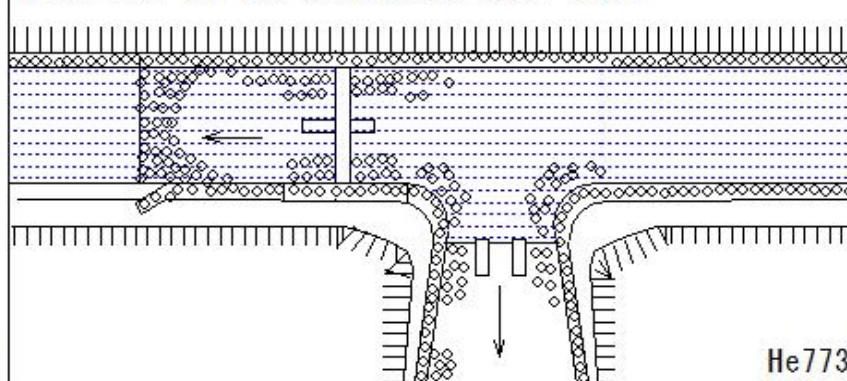
He771

⑦ Sabigawa River Aqueduct
d Sabigawa River



He772

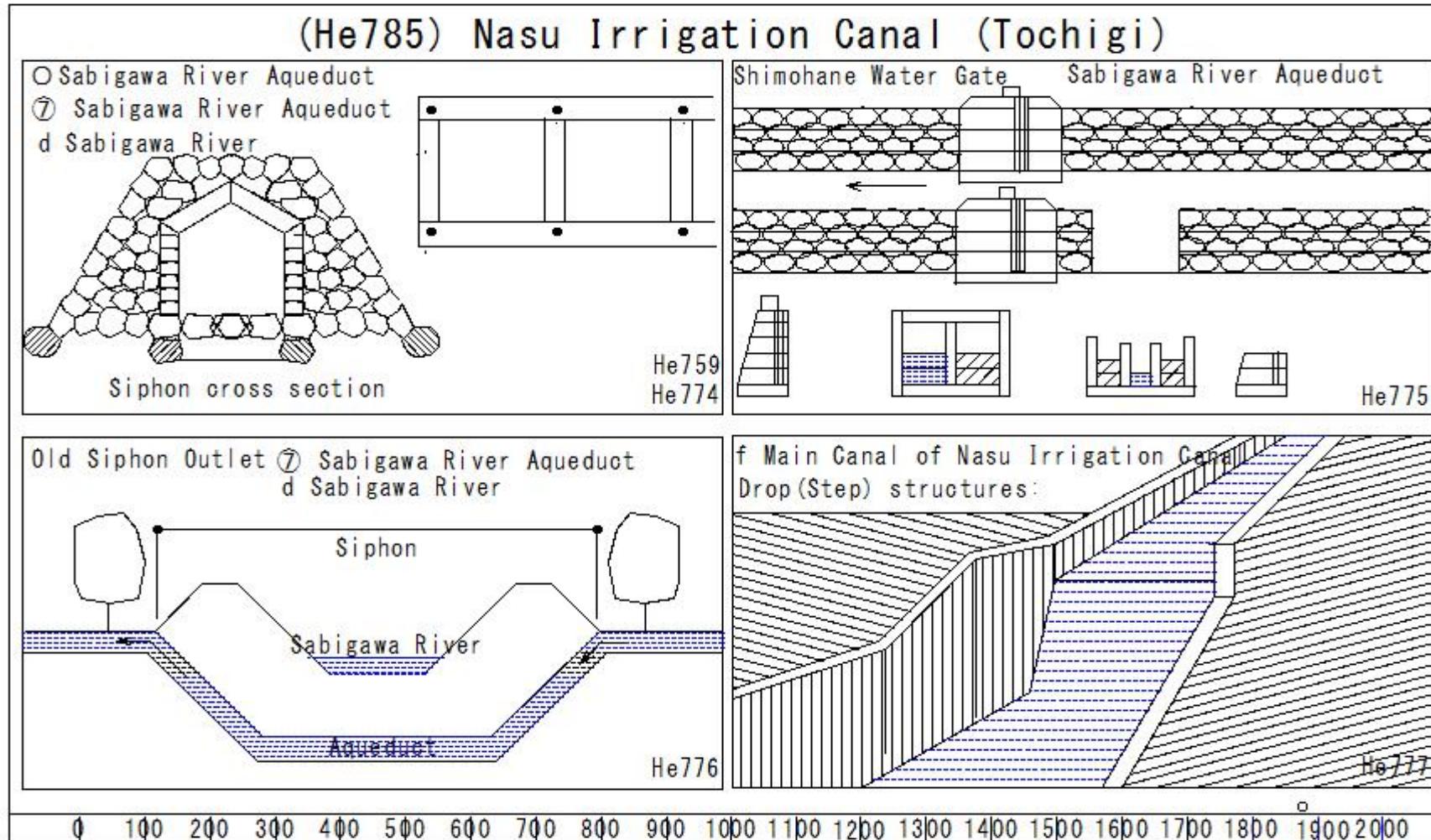
Plan view of the Shimohane Water Gate



He773

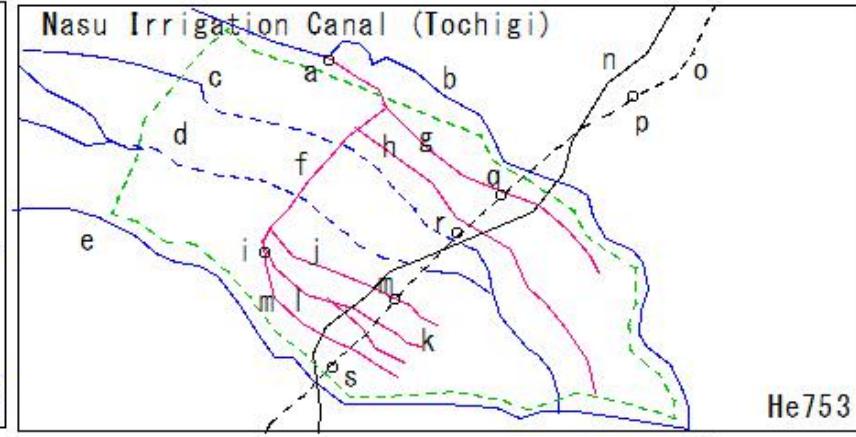
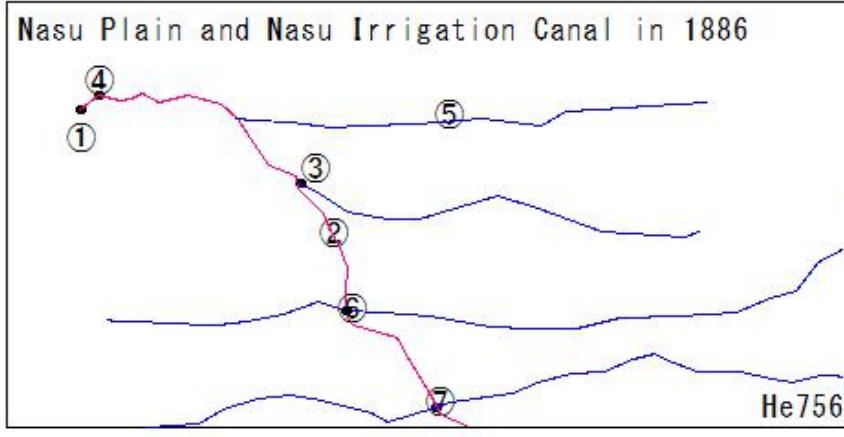
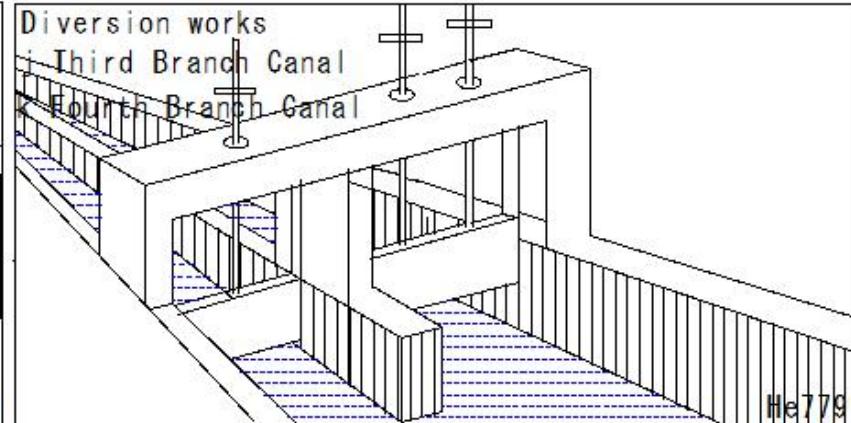
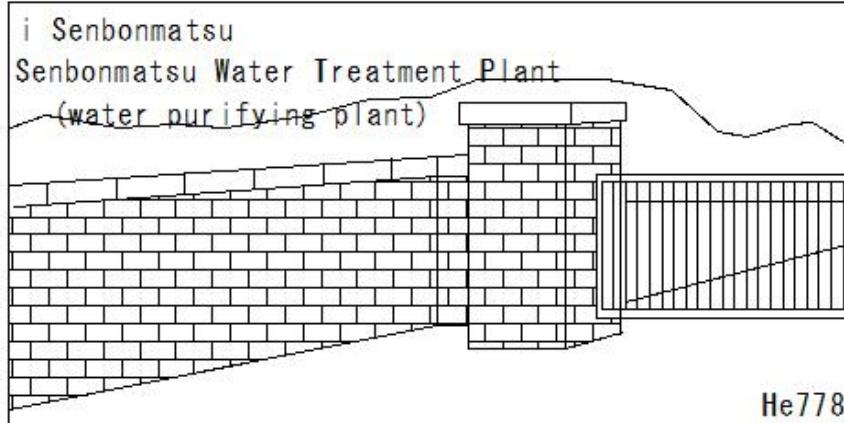
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(He785) Nasu Irrigation Canal (Tochigi)



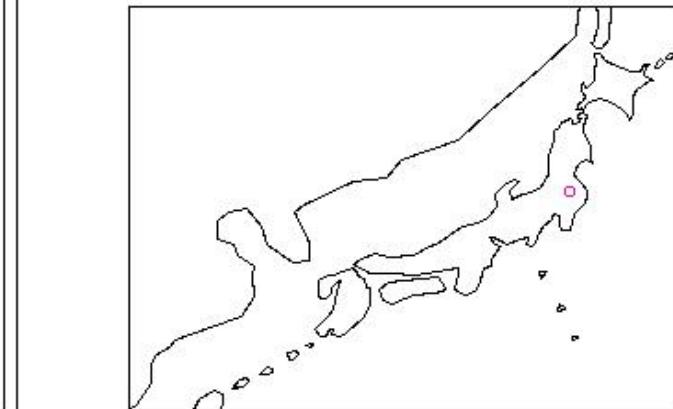
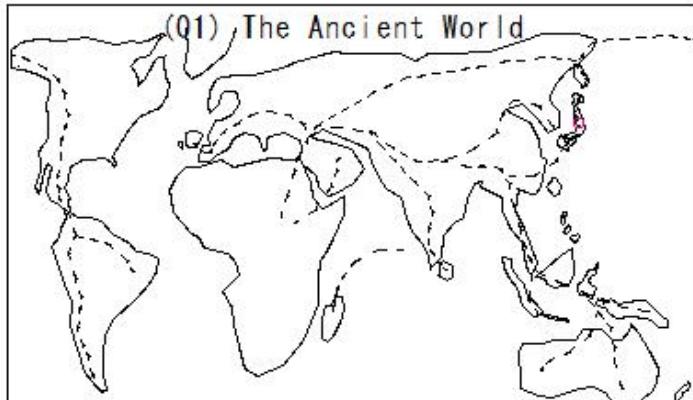
(He786) Nasu Irrigation Canal (Tochigi)

(He786) Nasu Irrigation Canal (Tochigi)



(He787) Ogawazeki Irrigation Canal (Gunma)

(He787) Ogawazeki Irrigation Canal (Gunma)

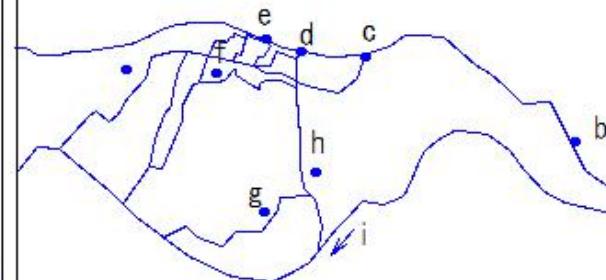


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal



He787

∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He788) Ogawazeki Irrigation Canal (Gunma)

(He788) Ogawazeki Irrigation Canal (Gunma)

- ◆Location: Oaza Obata, Kanra-machi, Kanra-gun, Saitama Prefecture
- ◆Date: Kan'ei 19 (1642)
- ◆Type: Cobblestone structure (dry mass)
- ◆Managed by: Kanra Town
- ◆Notes: World Heritage Irrigation Structures
- ◆Reason for designation: This cobblestone (dry mass) irrigation canal was constructed to secure drinking water and water for the residents living around Obata Castle. It is a valuable civil engineering heritage that preserves its ancient history to the present day.

(He789) Ogawazeki Irrigation Canal (Gunma)

(He789) Ogawazeki Irrigation Canal (Gunma)

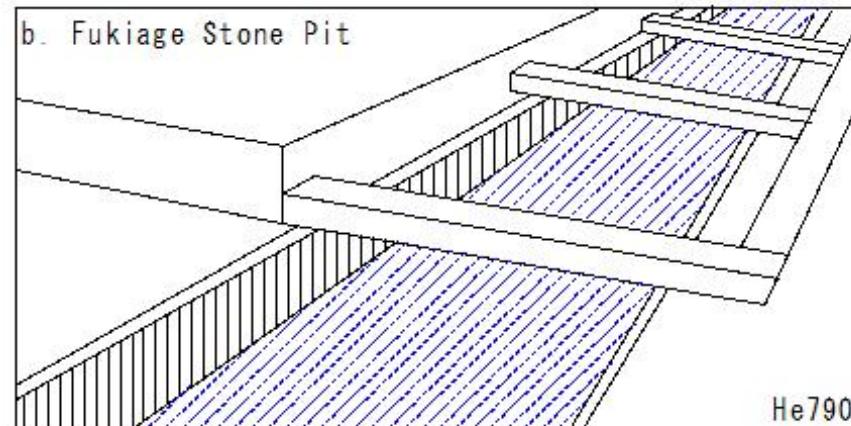
[Features]

- ① Ogawa Weir takes water from the Ogawa River, a Class A river, and flows north through the Obata district, irrigating the rice paddies to the north.
- ② Renovations were made between 1629 (Kan'ei 6) and 1642 (Kan'ei 19), when construction was completed.
- ③ The small weir is a network of waterways that runs through the samurai residence district.
- ④ The three water intakes, named from upstream to downstream as Ichibanguchi (the size of a 1.8 liter measure), Sanbanguchi (the size of a 3.8 liter measure), demonstrate the ingenuity of our ancestors.
- ⑤ The Ogawa Weir in the Machiya district has over 47 washing areas, and in the past there were 12 stone bridges spanning them.

(He790) Ogawazeki Irrigation Canal (Gunma)

(He790) Ogawazeki Irrigation Canal (Gunma)

b. Fukiage Stone Pit

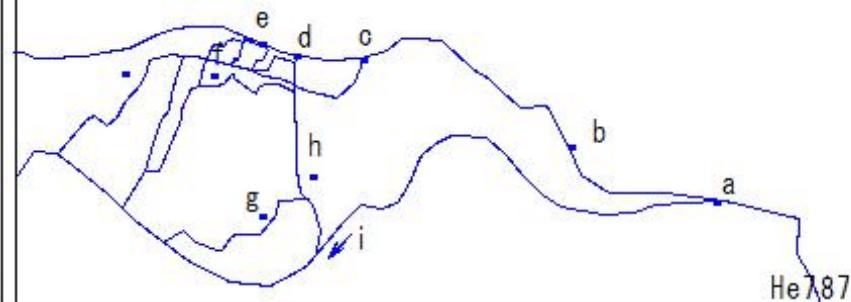


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal



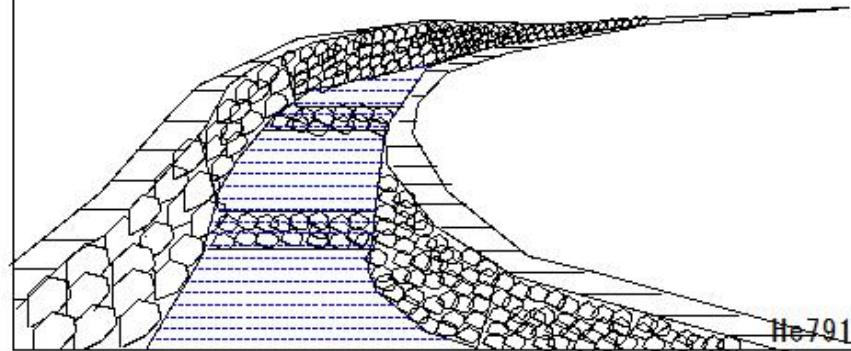
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(He791) Ogawazeki Irrigation Canal (Gunma)

(He791) Ogawazeki Irrigation Canal (Gunma)

Ogawazeki Irrigation Canal (large weir)

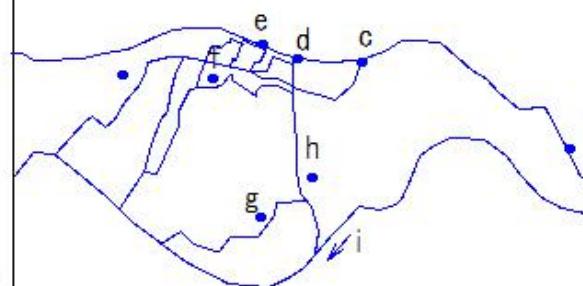
Ogawazeki Irrigation Canal (large weir)



Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

Ogawazeki Irrigation Canal



He787

∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He792) Ogawazeki Irrigation Canal (Gunma)

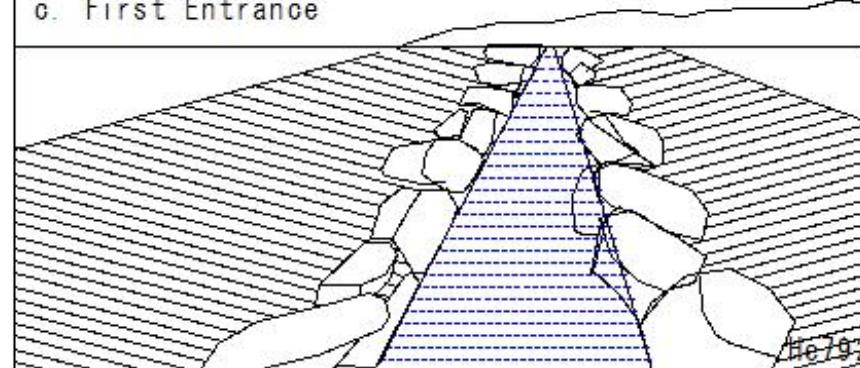
(He792) Ogawazeki Irrigation Canal (Gunma)

Small Irrigation Canal

c. First Entrance

Small Irrigation Canal

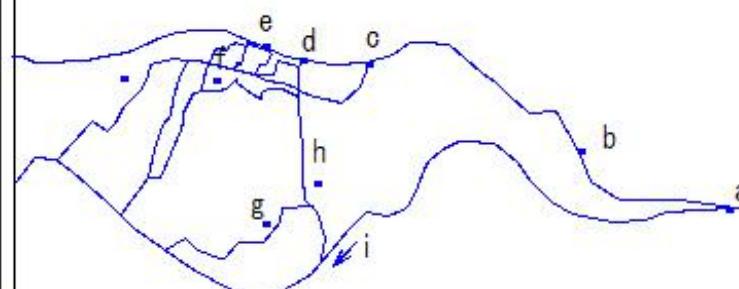
c. First Entrance



Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

Ogawazeki Irrigation Canal

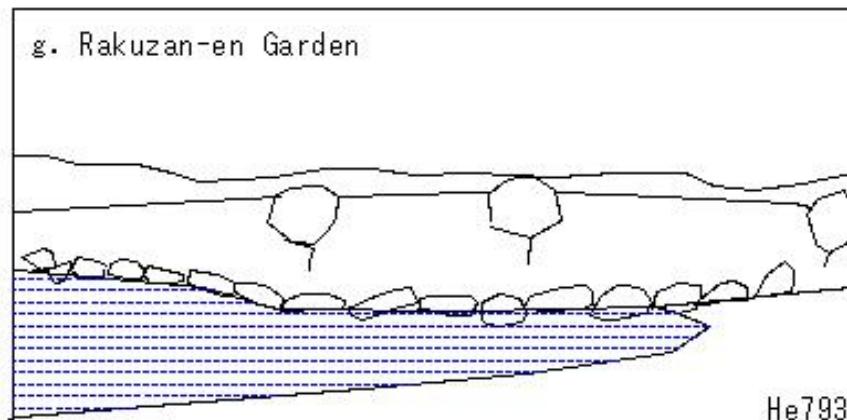


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He793) Ogawazeki Irrigation Canal (Gunma)

(He793) Ogawazeki Irrigation Canal (Gunma)

g. Rakuzan-en Garden

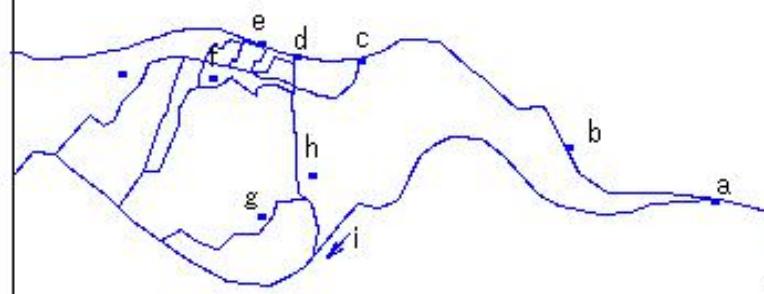


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal



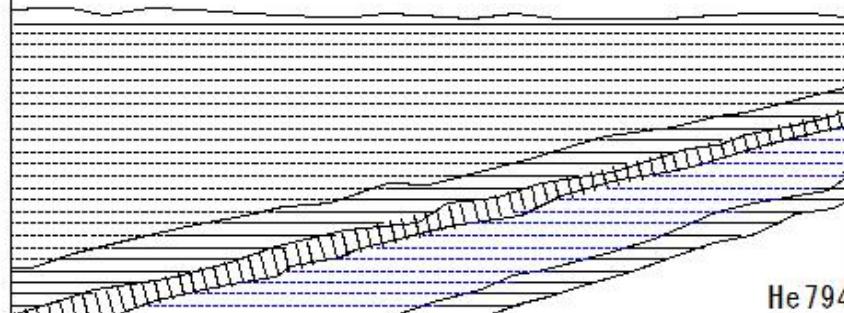
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(He794) Ogawazeki Irrigation Canal (Gunma)

(He794) Ogawazeki Irrigation Canal (Gunma)

Ogawazeki Irrigation Canal(rice paddies)

Ogawazeki Irrigation Canal(rice paddies)

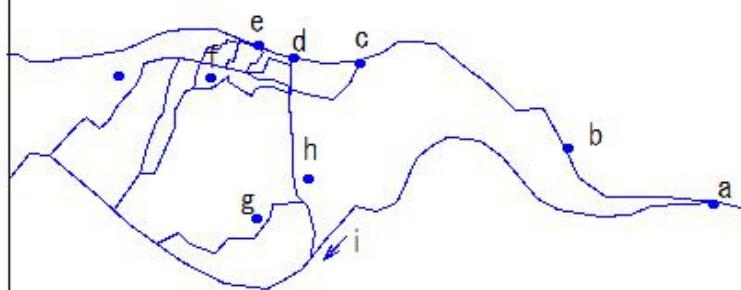


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal

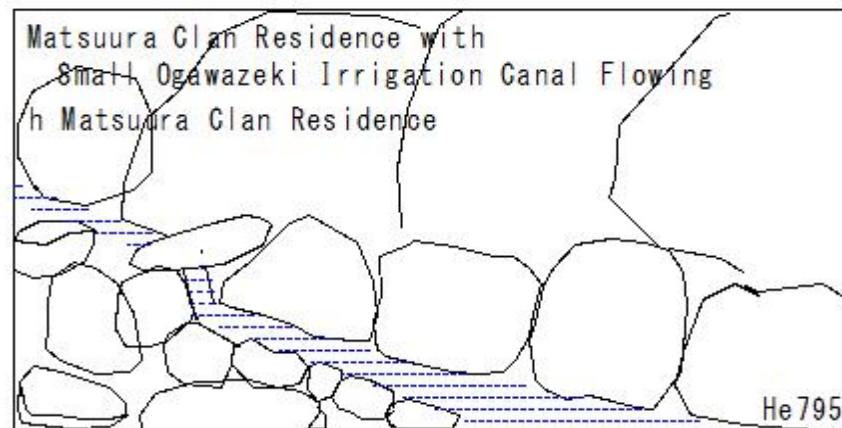


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(He795) Ogawazeki Irrigation Canal (Gunma)

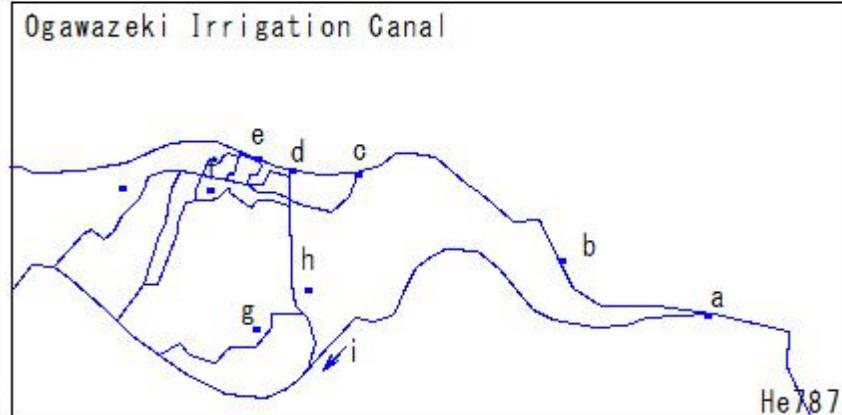
(He795) Ogawazeki Irrigation Canal (Gunma)

Matsuura Clan Residence with
Small Ogawazeki Irrigation Canal Flowing
h Matsuura Clan Residence



Ogawazeki Irrigation Canal
a. Intake
b. Fukiage Stone Pit
c. First Entrance
d. Second Entrance
e. Third Entrance
f. Takahashi Clan Residence
g. Rakuzan-en Garden
h. Matsuura Clan Residence
i. Ogawa River

He787

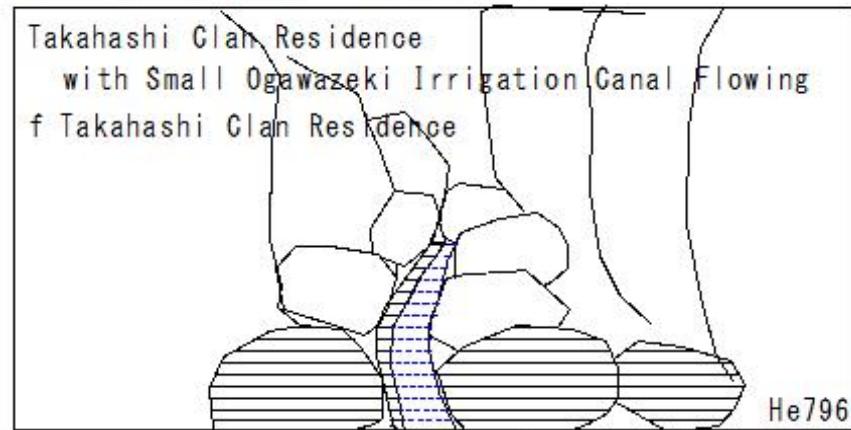


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(He796) Ogawazeki Irrigation Canal (Gunma)

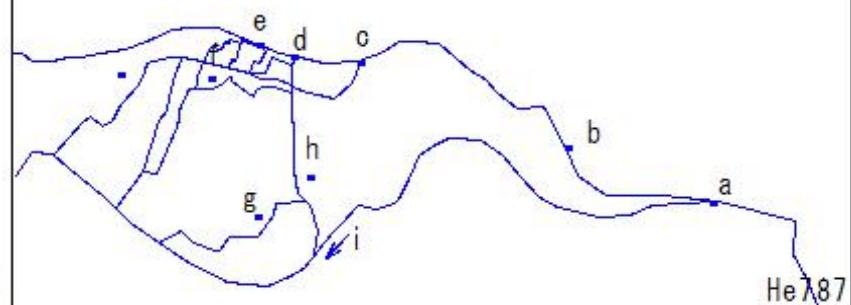
(He796) Ogawazeki Irrigation Canal (Gunma)

Takahashi Clan Residence
with Small Ogawazeki Irrigation Canal Flowing
f Takahashi Clan Residence



Ogawazeki Irrigation Canal
a. Intake
b. Fukiage Stone Pit
c. First Entrance
d. Second Entrance
e. Third Entrance
f. Takahashi Clan Residence
g. Rakuzan-en Garden
h. Matsuura Clan Residence
i. Ogawa River

Ogawazeki Irrigation Canal

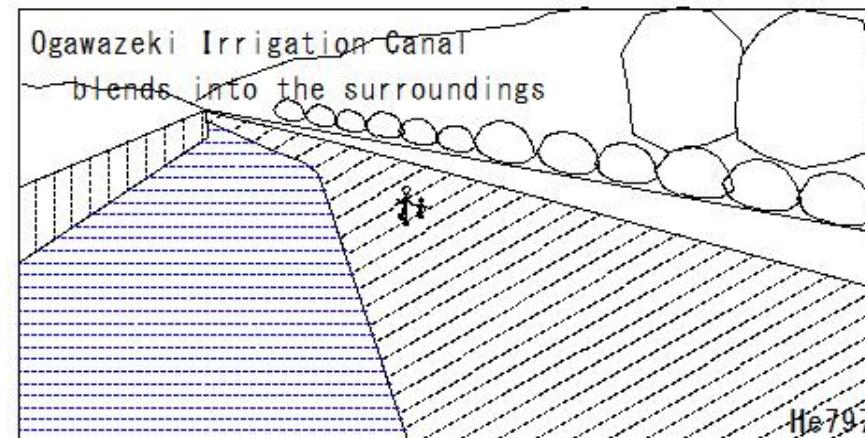


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He797) Ogawazeki Irrigation Canal (Gunma)

(He797) Ogawazeki Irrigation Canal (Gunma)

Ogawazeki Irrigation Canal
blends into the surroundings

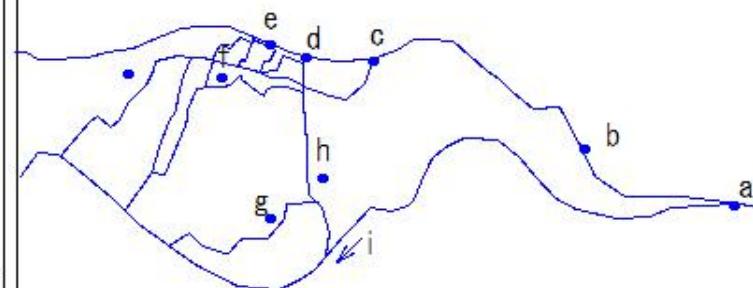


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal

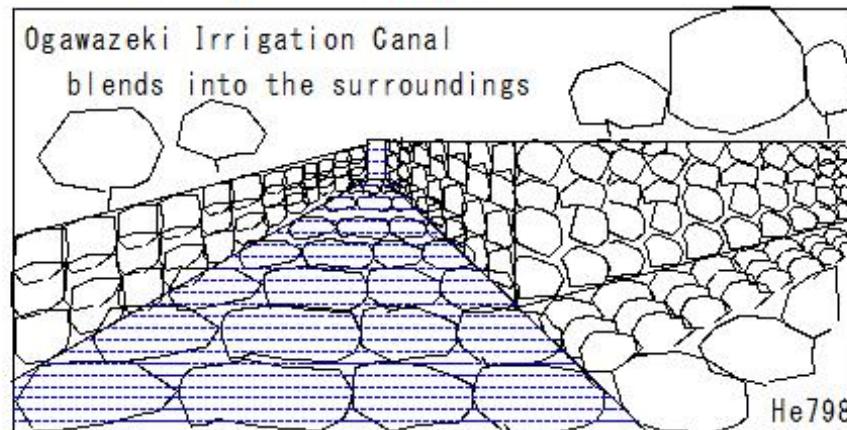


∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He798) Ogawazeki Irrigation Canal (Gunma)

(He798) Ogawazeki Irrigation Canal (Gunma)

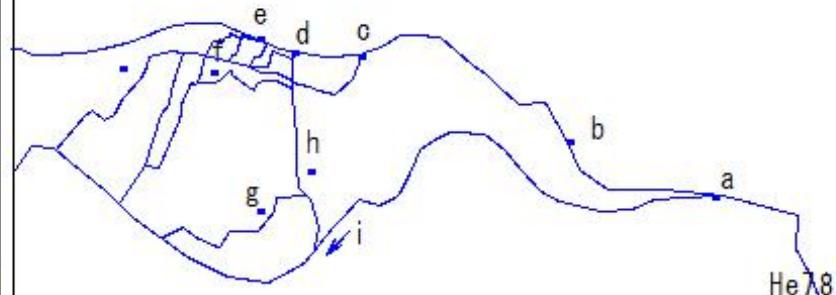
Ogawazeki Irrigation Canal
blends into the surroundings



Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

Ogawazeki Irrigation Canal

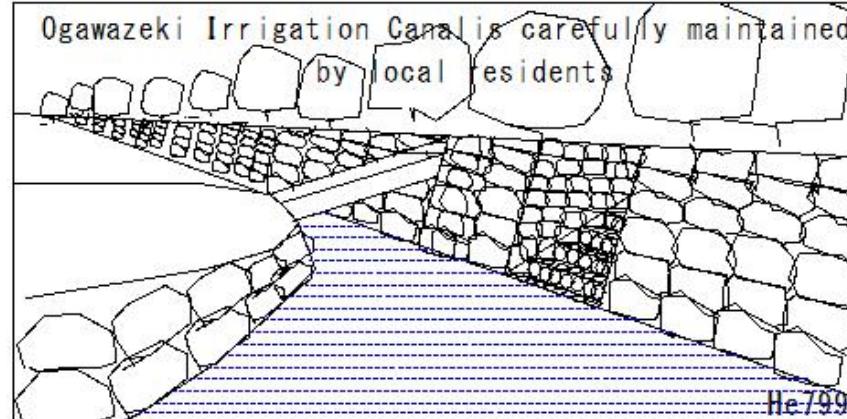


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He799) Ogawazeki Irrigation Canal (Gunma)

(He799) Ogawazeki Irrigation Canal (Gunma)

Ogawazeki Irrigation Canal is carefully maintained by local residents

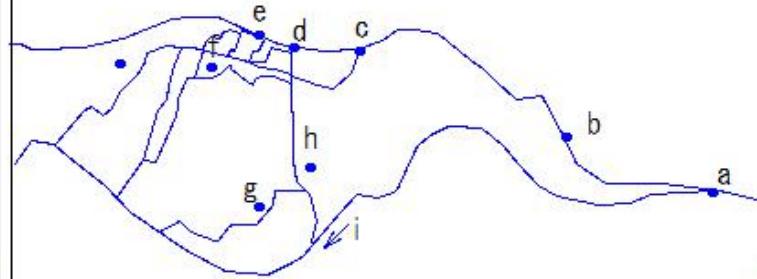


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal

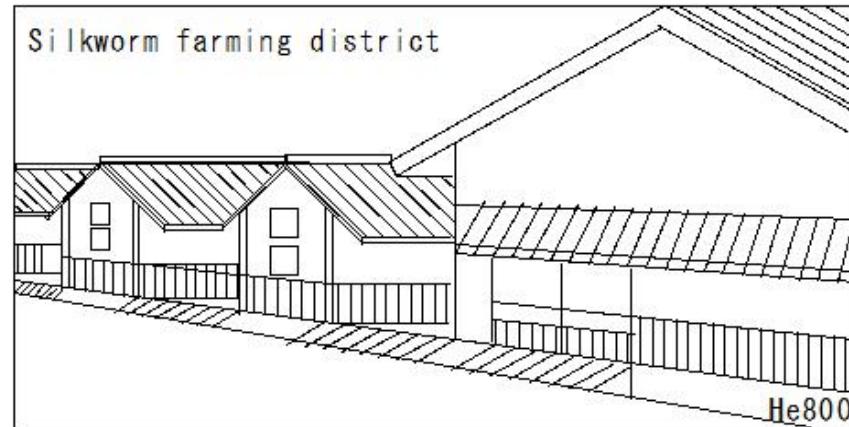


Ø 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He800) Ogawazeki Irrigation Canal (Gunma)

(He800) Ogawazeki Irrigation Canal (Gunma)

Silk worm farming district

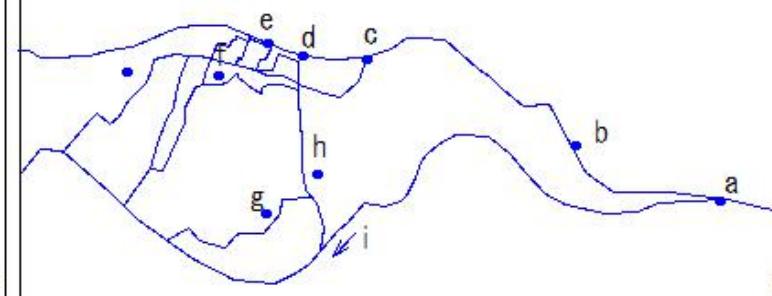


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal

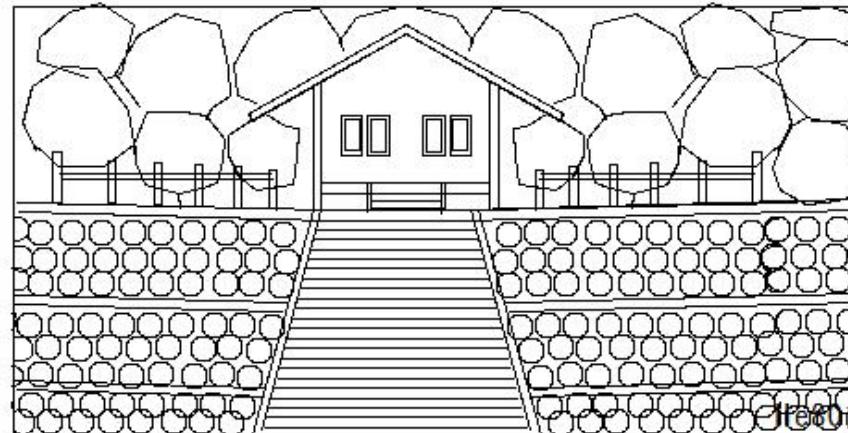


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(He801) Ogawazeki Irrigation Canal (Gunma)

(He801) Ogawazeki Irrigation Canal (Gunma)

Kowata Hachiman Shrine

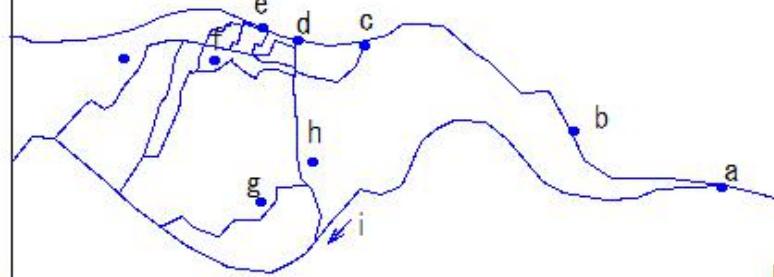


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal



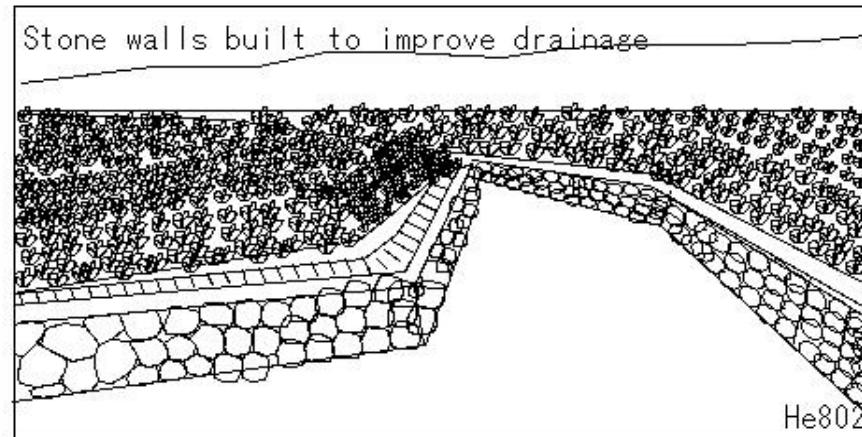
He787

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(He802) Ogawazeki Irrigation Canal (Gunma)

(He802) Ogawazeki Irrigation Canal (Gunma)

Stone walls built to improve drainage

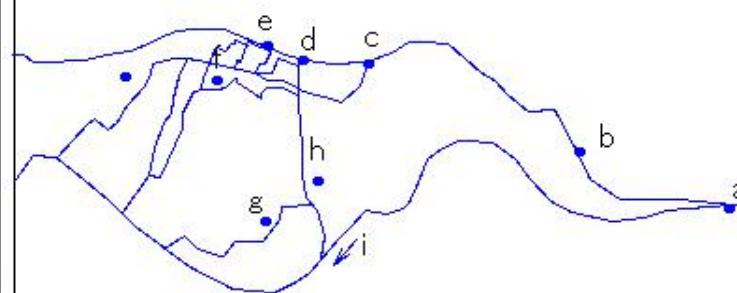


Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal



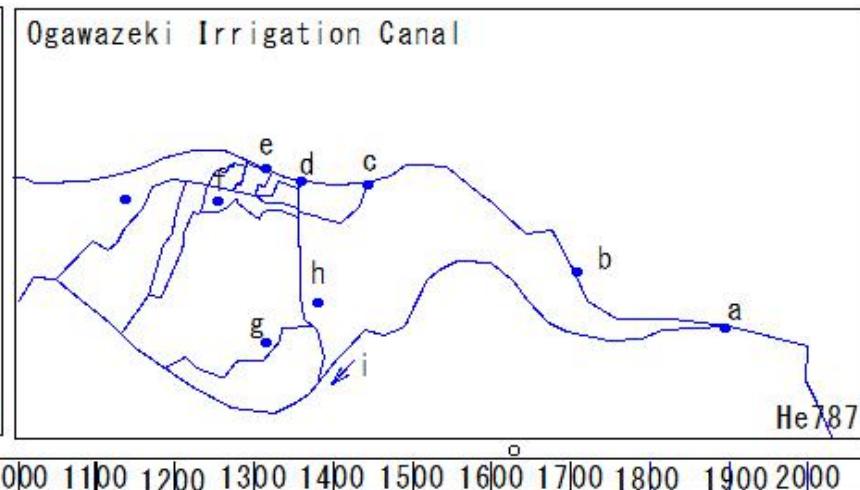
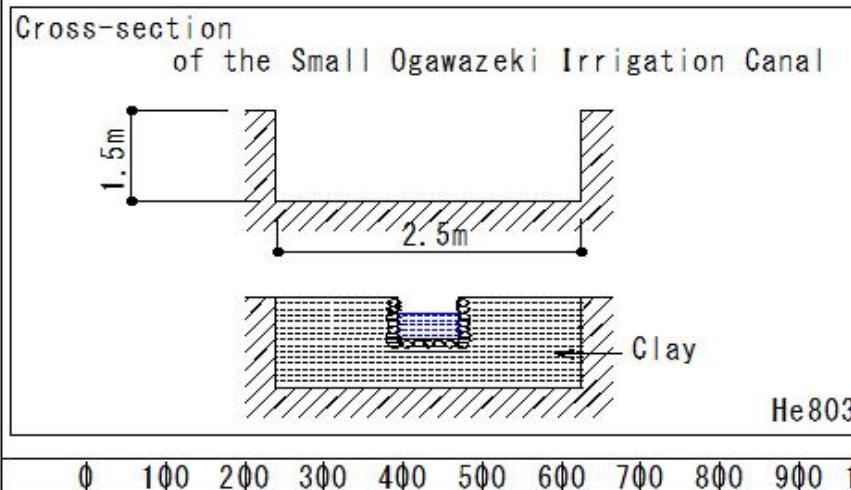
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(He803) Ogawazeki Irrigation Canal (Gunma)

(He803) Ogawazeki Irrigation Canal (Gunma)

Cross-section of the Small Ogawazeki Irrigation Canal

Around the Small Ogawazeki Irrigation Canal, soil improvement work was carried out using clay to prevent water infiltration.

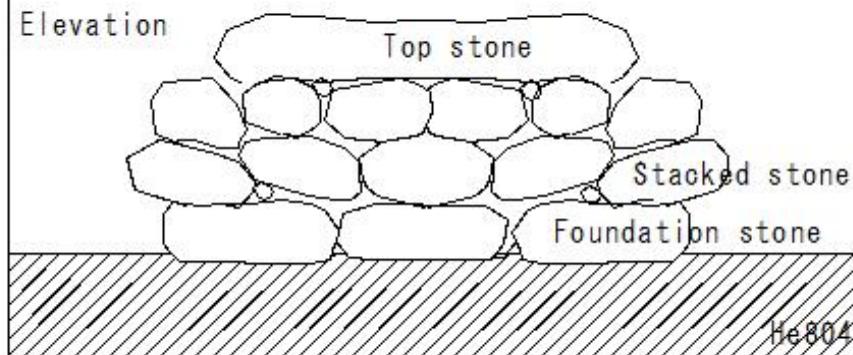


(He804) Ogawazeki Irrigation Canal (Gunma)

(He804) Ogawazeki Irrigation Canal (Gunma)

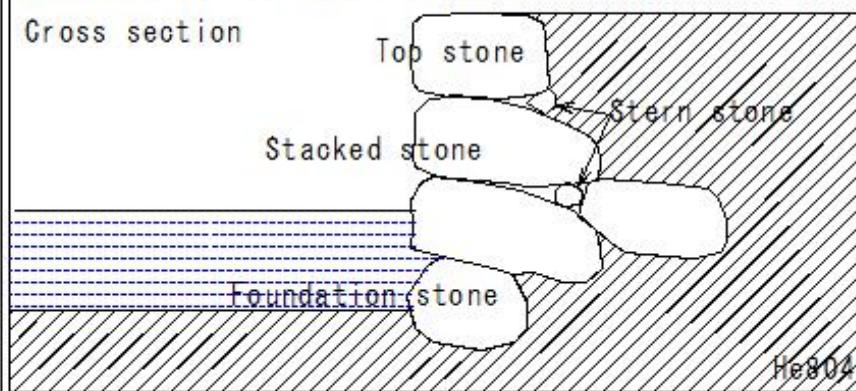
Stonework of the Small Ogawazeki Irrigation Canal

Stonework of the Small Ogawazeki Irrigation Canal

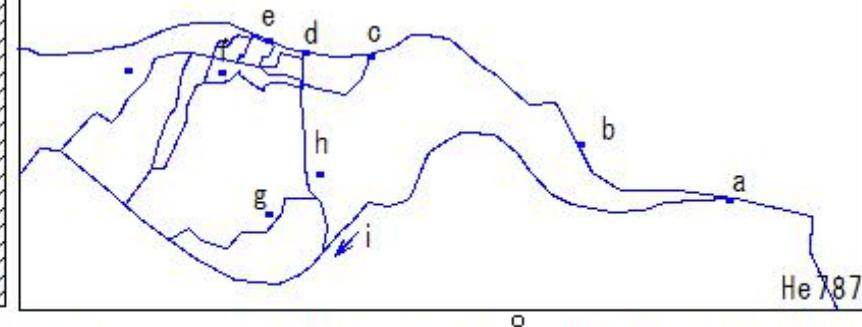


Stonework of the Small Ogawazeki Irrigation Canal

Cross section



Ogawazeki Irrigation Canal



Φ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He805) Ogawazeki Irrigation Canal (Gunma)

(He805) Ogawazeki Irrigation Canal (Gunma)

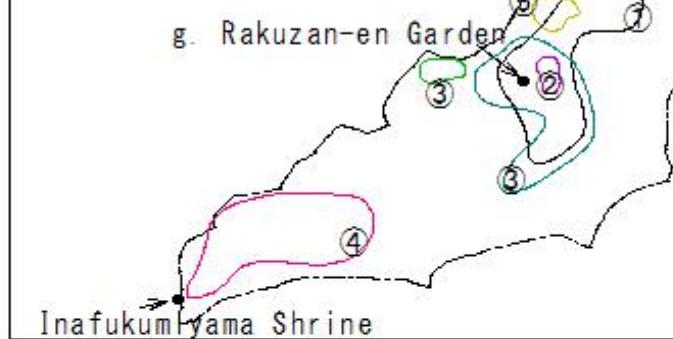
Historical Landscapes of Kanra Town

Historical Scenic Beauty

- ① Ogawazeki Irrigation Canal
- ② Kohata Hachiman Shrine Annual Festival
- ③ Konjac Production
- ④ Chijikaki Village
- ⑤ Tile Manufacturing

He805

Historical Landscapes of Kanra Town
Historical Scenic Beauty



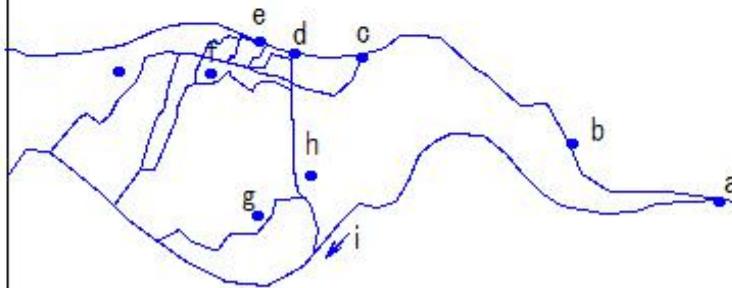
He805

Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal



He787

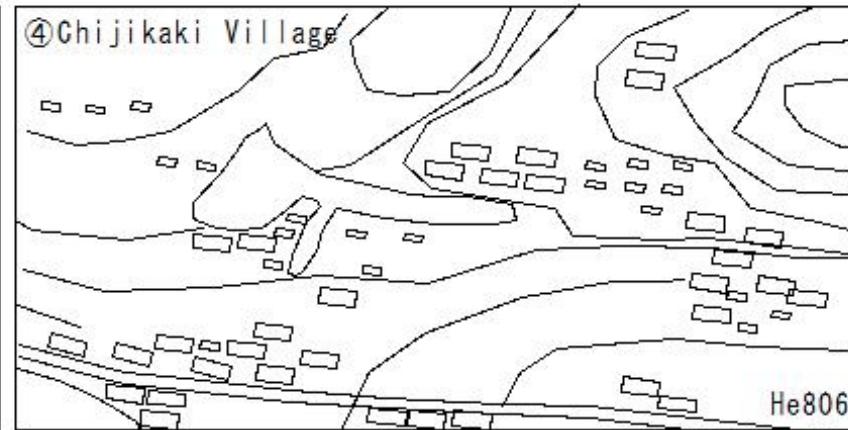
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He806) Ogawazeki Irrigation Canal (Gunma)

(He806) Ogawazeki Irrigation Canal (Gunma)

④Chijikaki Village

- Historical scenery of the Chijikakki Village
- Stone walls made of small stones
- Taisho era: Mount Inafukumiya
- Southernmost part of Kanra Town
- Source of the Ogawa River



He806

Historical Landscapes of Kanra Town

Historical Scenic Beauty

①Ogawazeki Irrigation Canal

②Kohata Hachiman Shrine Annual Festival

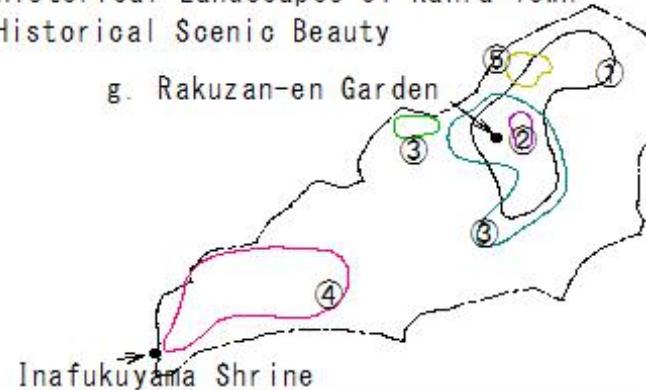
③Konjac Production

④Chijikaki Village

⑤Tile Manufacturing

Historical Landscapes of Kanra Town
Historical Scenic Beauty

g. Rakuzan-en Garden



He805

He805

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He807) Ogawazeki Irrigation Canal (Gunma)

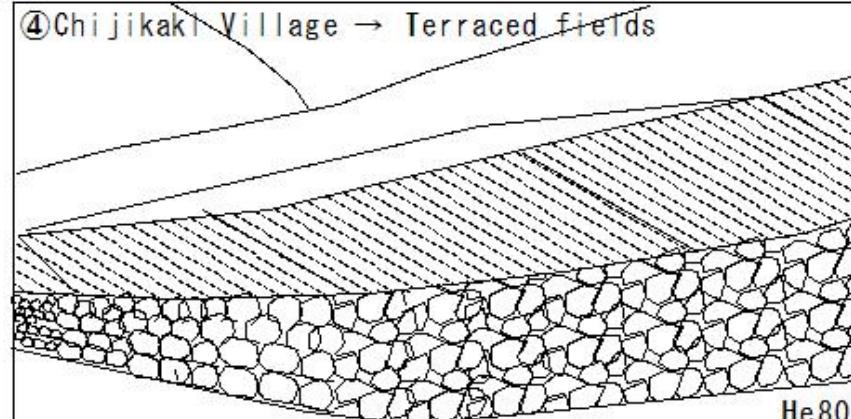
(He807) Ogawazeki Irrigation Canal (Gunma)

④ Chijikaki Village

Historical Landscape of Chijikaki Village

- Forestry → Agriculture
- High sand content → Good drainage
- Steep slopes
- Securing arable land
- Soil erosion
- Countermeasures → Stone walls (Chijikaki)
→ Terraced fields

④ Chijikaki Village → Terraced fields



He807

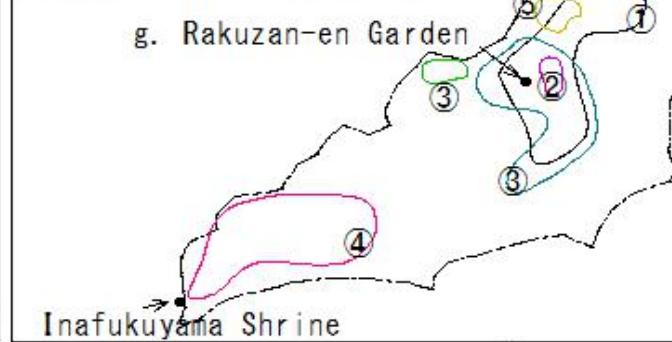
Historical Landscapes of Kanra Town

Historical Scenic Beauty

- ① Ogawazeki Irrigation Canal
- ② Kohata Hachiman Shrine Annual Festival
- ③ Konjac Production
- ④ Chijikaki Village
- ⑤ Tile Manufacturing

Historical Landscapes of Kanra Town

Historical Scenic Beauty



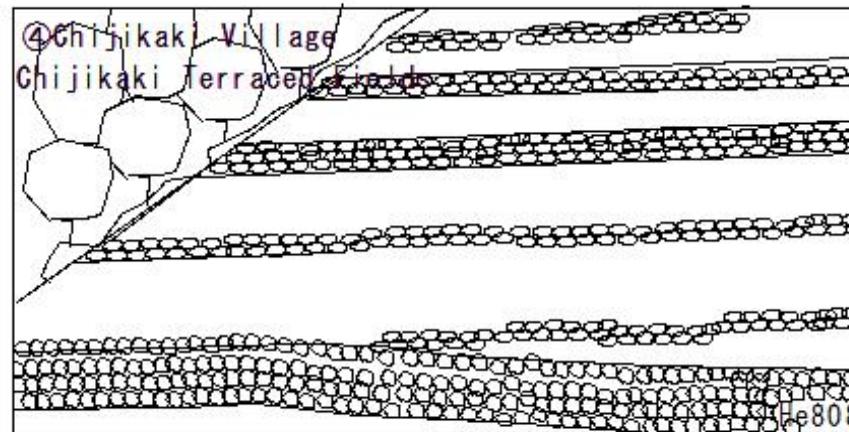
He805

∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

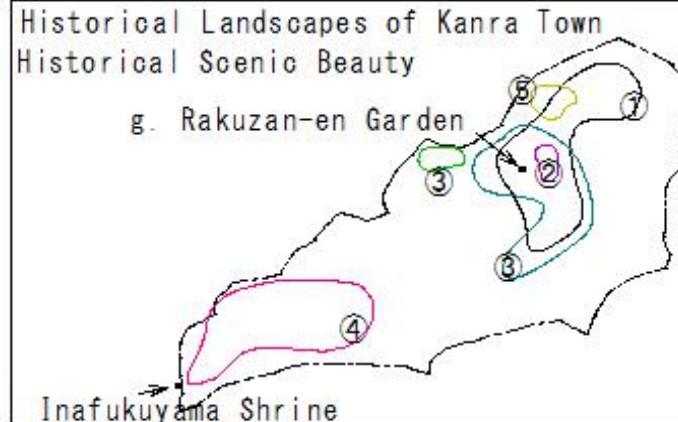
(He808) Ogawazeki Irrigation Canal (Gunma)

(He808) Ogawazeki Irrigation Canal (Gunma)

Historical Landscape of the Chijikaki Village
④Chijikaki Village
Chijikaki Terraced Fields
Late Kamakura Period(1185-1333)
Okawa River Stone Slabs



Historical Landscapes of Kanra Town
Historical Scenic Beauty
①Ogawazeki Irrigation Canal
②Kohata Hachiman Shrine Annual Festival
③Konjac Production
④Chijikaki Village
⑤Tile Manufacturing



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He809) Ogawazeki Irrigation Canal (Gunma)

(He809) Ogawazeki Irrigation Canal (Gunma)

The historical landscape of Chijikaki village

④ Chijikaki Village

Fields on steep slopes

Heavy rain → Field soil → Runoff

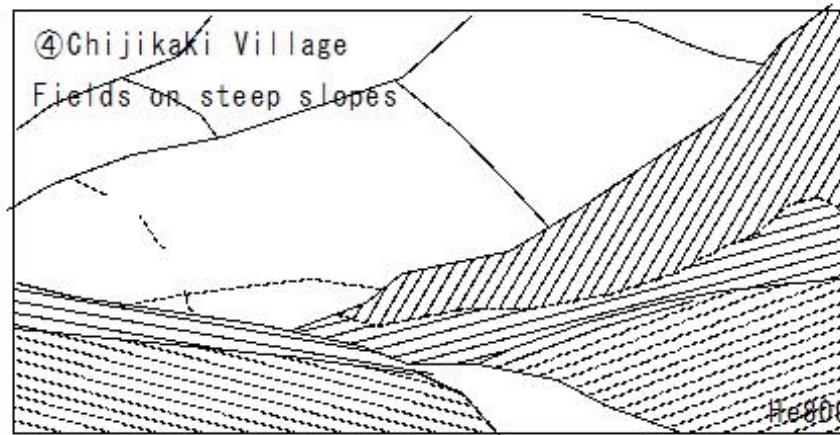
Transporting fertilizer → Difficult

Upside-down ditch → Digging from bottom to top

Stone wall repair work →

Work done during the off-season

He809



He809

Historical Landscapes of Kanra Town

Historical Scenic Beauty

① Ogawazeki Irrigation Canal

② Kohata Hachiman Shrine Annual Festival

③ Konjac Production

④ Chijikaki Village

⑤ Tile Manufacturing

He805

Historical Landscapes of Kanra Town
Historical Scenic Beauty

g. Rakuzan-en Garden



He805

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He810) Ogawazeki Irrigation Canal (Gunma)

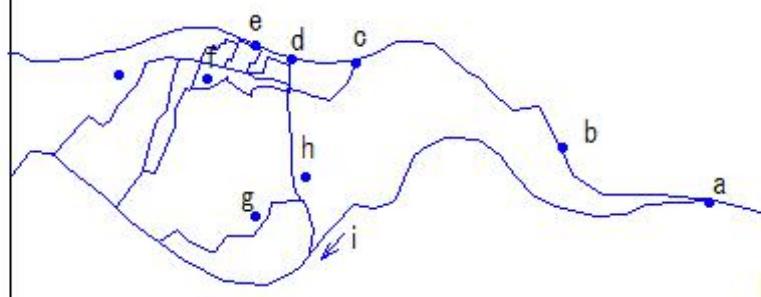
(He810) Ogawazeki Irrigation Canal (Gunma)

Ogawazeki Irrigation Canal

- a. Intake
- b. Fukiage Stone Pit
- c. First Entrance
- d. Second Entrance
- e. Third Entrance
- f. Takahashi Clan Residence
- g. Rakuzan-en Garden
- h. Matsuura Clan Residence
- i. Ogawa River

He787

Ogawazeki Irrigation Canal



He787

Historical Landscapes of Kanra Town

Historical Scenic Beauty

- ① Ogawazeki Irrigation Canal
- ② Kohata Hachiman Shrine Annual Festival
- ③ Konjac Production
- ④ Chijikaki Village
- ⑤ Tile Manufacturing

He805

Historical Landscapes of Kanra Town
Historical Scenic Beauty



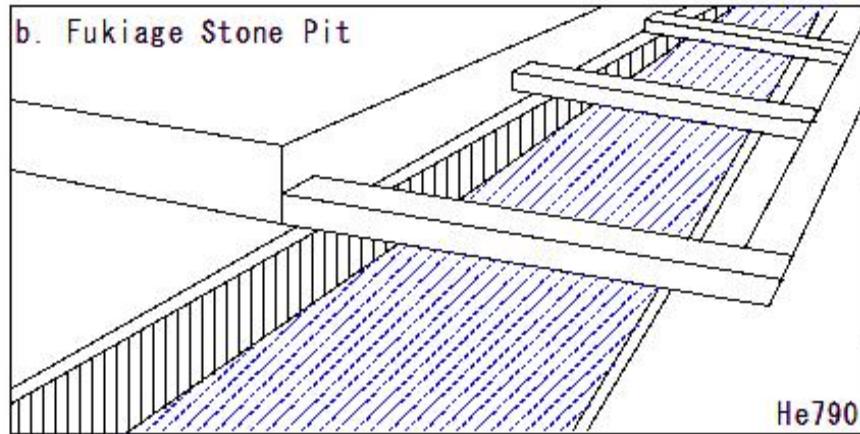
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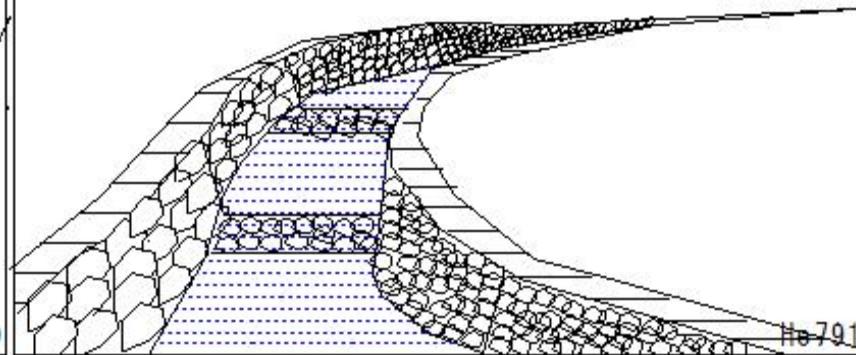
(He811) Ogawazeki Irrigation Canal (Gunma)

(He811) Ogawazeki Irrigation Canal (Gunma)

b. Fukiage Stone Pit

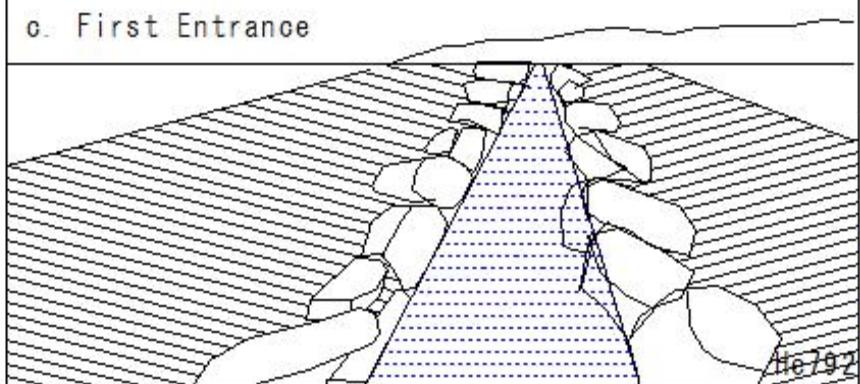


Ogawazeki Irrigation Canal (large weir)

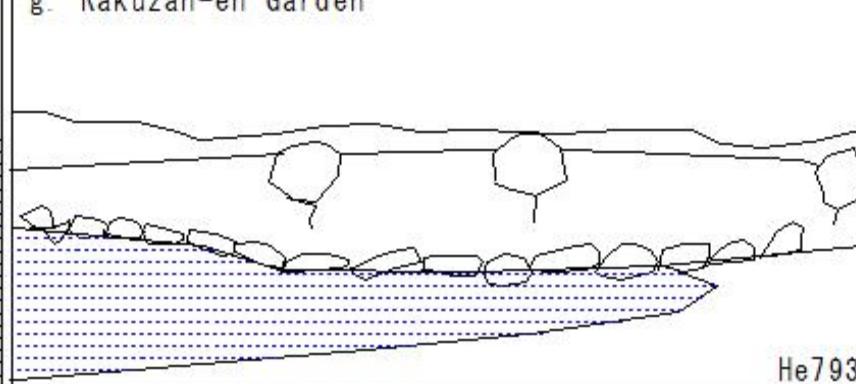


Small Irrigation Canal

c. First Entrance



g. Rakuzan-en Garden

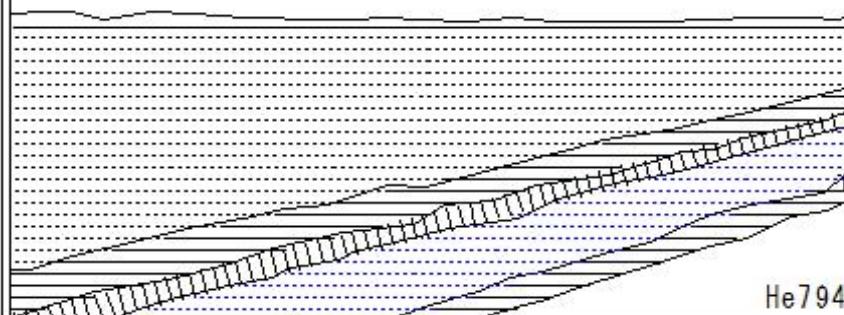


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He812) Ogawazeki Irrigation Canal (Gunma)

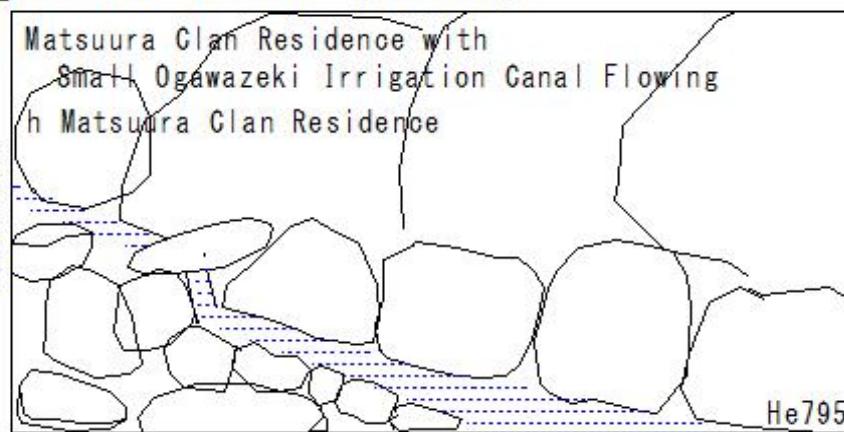
(He812) Ogawazeki Irrigation Canal (Gunma)

Ogawazeki Irrigation Canal (rice paddies)



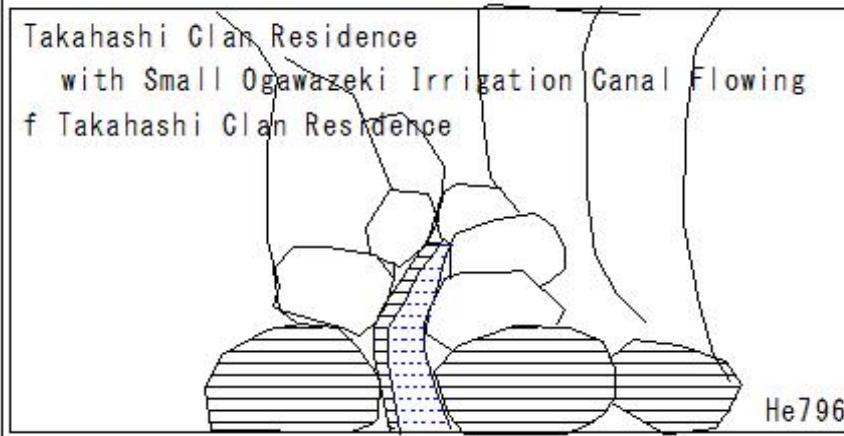
He794

Matsuura Clan Residence with
Small Ogawazeki Irrigation Canal Flowing
in Matsuura Clan Residence



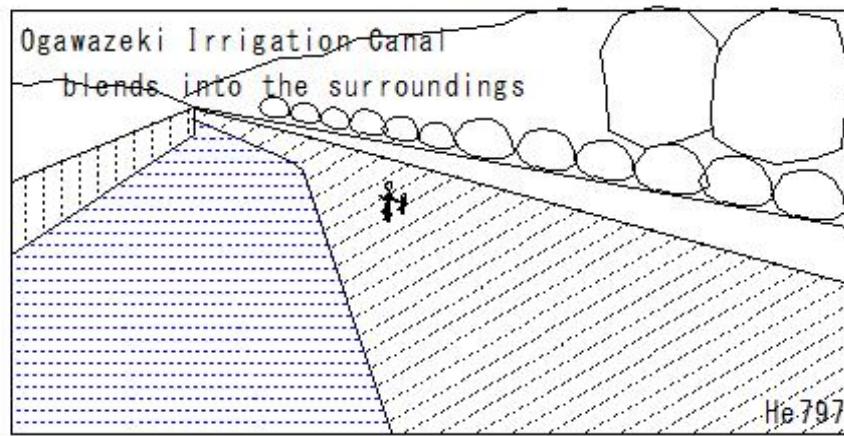
He795

Takahashi Clan Residence
with Small Ogawazeki Irrigation Canal Flowing
in Takahashi Clan Residence



He796

Ogawazeki Irrigation Canal
blends into the surroundings

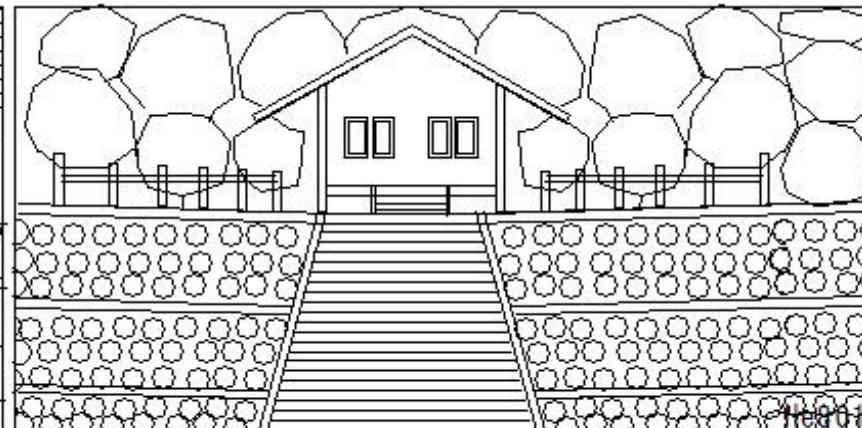
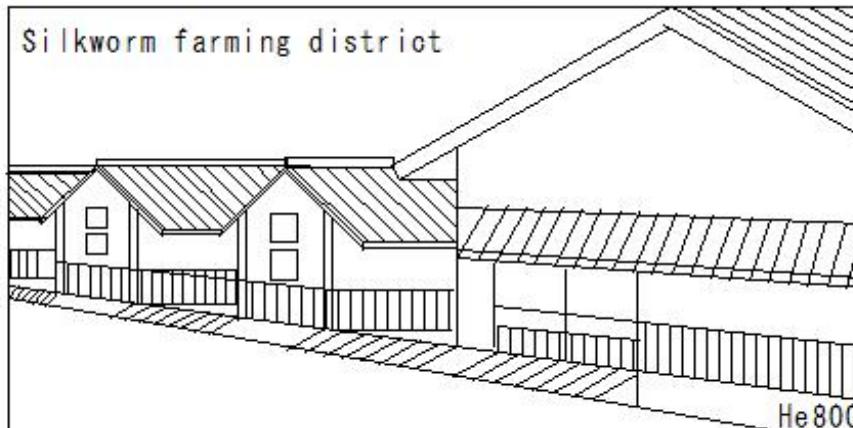
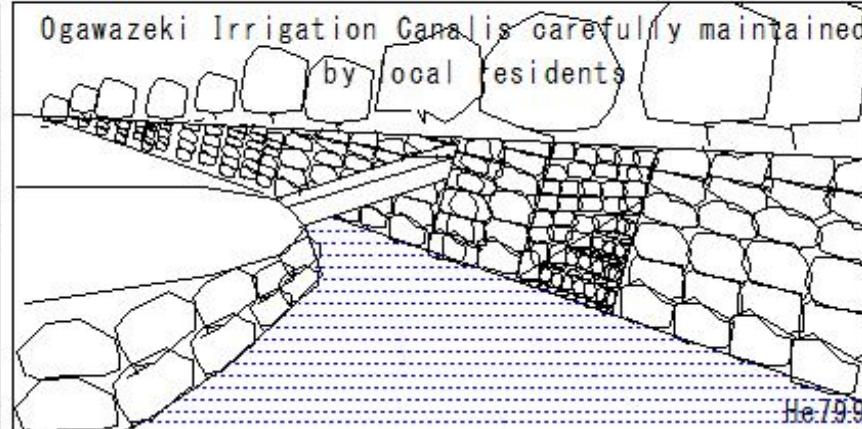
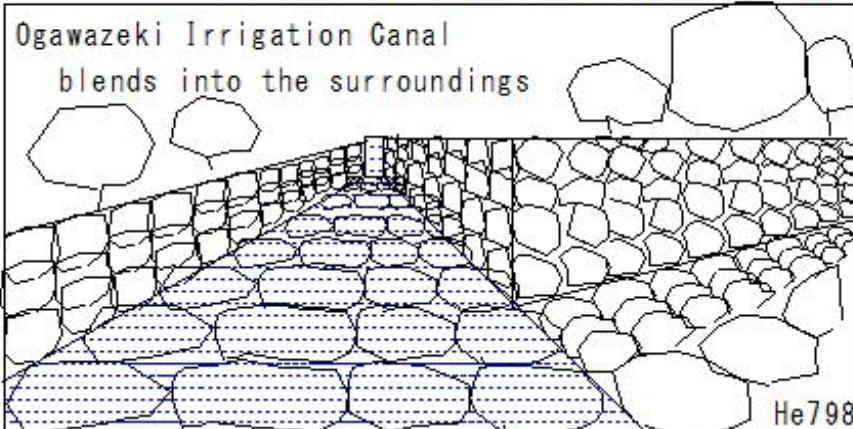


He797

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He813) Ogawazeki Irrigation Canal (Gunma)

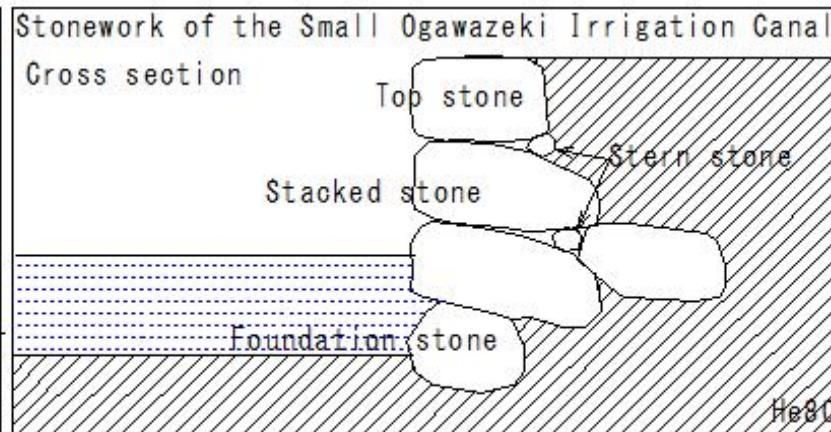
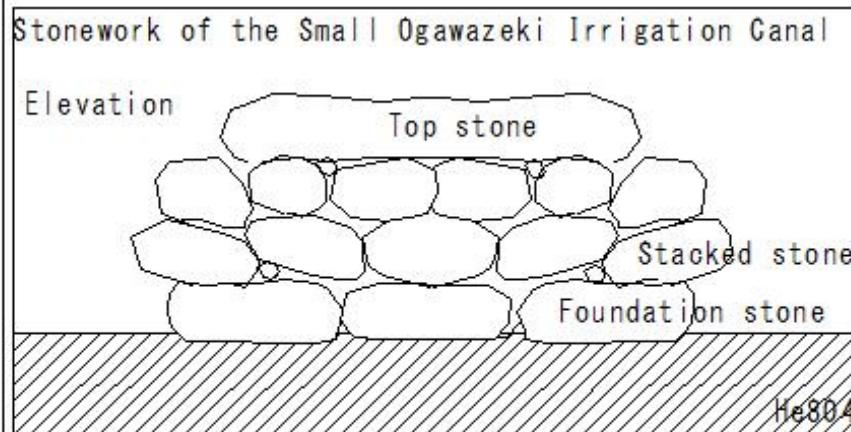
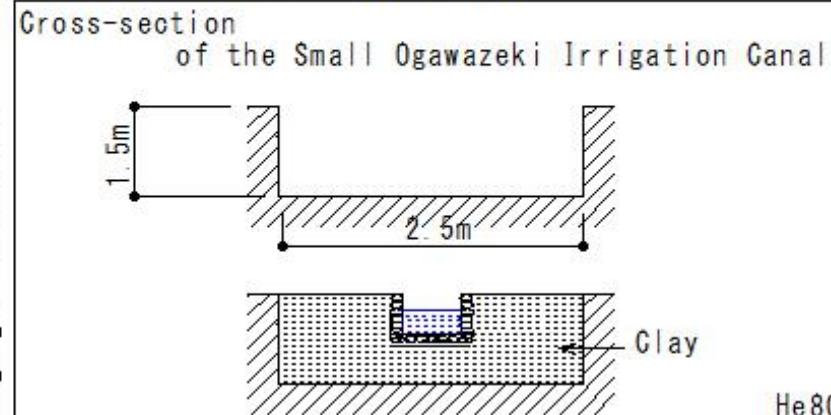
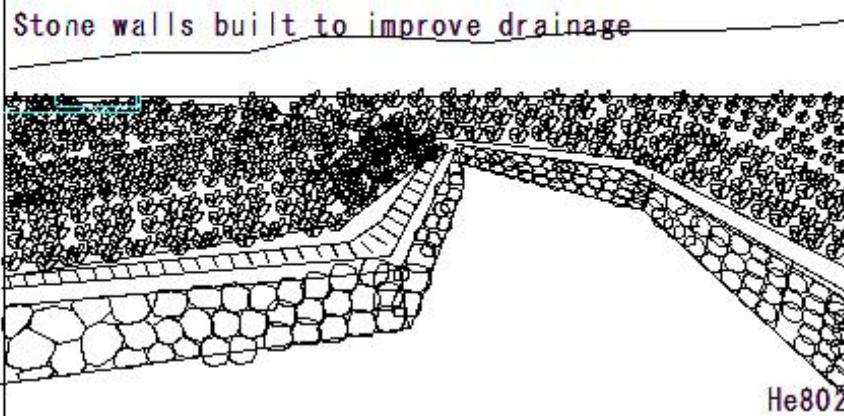
(He813) Ogawazeki Irrigation Canal (Gunma)



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He814) Ogawazeki Irrigation Canal (Gunma)

(He814) Ogawazeki Irrigation Canal (Gunma)



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He815) Ogawazeki Irrigation Canal (Gunma)

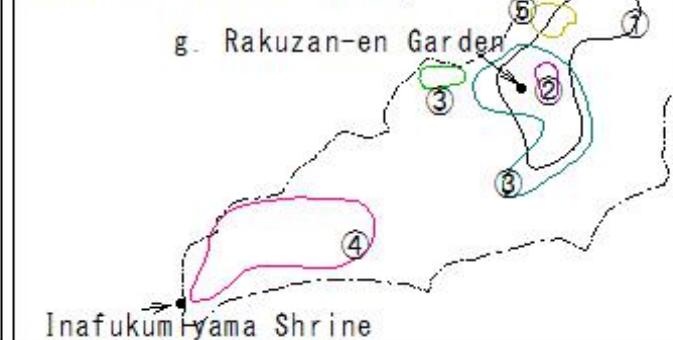
(He815) Ogawazeki Irrigation Canal (Gunma)

Historical Landscapes of Kanra Town

Historical Scenic Beauty

- ① Ogawazeki Irrigation Canal
- ② Kohata Hachiman Shrine Annual Festival
- ③ Konjac Production
- ④ Chijikaki Village
- ⑤ Tile Manufacturing

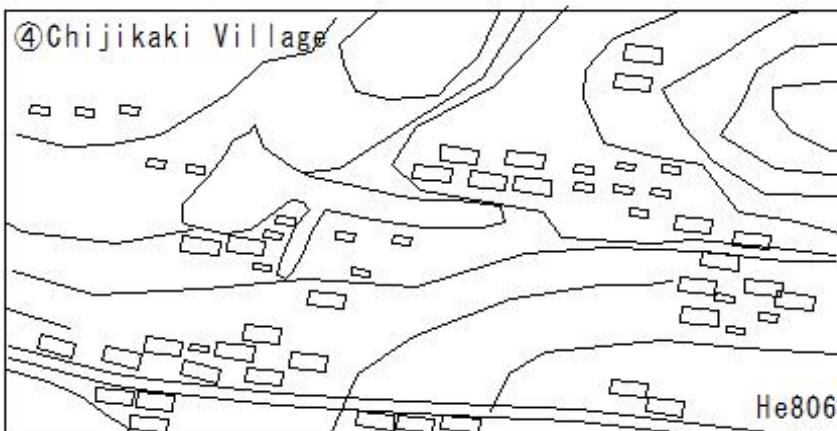
Historical Landscapes of Kanra Town
Historical Scenic Beauty



He805

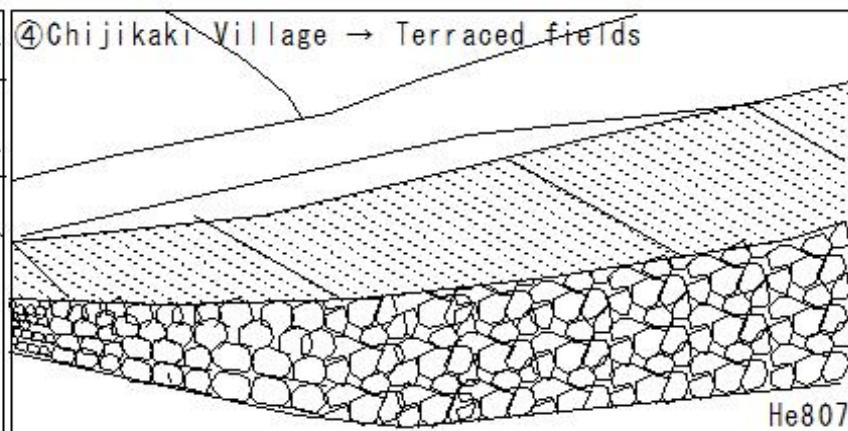
He805

④ Chijikaki Village



He806

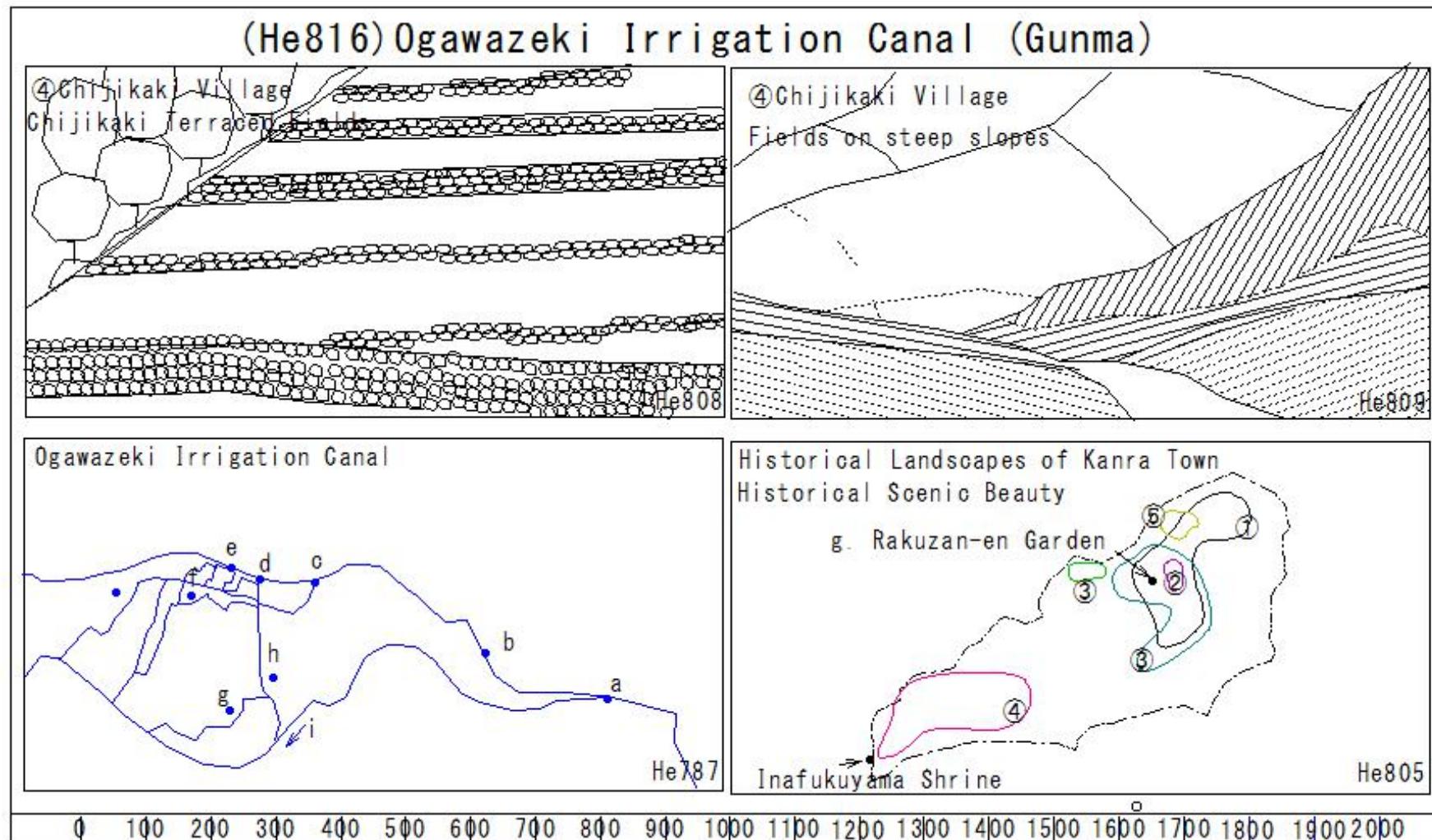
④ Chijikaki Village → Terraced fields



He807

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

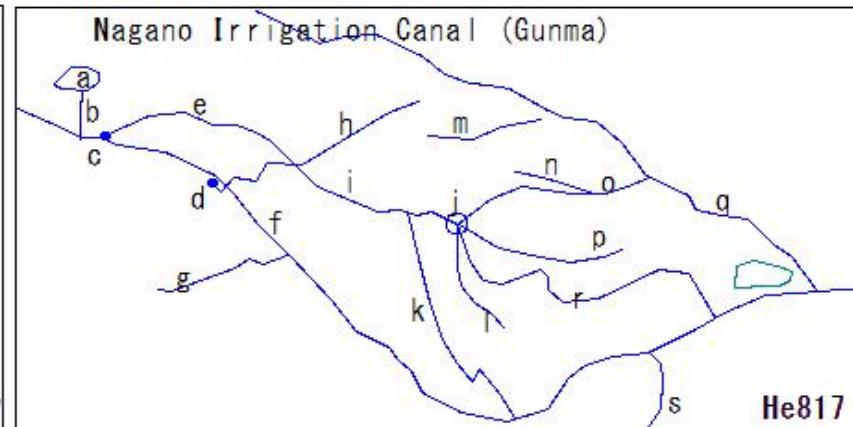
(He816) Ogawazeki Irrigation Canal (Gunma)



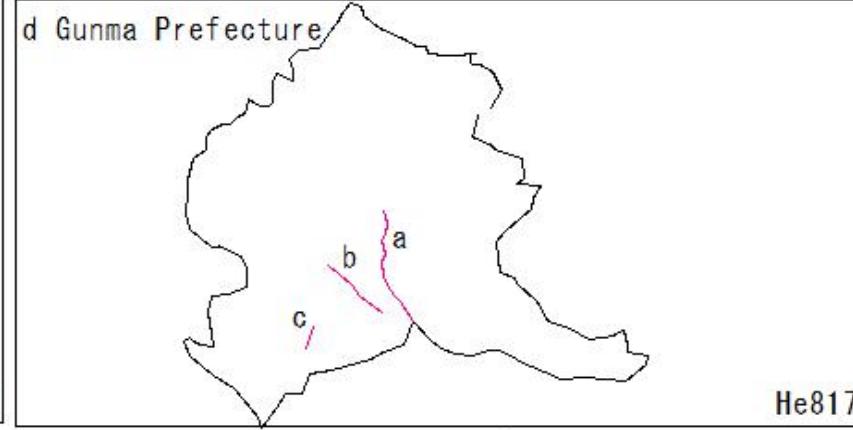
(He817) Nagano Irrigation Canal (Gunma)

(He817) Nagano Irrigation Canal (Gunma)

- a Lake Haruna
- b Haruna River
- c Nagano Irrigation Canal Headworks
- d Two-Stage Cofferdam Headworks
- e Two-Stage Cofferdam Channel
- f Karasu River
- g Usui River
- h Gogu Irrigation Channel
- i Nagano Irrigation Main Channel
- j Cylindrical Diversion Irrigation Canal
- k Sano Irrigation Channel
- l Kuragano Irrigation Channel
- m Jigoku Irrigation Channel
- n Bukkoseki Irrigation Channel
- o Yanaka Irrigation Channel
- p Ino River
- q (Kawano-Omo-Seki)
- r Irrigation Channel
- s Kabura River
- He817



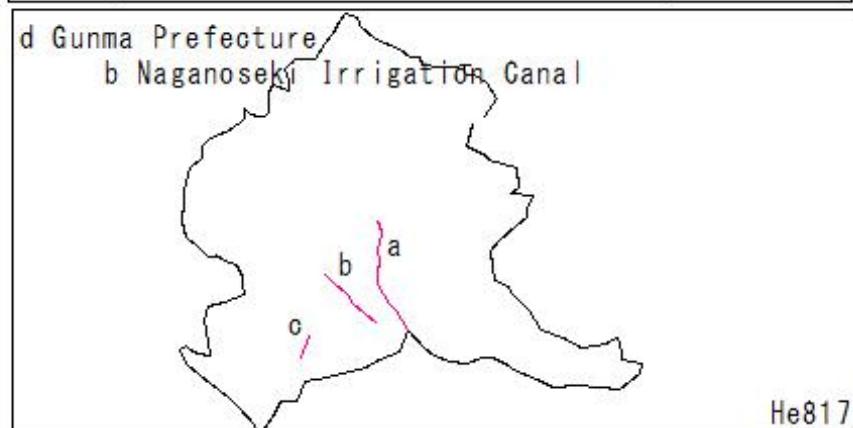
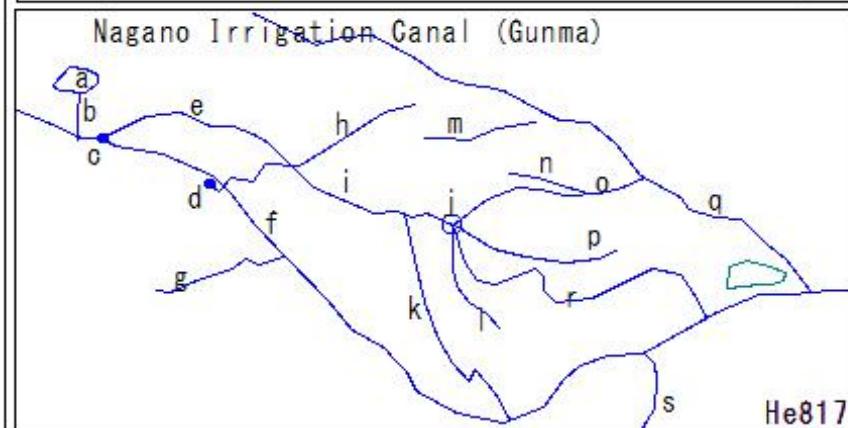
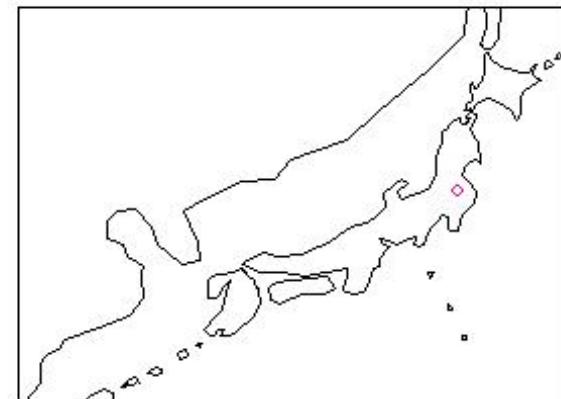
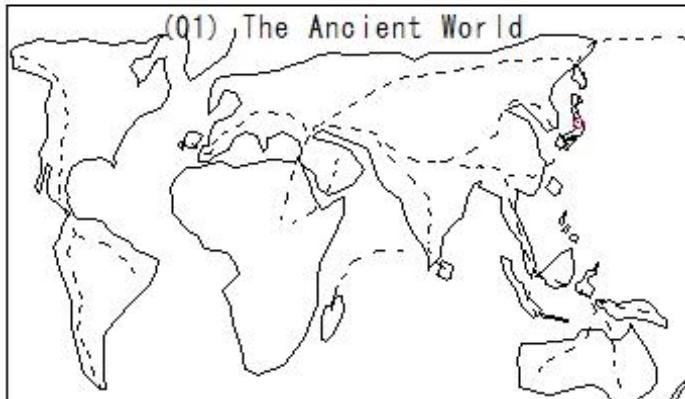
- a Tenguiwa Irrigation Canal
- b Naganoseki Irrigation Canal
- c Ogawa Irrigation Canal
- d Gunma Prefecture



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He818) Nagano Irrigation Canal (Gunma)

(He818) Nagano Irrigation Canal (Gunma)



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

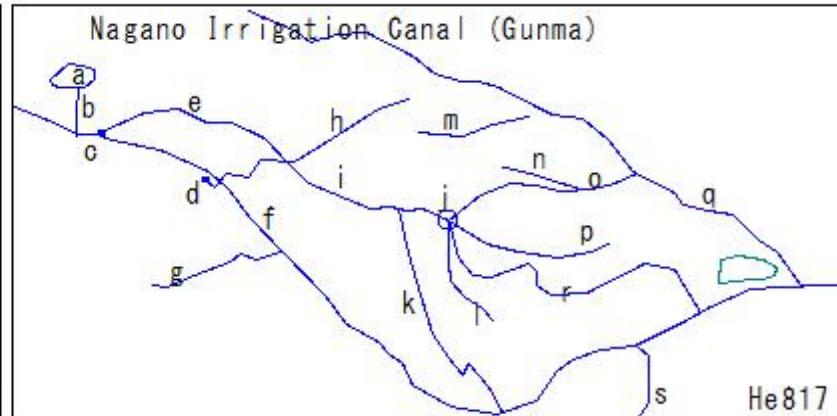
(He819) Nagano Irrigation Canal (Gunma)

(He819) Nagano Irrigation Canal (Gunma)

Nagano Irrigation Canal

- ① An irrigation canal that contributed to the development of Takasaki City.
- ② In 928, Nagano Yasunori began development of the Nagano Irrigation Canal.
- ③ In 1551 (his descendant, Nagano Narimasa, the fourth lord of Minowa Castle, renovated it and created the prototype for the current Nagano Irrigation Canal).
- ④ The Jigoku Irrigation Canal, Kaminakai Irrigation Canal, Yanaka Irrigation Canal, and Kuragano Irrigation Canal were constant disputes over water volume.
- ⑤ In 1962, a cylindrical diversion weir (a method for dividing water fairly) was constructed.
- ⑥ After supplying water to each area, the four canals flow into the Karasu River and Ino River.
- ⑦ This was a key location for irrigation canals, efficiently distributing water to Takasaki City, which had rivers but was unable to draw water efficiently, and irrigating the fields.

a	Lake Haruna	k	Sano Irrigation Channel
b	Haruna River	l	Kuragano Irrigation Channel
c	Nagano Irrigation Canal Headworks		
d	Two-Stage Cofferdam Headworks	o	Jigoku Irrigation Channel
e	Two-Stage Cofferdam Channel	p	Yanaka Irrigation Channel
f	Karasu River	m	Gogu Irrigation Channel
g	Usui River	n	Bukkoseki Irrigation Channel
h	Kaizawa Irrigation Channel	q	Ino River
i	Nagano Irrigation Main Channel	r	(Kawano-Omo-Seki Irrigation Channel)
j	Cylindrical Diversion Irrigation Canal	s	Kabura River
			He817



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

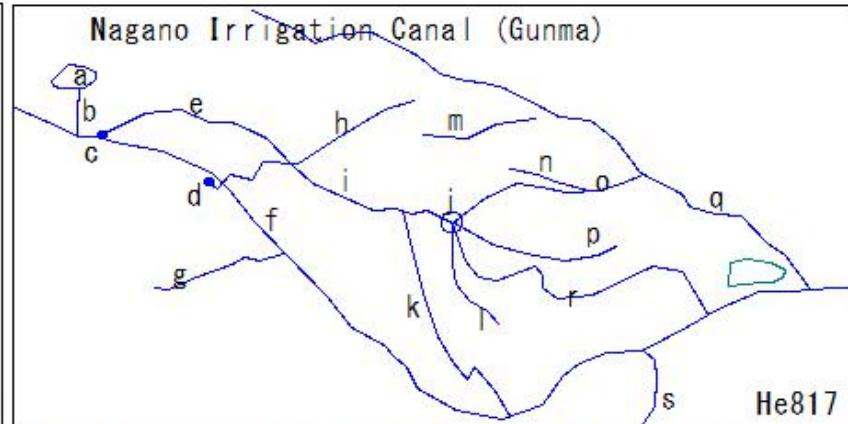
(He820) Nagano Irrigation Canal (Gunma)

(He820) Nagano Irrigation Canal (Gunma)

Nagano Irrigation Canal

- ① Currently, the water intake is up to 5.787 tons per second from the Class A Kurokawa River.
- ② The main canal is diverted at 15 gates.
- ③ 8.6 kilometers downstream, a cylindrical diversion weir branches it into four branches.
- ④ These four branches total 17.1 kilometers.
- ⑤ Currently, it irrigates 340 hectares of rice paddies.

a	Lake Haruna	k	Sano Irrigation Channel
b	Haruna River	l	Kuragano Irrigation Channel
c	Nagano Irrigation Canal Headworks		
d	Two-Stage Cofferdam Headworks	o	Jigoku Irrigation Channel
e	Two-Stage Cofferdam Channel	p	Yanaka Irrigation Channel
f	Karasu River	q	Gogu Irrigation Channel
g	Usui River	n	Bukkoseki Irrigation Channel
h	Kaizawa Irrigation Channel	r	(Kawano-Omo-Seki
i	Nagano Irrigation Main Channel	s	Irrigation Channel)
j	Cylindrical Diversion Irrigation Canal	t	
			He817



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(He821) Nagano Irrigation Canal (Gunma)

(He821) Nagano Irrigation Canal (Gunma)

Nagano Irrigation Canal

Old Headworks

c Nagano Irrigation Canal Headworks

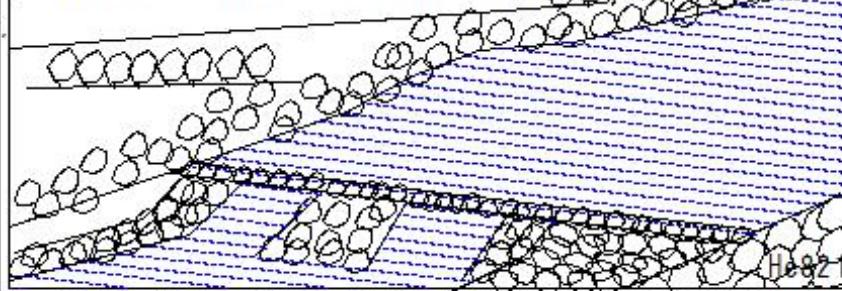
A headwork is a structure (such as a sluice gate, dam, or sand spillway) that dams a river, raises the water level, and funnels it into a waterway to draw water for agricultural use.

He821

Nagano Irrigation Canal

Old Headworks

c Nagano Irrigation Canal Headworks



He821

a Lake Haruna k Sano Irrigation Channel

b Haruna River l Kuragano Irrigation Channel

c Nagano Irrigation Canal Headworks

d Two-Stage Cofferdam Headworks o Jigoku Irrigation Channel

e Two-Stage Cofferdam Channel p Yanaka Irrigation Channel

f Karasu River m Gogu Irrigation Channel

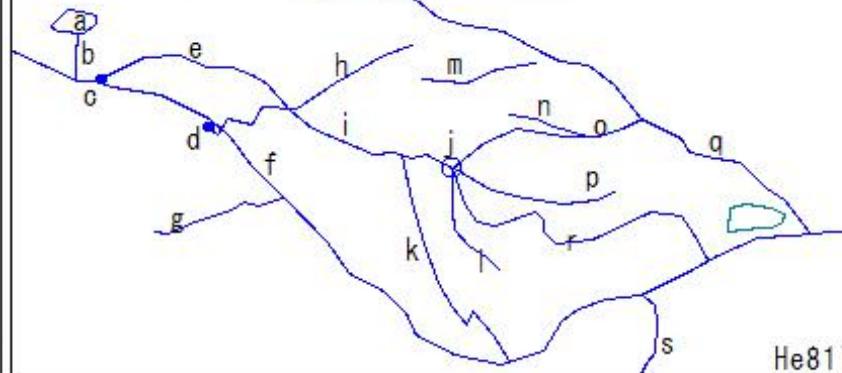
g Usui River n Bukkoseki Irrigation Channel q Ino River

h Kaizawa Irrigation Channel r (Kawano-Omo-Seki

i Nagano Irrigation Main Channel t Irrigation Channel

j Cylindrical Diversion Irrigation Canal s Kabura River He817

Nagano Irrigation Canal (Gunma)



He817

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He822) Nagano Irrigation Canal (Gunma)

(He822) Nagano Irrigation Canal (Gunma)

Nagano Irrigation Canal

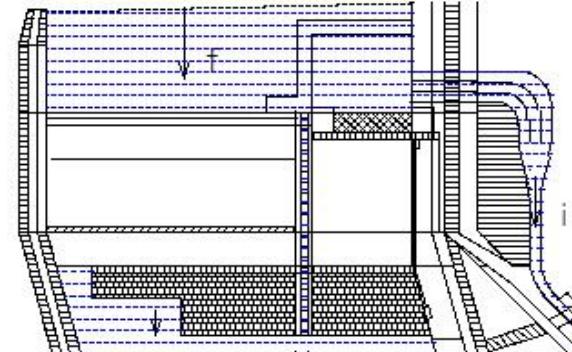
Old Headworks

c Nagano Irrigation Canal Headworks

A headwork is a structure (such as a sluice gate, dam, or sand spillway) that dams a river, raises the water level, and funnels it into a waterway to draw water for agricultural use.

He821

c Nagano Irrigation Canal Headworks



Plan

c Nagano Irrigation Canal Headworks

i Nagano Irrigation Main Channel

① Movable Weir (Sand Spill)

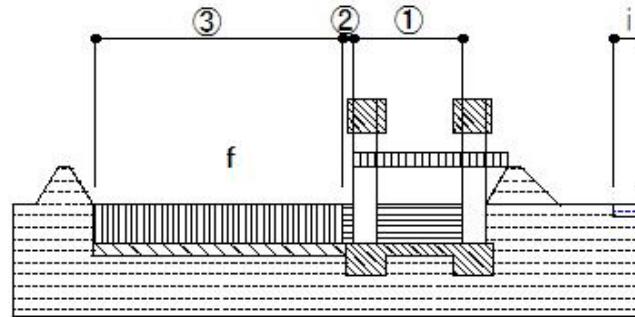
② Fishway

③ Fixed Weir

f Karasu River

He822

c Nagano Irrigation Canal Headworks



Elevation

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(He823) Nagano Irrigation Canal (Gunma)

(He823) Nagano Irrigation Canal (Gunma)

Nagano Irrigation Canal

i Nagano Irrigation Main Channel

l Kuragano Irrigation Channel

p Yanaka Irrigation Channel

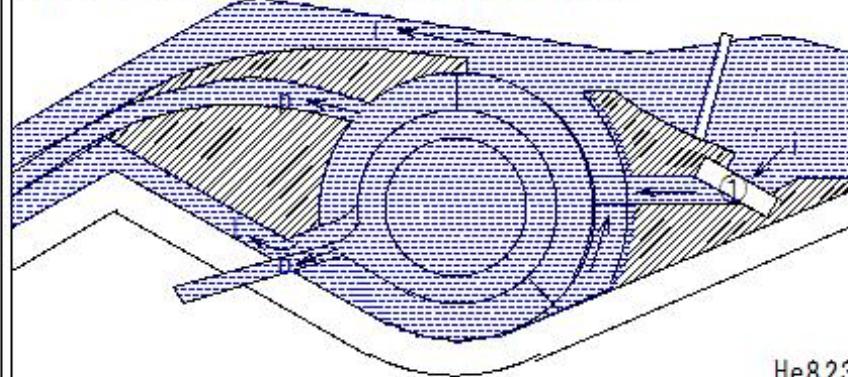
t Kaminakai Irrigation Channel

o Jigoku Irrigation Channel

① Dustproofing Device

- A cylindrical water diversion weir (a method for dividing water equally) was constructed in 1962. He823

Cylindrical Water Diversion Mechanism



He823

- The four channels supply water to each area and then flow into the Karasu River and Ino River.

② Siphon

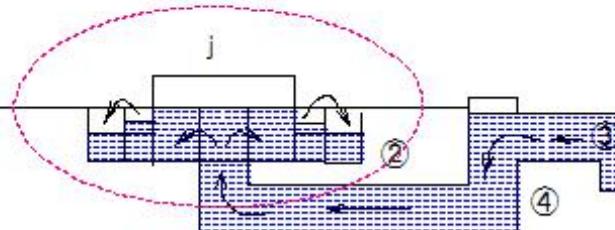
③ Irrigation Canal

④ Head

j Cylindrical Diversion Irrigation Canal

- Naturally divides water into four directions

Cylindrical Water Diversion Mechanism



He823

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(He824) Nagano Irrigation Canal (Gunma)

(He824) Nagano Irrigation Canal (Gunma)

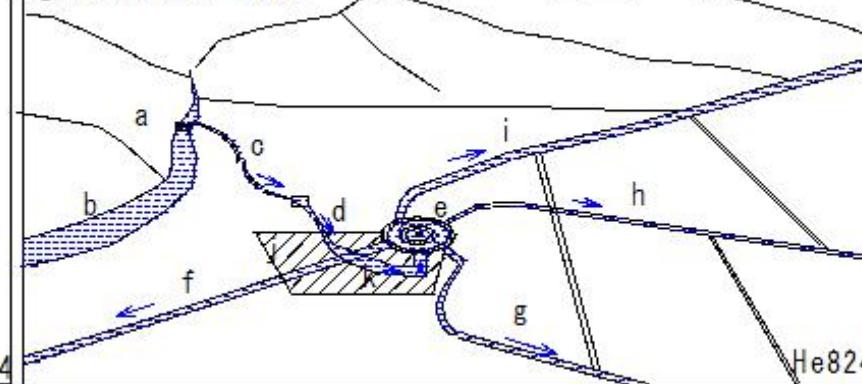
Agricultural Water

- ① Water needed to grow rice and vegetables.
- ② Headworks for taking water from rivers.
- ③ Waterways for delivering water to rice paddies and fields.
- ④ Siphons for passing water through intersections with roads and waterways.
- ⑤ Cylindrical Diversion Weirs for dividing water equally.
- ⑥ Water is also used for daily life and fire prevention.

Agricultural Water

- | | |
|------------------------------|--------------------|
| a Headworks | i Channel 4 |
| b River | j Underground View |
| c Channel | k Siphon |
| d Head | |
| e Cylindrical Diversion Weir | |
| f Channel 1 | |
| g Channel 2 | |
| h Channel 3 | |

Agricultural Water



He824

He824

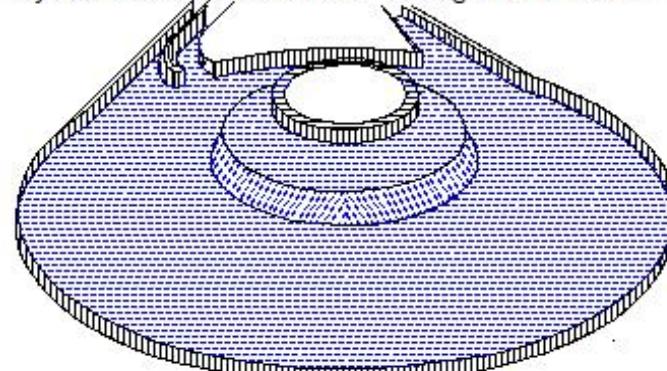
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He825) Nagano Irrigation Canal (Gunma)

(He825) Nagano Irrigation Canal (Gunma)

- j Cylindrical Diversion Irrigation Canal
- Naturally divides water into four directions
 - The four channels supply water to each area and then flow into the Karasu River and Ino River.

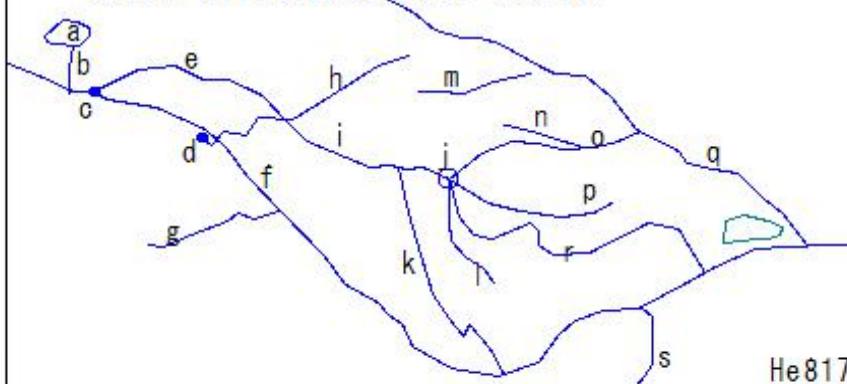
j Cylindrical Diversion Irrigation Canal



He825

- a Lake Haruna k Sano Irrigation Channel
b Haruna River l Kuragano Irrigation Channel
c Nagano Irrigation Canal Headworks
d Two-Stage Cofferdam Headworks o Jigoku Irrigation Channel
e Two-Stage Cofferdam Channel p Yanaka Irrigation Channel
f Karasu River m Gogu Irrigation Channel
g Usui River n Bukkoseki Irrigation Channel q Ino River
h Kaizawa Irrigation Channel r (Kawano-Omo-Seki)
i Nagano Irrigation Main Channel s Kabura River
j Cylindrical Diversion Irrigation Canal t (Kawano-Omo-Seki)
He817

Nagano Irrigation Canal (Gunma)



He817

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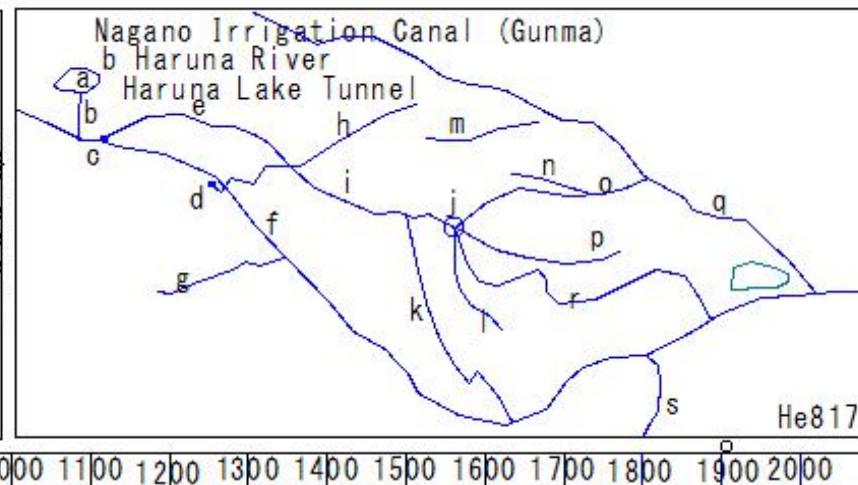
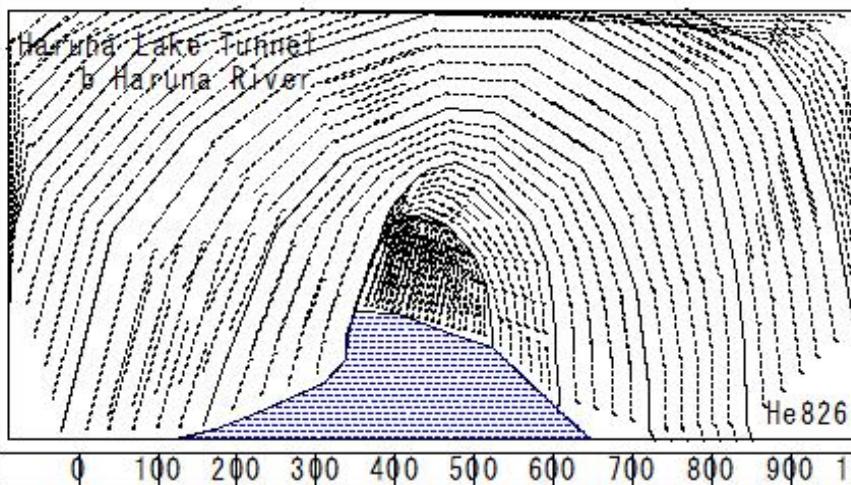
(He826) Nagano Irrigation Canal (Gunma)

(He826) Nagano Irrigation Canal (Gunma)

Haruna Lake Tunnel

- ① In 1903 (Meiji 36), it was planned to divert water from Lake Haruna to the Karasu River for the Nagano Weir Irrigation Canal.
- ② In 1904 (Meiji 37), a tunnel was completed that ran from Lake Haruna under Tenjin Pass.
- ③ Water taken from Lake Haruna flows from the Haruna River into the Karasu River,
- ④ and is directed to the Nagano Weir main canal from the headworks in Hongo-cho.
- ⑤ The tunnel exit for the Nagano Weir Irrigation Canal, where water is taken from Lake Haruna (completed in 1904)

b Haruna River

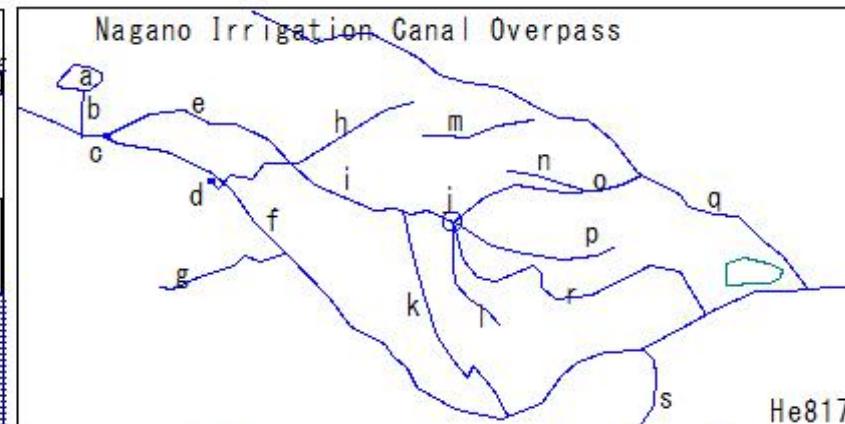
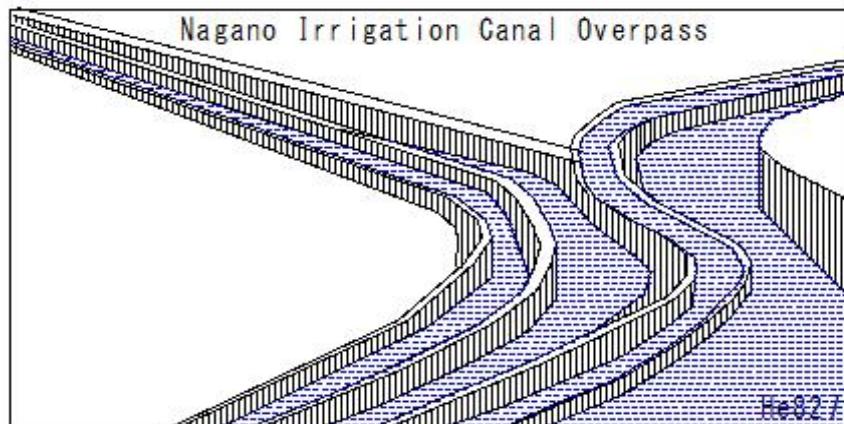


(He827) Nagano Irrigation Canal (Gunma)

(He827) Nagano Irrigation Canal (Gunma)

Nagano Irrigation Canal Overpass

- ① Kaminakai-cho, Takasaki City, Yamaguchi Prefecture
- ② Four separated waterways
- ③ An overpass like a highway.



(He828) Nagano Irrigation Canal (Gunma)

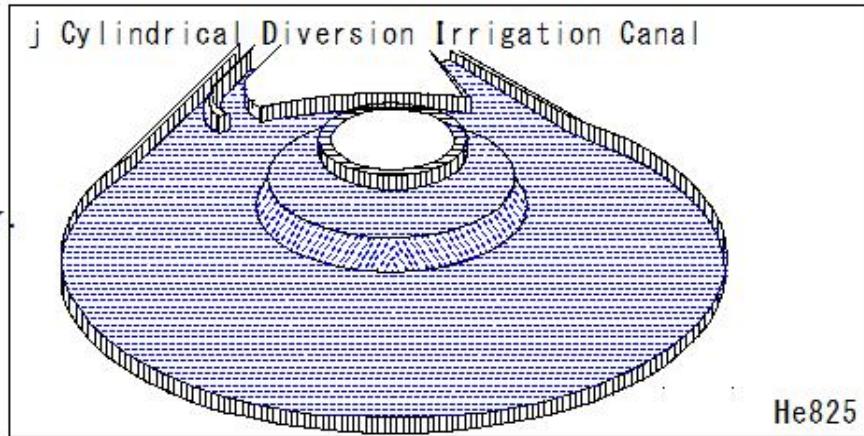
(He828) Nagano Irrigation Canal (Gunma)

Nagano Irrigation Canal

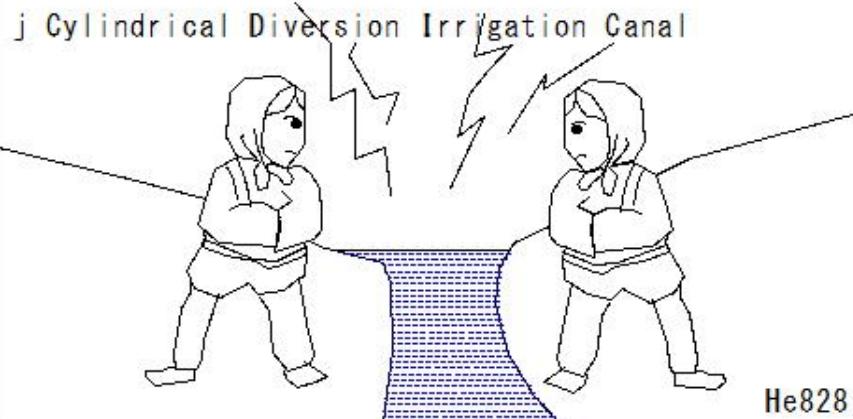
j Cylindrical Diversion Irrigation Canal

Why do we need to divide it into four directions?

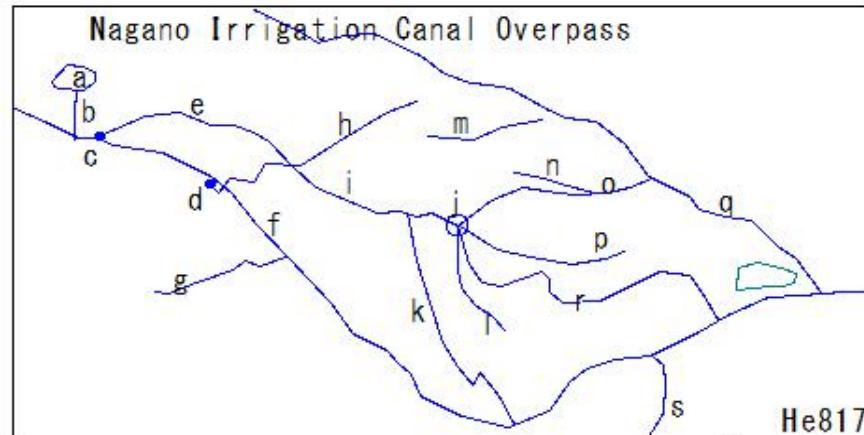
- ① Rice can't grow without water.
- ② In the past, there were many conflicts over water.
- ③ It was created to eliminate those conflicts.



He825



He828



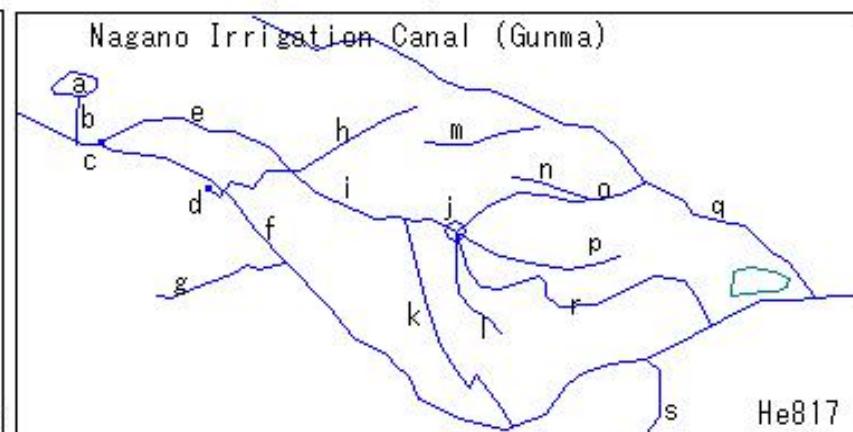
He817

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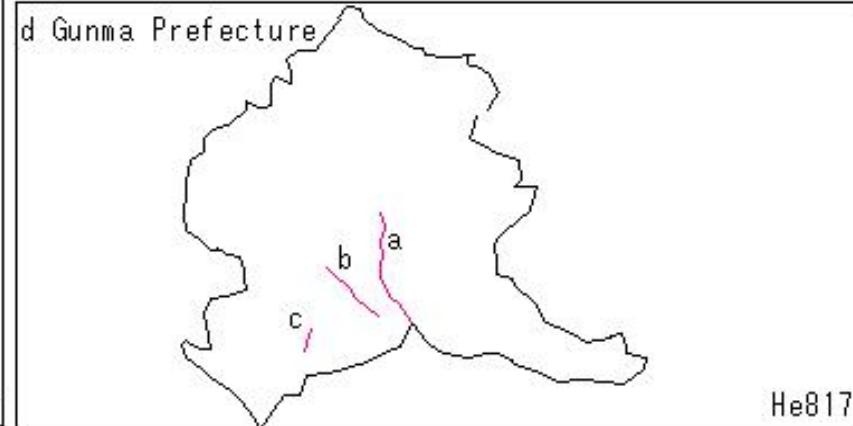
(He829) Nagano Irrigation Canal (Gunma)

(He829) Nagano Irrigation Canal (Gunma)

a Lake Haruna k Sano Irrigation Channel
b Haruna River l Kuragano Irrigation Channel
c Nagano Irrigation Canal Headworks
d Two-Stage Cofferdam Headworks o Jigoku Irrigation Channel
e Two-Stage Cofferdam Channel p Yanaka Irrigation Channel
f Karasu River m Gogu Irrigation Channel
g Usui River n Bukkoseki Irrigation Channel q Ino River
h Kaizawa Irrigation Channel r (Kawano-Omo-Seki)
i Nagano Irrigation Main Channel s Kabura River
j Cylindrical Diversion Irrigation Canal t Irrigation Channel
He817



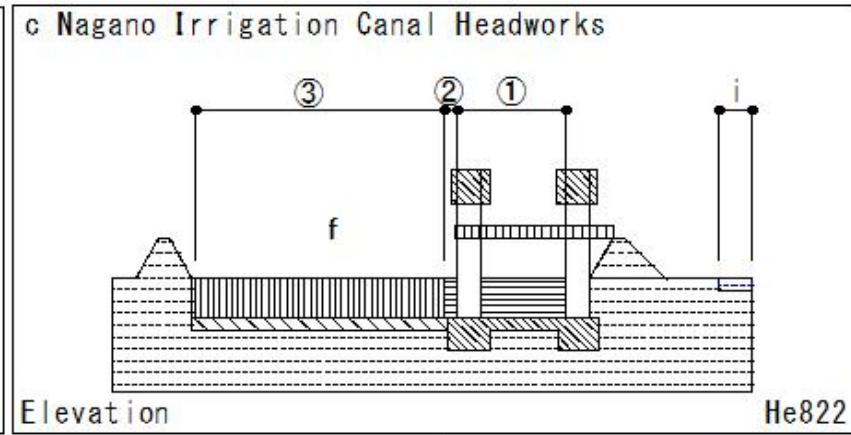
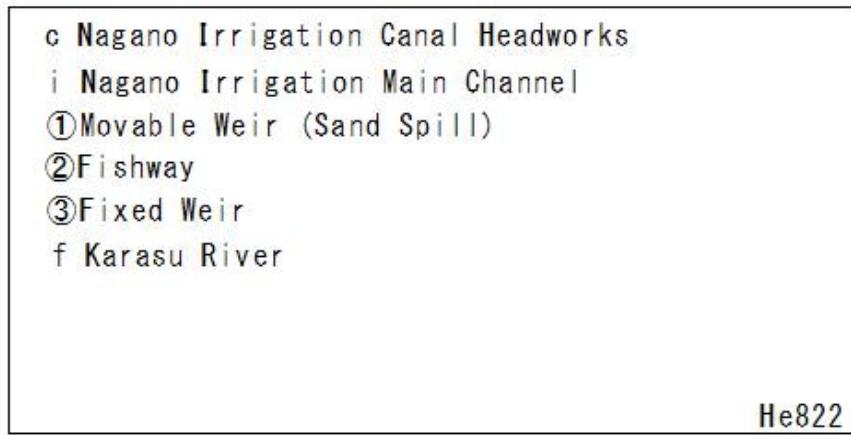
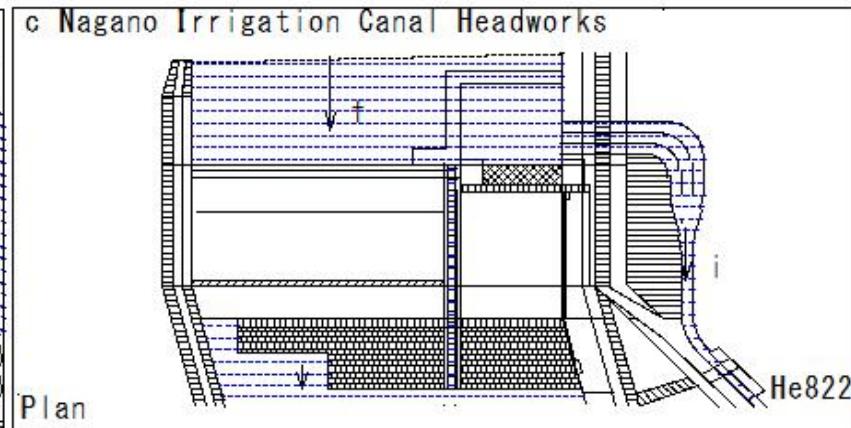
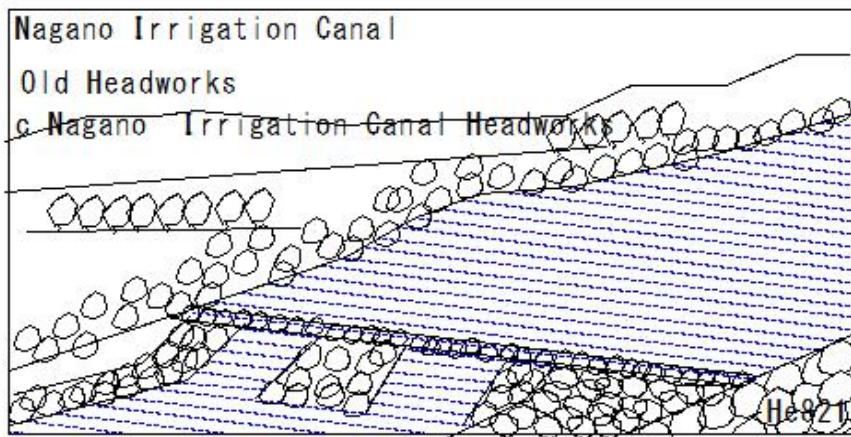
a Tenguiwa Irrigation Canal
b Naganoseki Irrigation Canal
c Ogawa Irrigation Canal
d Gunma Prefecture



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He830) Nagano Irrigation Canal (Gunma)

(He830) Nagano Irrigation Canal (Gunma)

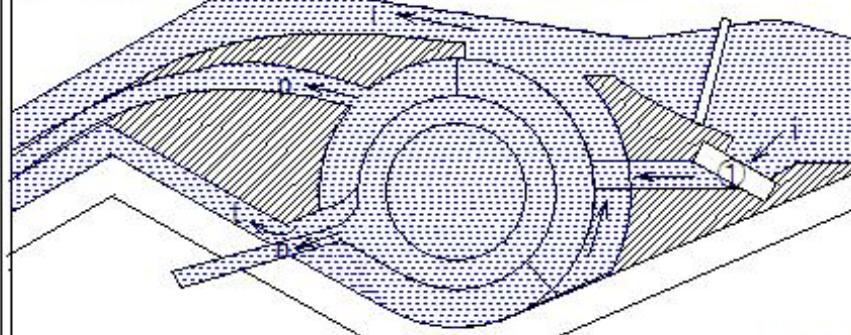


Ø 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He831) Nagano Irrigation Canal (Gunma)

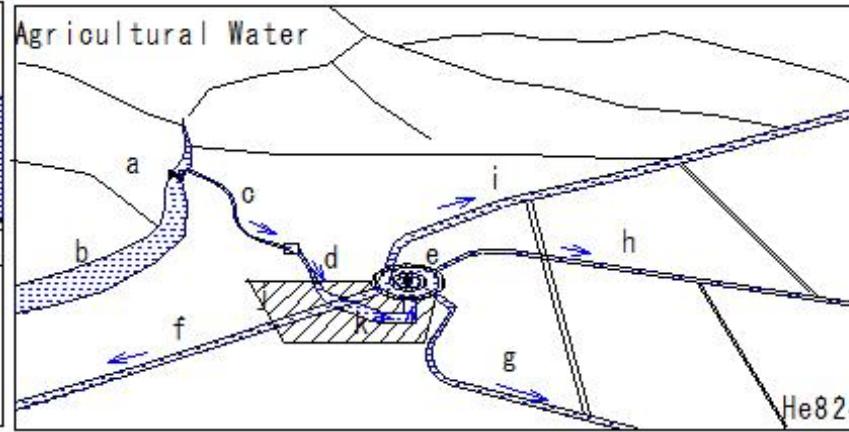
(He831) Nagano Irrigation Canal (Gunma)

Cylindrical Water Diversion Mechanism



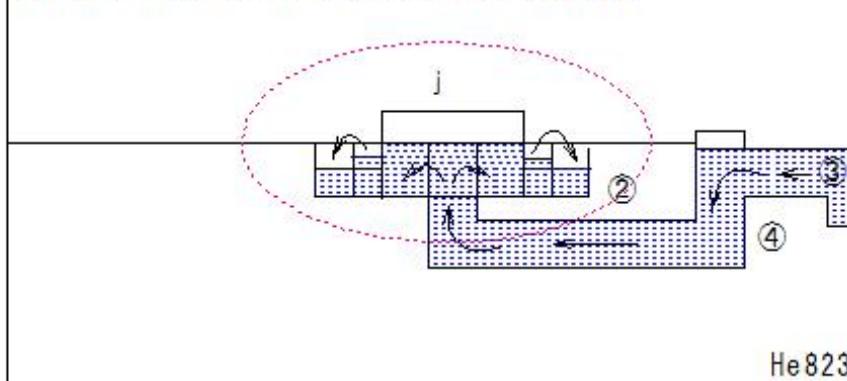
He823

Agricultural Water



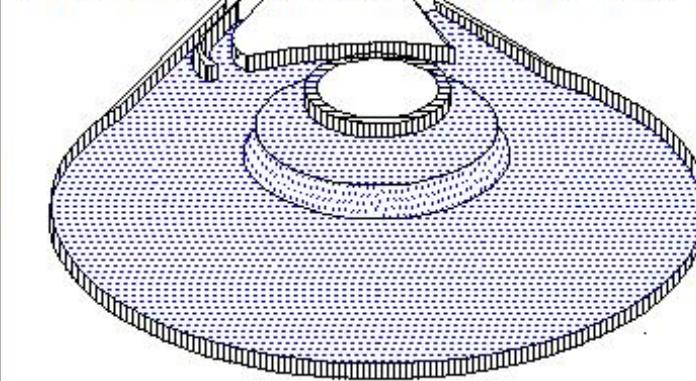
He824

Cylindrical Water Diversion Mechanism



He823

j Cylindrical Diversion Irrigation Canal

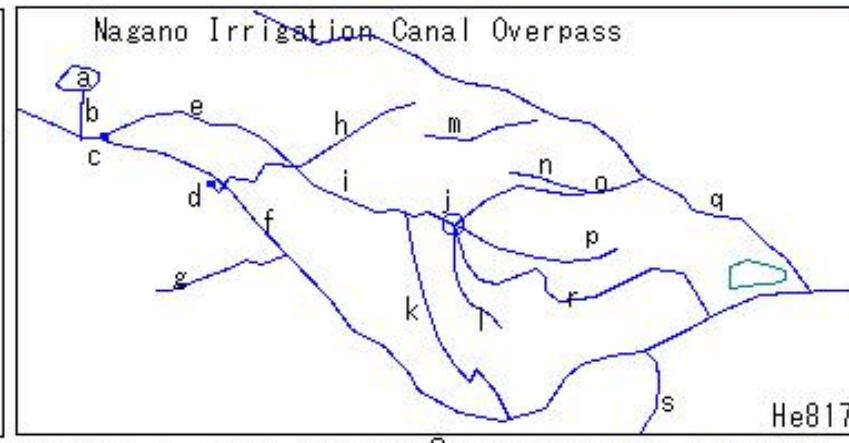
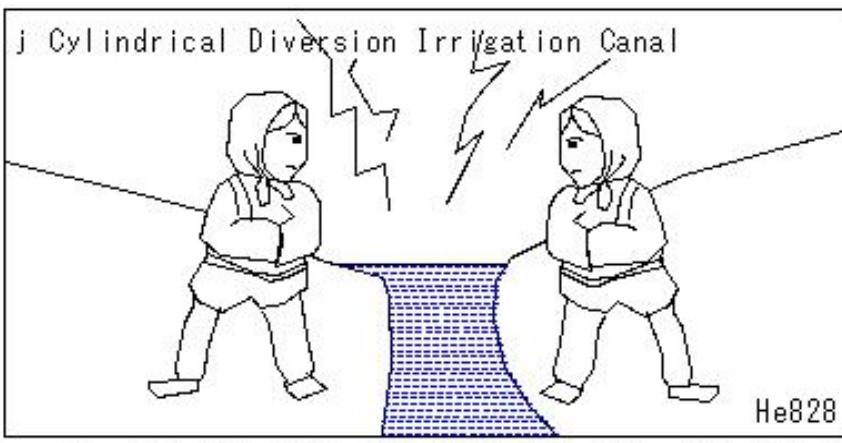
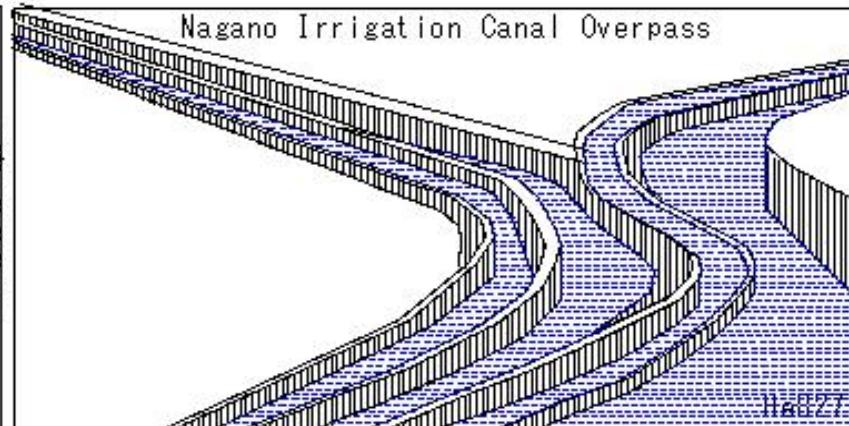
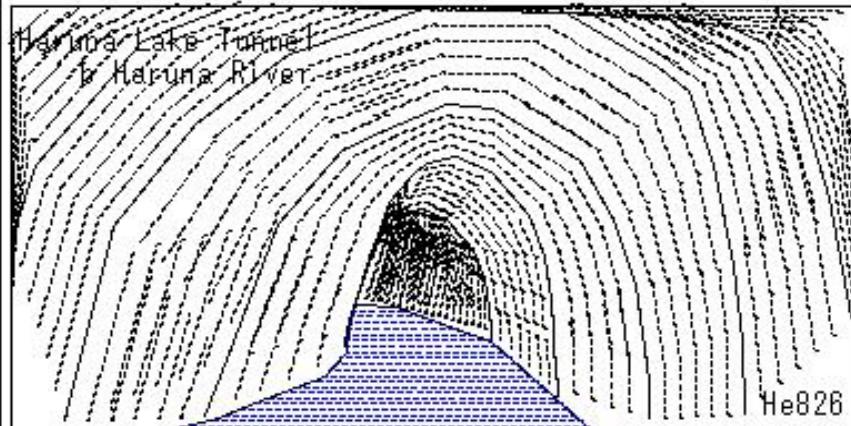


He825

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(He832) Nagano Irrigation Canal (Gunma)

(He832) Nagano Irrigation Canal (Gunma)

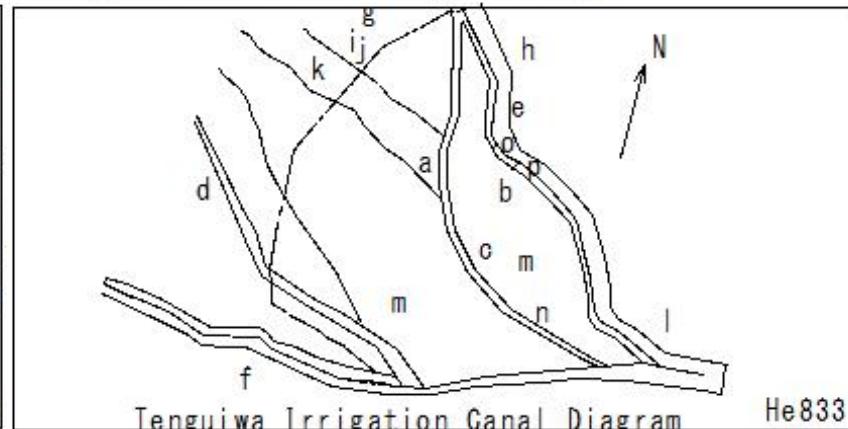


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(He833) Tenguiwa Irrigation Canal(Gunma)

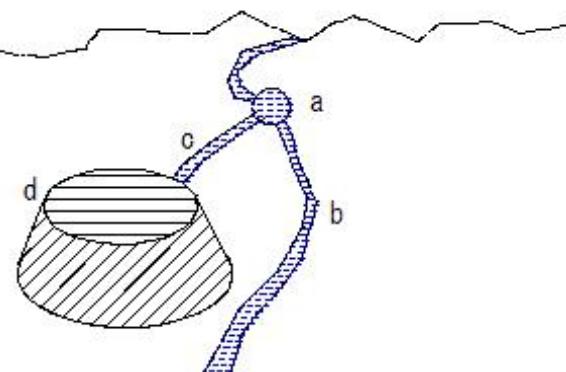
(He833) Tenguiwa Irrigation Canal (Gunma)

Tenguiwa Irrigation Canal g Shibukawa City
Daikanbori Test Site h Kitatachibana Village
Tenguiwa Weir Irrigation District i Yoshioka Village
a Etchubori k Maebashi City
b Tenguiwa Weir (Takigawa River) l Gunma Town | Isesaki City
c Daikanbori j Gunma Town | Isesaki City
d Inokawa River e Tone River f Karasukawa River
o Shimonida and Hagiwara Nishiyokote n Goryo
p Intermediate test site m Tamamura Town He833
Takikawa Village Chronicle



Tenguiwa Irrigation Canal
a Intake (Urushibara Village)
b Tone River
c Irrigation Canal
d Soja Domain

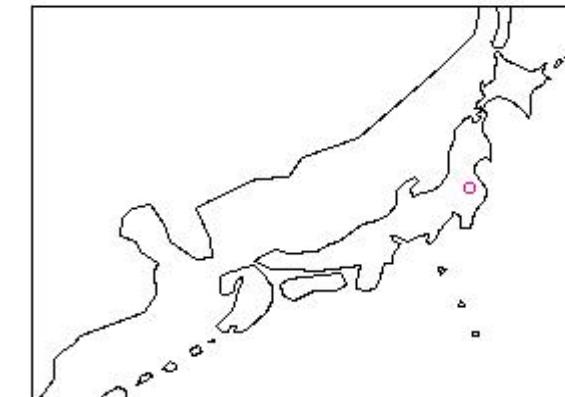
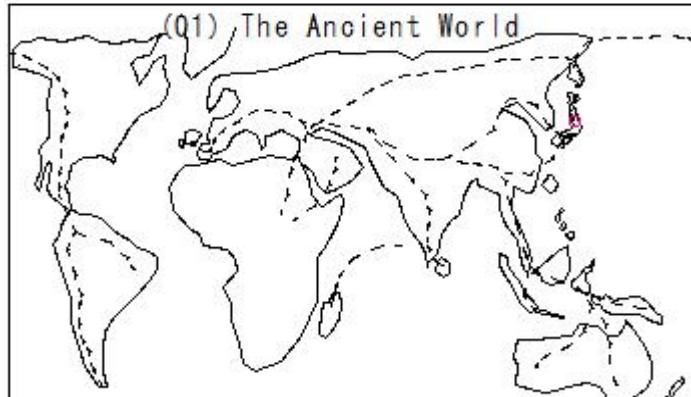
Tenguiwa Irrigation Canal



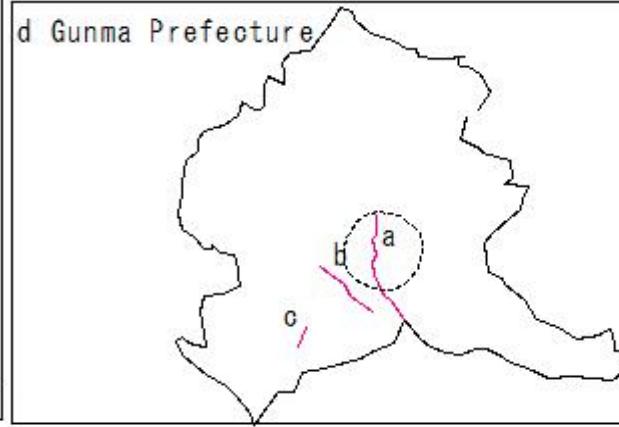
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He834) Tenquiwa Irrigation Canal(Gunma)

(He834) Tenguiwa Irrigation Canal (Gunma)



- a Tenguiwa Irrigation Canal
- b Naganoseki Irrigation Canal
- c Ogawa Irrigation Canal
- d Gunma Prefecture



He817

He817

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He835) Tenguiwa Irrigation Canal(Gunma)

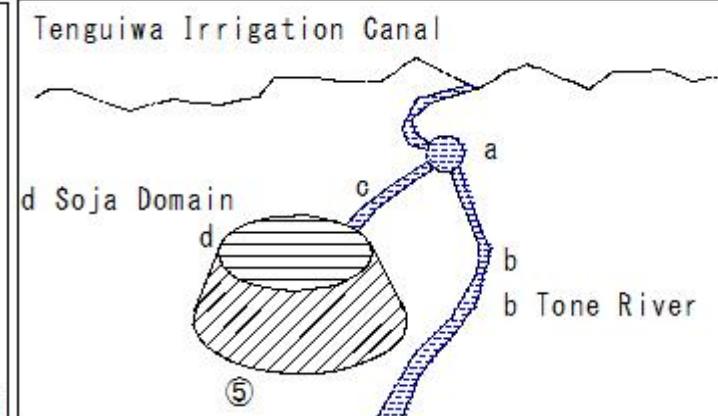
(He835) Tenguiwa Irrigation Canal (Gunma)

Soja Domain circa 1601 (near present-day Soja-cho, Maebashi City)

- ① We're struggling to find food, and even if we wanted to grow rice, we had no water.
- ② We couldn't even pay our annual tax (note), so we wondered if there was anything we could do...
- ③ Our territory had been devastated by repeated wars, and our farmers were in trouble.
- ④ We needed water to develop new rice fields.
- ⑤ Our territory is higher than the Tone River, so we couldn't draw water.
- ⑥ What should we do?

Lord of Soja Domain: Akimoto Nagatomo

Tenguiwa Irrigation Canal
a Intake (Urushibara Village)
b Tone River
c Irrigation Canal
d Soja Domain



He833

He833

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He836) Tenguiwa Irrigation Canal(Gunma)

(He836) Tenguiwa Irrigation Canal (Gunma)

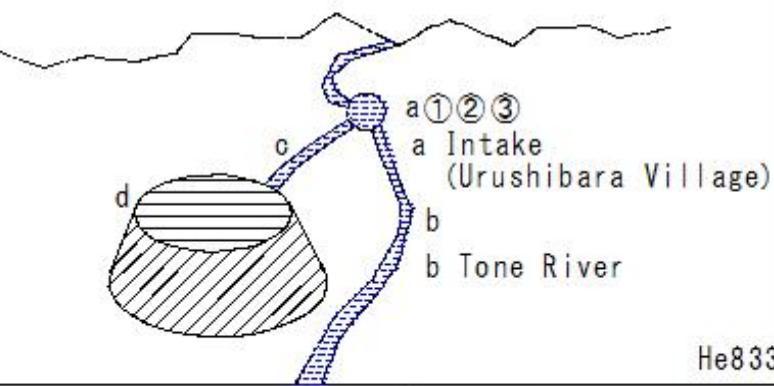
- ① The only way to get water is from further upstream on the Tone River.
- ② That place is higher than our territory, so it looks like we'll be able to get water there.
- ③ That place is the territory of the Shirai Domain.
- ④ Let's ask Honda-dono, the lord of Shirai Domain, for permission to take water.
- ⑤ First, let's ask Ii-dono, the lord of Takasaki Domain, for cooperation.

Tenguiwa Irrigation Canal

- a Intake (Urushibara Village)
- b Tone River
- c Irrigation Canal
- d Soja Domain

He833

Tenguiwa Irrigation Canal



He833

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

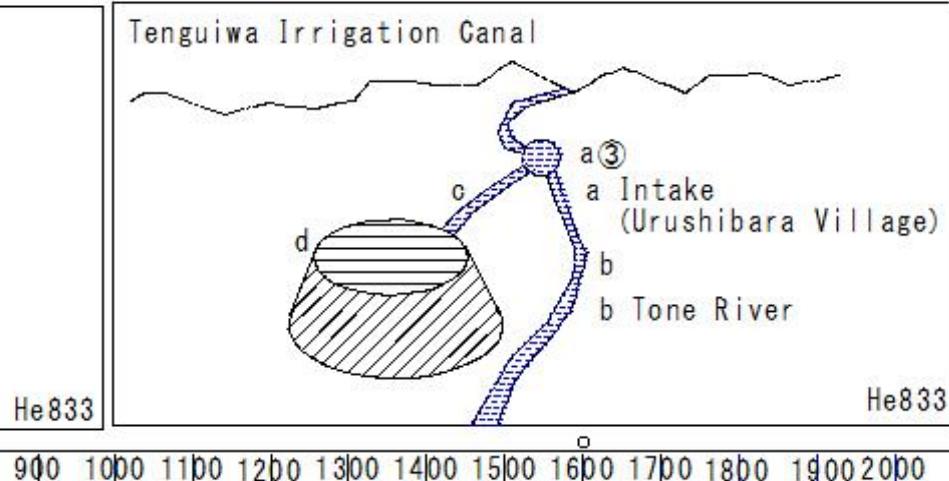
(He837) Tenguiwa Irrigation Canal(Gunma)

(He837) Tenguiwa Irrigation Canal (Gunma)

- ① With the cooperation of Ii Naomasa, the lord of Takasaki Domain, a meeting with Honda Yasushige, the lord of Shirai Domain.
- ② Lord Ii laughed at me, saying, "It's like trying to hang a ladder to the clouds, it's impossible," but I asked if he could somehow
- ③ I agreed. Let's allow us to take water from Urushibara Village (Note)!

*Note: Urushibara Village: present-day Yoshioka Town

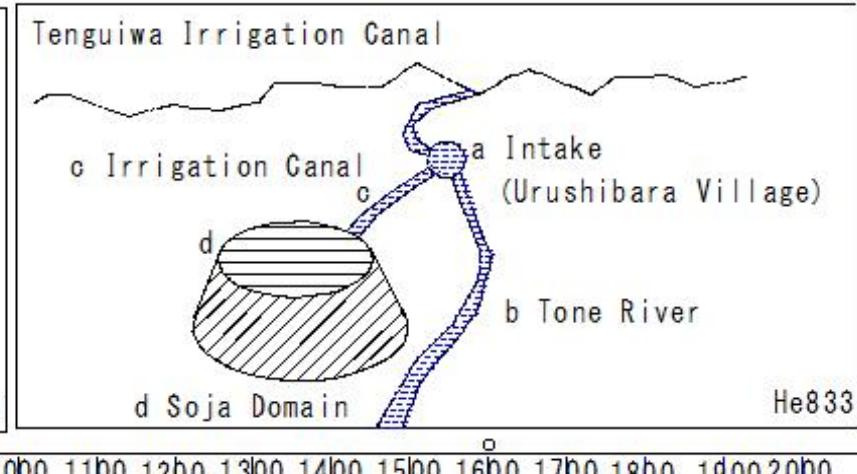
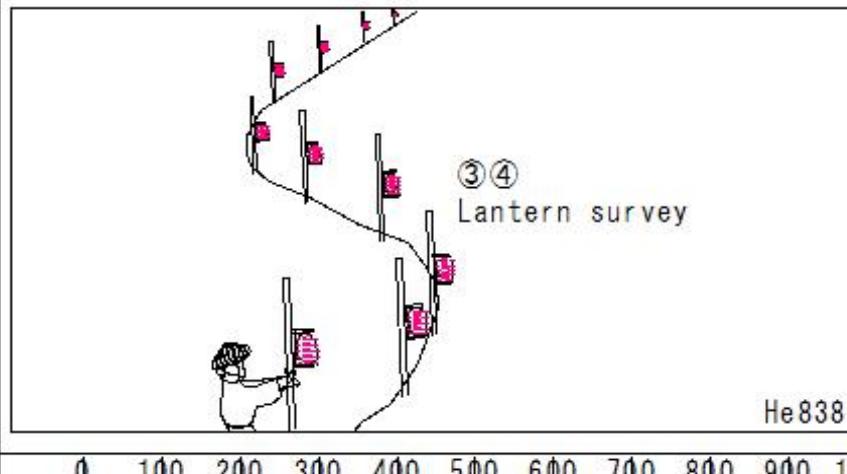
Tenguiwa Irrigation Canal
a Intake (Urushibara Village)
b Tone River
c Irrigation Canal
d Soja Domain



(He838) Tenguiwa Irrigation Canal(Gunma)

(He838) Tenguiwa Irrigation Canal (Gunma)

- ① We'll exempt you from paying taxes for three years if you help us build a waterway.
- ② If you'll be exempt from paying taxes, please let us help.
- ③ First, we'll do a lantern survey (note) to measure the elevation difference of the waterway.
- ④ Note: Lantern survey: The elevation difference was measured using the light of a lantern or candle.



(He839) Tenguiwa Irrigation Canal(Gunma)

(He839) Tenguiwa Irrigation Canal (Gunma)

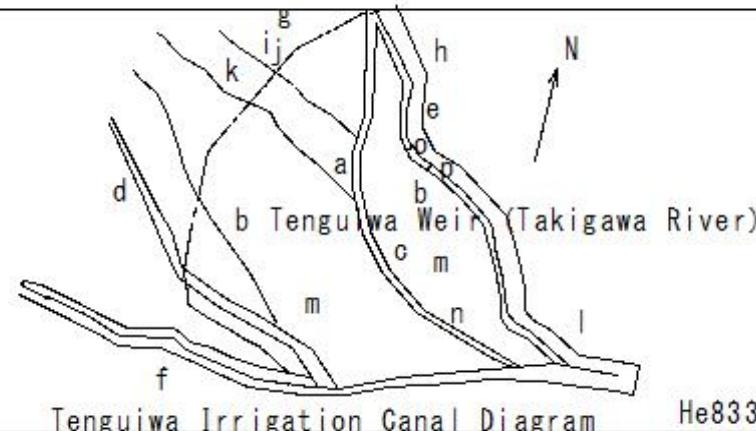
- ① After three years of hard work, the canal was completed in 1604.
- ② Just as they were struggling to remove a large rock, a white-haired old man appeared and helped them.
- ③ Perhaps it was the incarnation of a Tengu. The "Tengu Rock Canal" was built thanks to the Tengu!
b Tenguiwa Weir (Takigawa River)

He839



He839

Tenguiwa Irrigation Canal g Shibukawa City
Daikanbori Test Site h Kitatachibana Village
Tenguiwa Weir Irrigation District
a Etchubori i Yoshioka Village
b Tenguiwa Weir (Takigawa River) k Maebashi City
c Daikanbori j Gunma Town l Isesaki City
d Inokawa River e Tone River f Karasukawa River
o Shimonida and Hagiwara Nishiyokote n Goryo
p Intermediate test site m Tamamura Town
Takikawa Village Chronicle He833



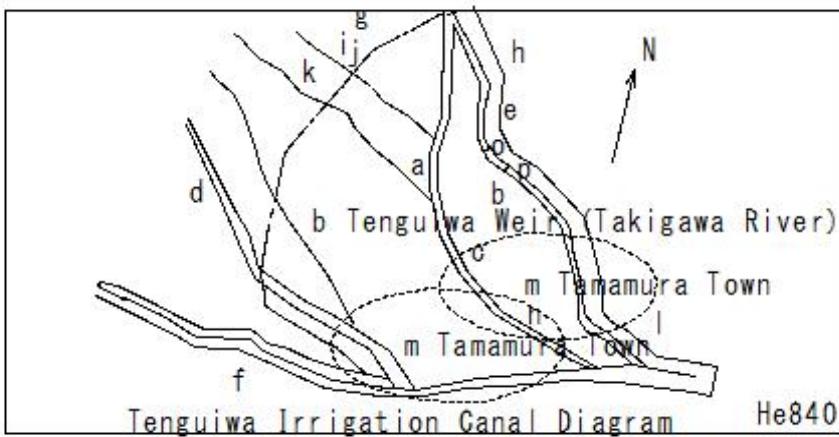
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He840) Tenguiwa Irrigation Canal(Gunma)

(He840) Tenguiwa Irrigation Canal (Gunma)

- ① Around the same time, Ina Tadatsugu and Ebara Genzaemon were considering bringing water to the Tamamura region.
- ② If only this barren territory had water, we could grow more rice...
- ③ Why not enlarge the intake dam for the Tenguiwa Irrigation Canal on Lord Akimoto's territory upstream and bring water to this region?
- ④ That's a great idea. Let's ask Lord Akimoto about it.

Tenguiwa Irrigation Canal g Shibukawa City
Daikanbori Test Site h Kitatachibana Village
Tenguiwa Weir Irrigation District
a Etchubori i Yoshioka Village
b Tenguiwa Weir (Takigawa River) k Maebashi City
c Daikanbori j Gunma Town l Isesaki City
d Inokawa River e Tone River f Karasukawa River
o Shimonida and Hagiwara Nishiyokote n Goryo
p Intermediate test site m Tamamura Town o Goryo
Takikawa Village Chronicle He833



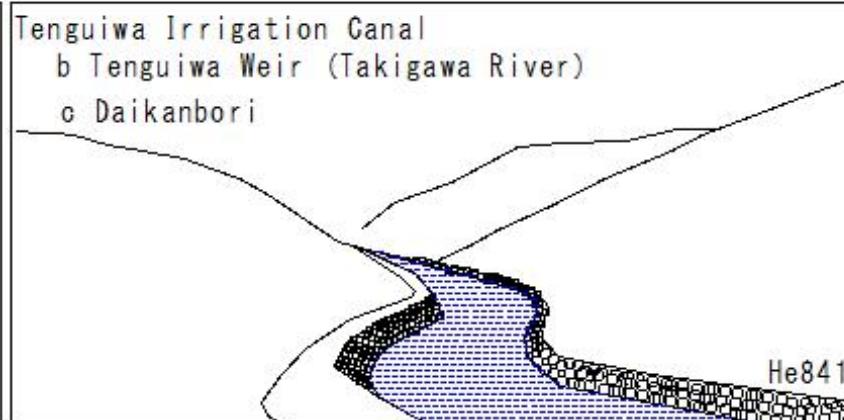
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He841) Tenguiwa Irrigation Canal(Gunma)

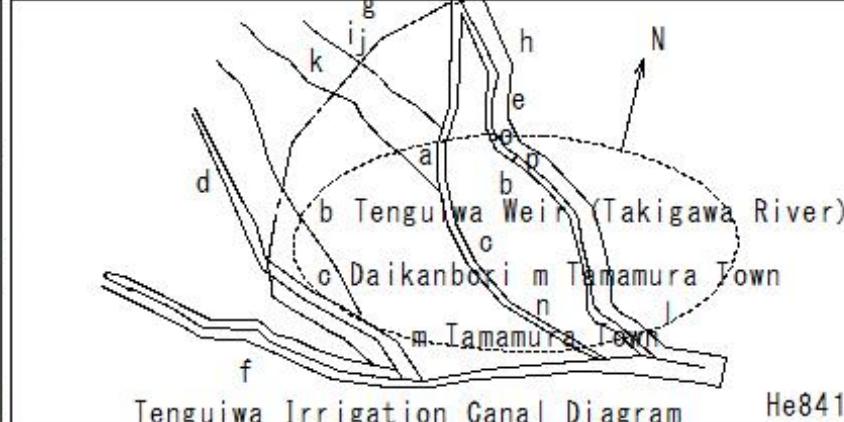
(He841) Tenguiwa Irrigation Canal (Gunma)

- ① The Tenguiwa Irrigation Canal was extended to Tamamura-cho by Kanto Gundai Ina Tadatsugu and Ebara Genzaemon.
- ② This section is called the Takikawa Irrigation Canal or Daikanbori.
- ③ For 400 years, the Tenguiwa Irrigation Canal has supplied irrigation water to rice paddies, not only supporting rice cultivation but also enriching the lives of the local community and its people.

He841



Tenguiwa Irrigation Canal g Shibukawa City
Daikanbori Test Site h Kitatachibana Village
Tenguiwa Weir Irrigation District
a Etchubori i Yoshioka Village
b Tenguiwa Weir (Takigawa River) k Maebashi City
c Daikanbori j Gunma Town l Isesaki City
d Inokawa River e Tone River f Karasukawa River
o Shimonida and Hagiwara Nishiyokote n Goryo
p Intermediate test site m Tamamura Town
Takikawa Village Chronicle He833

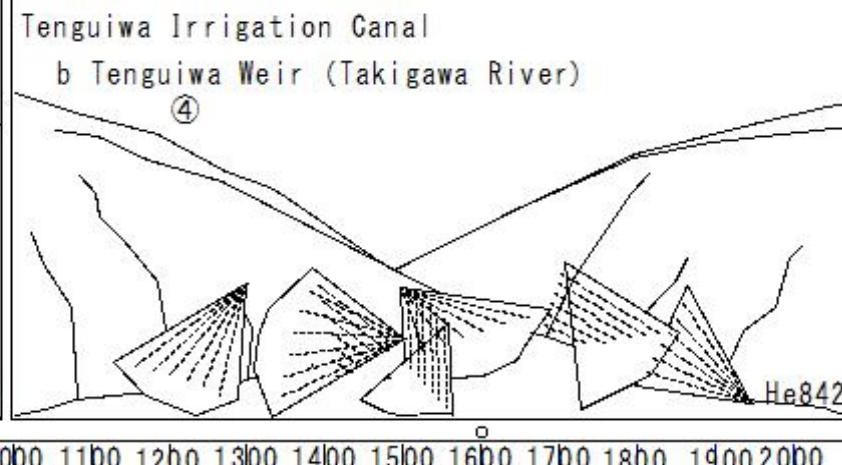
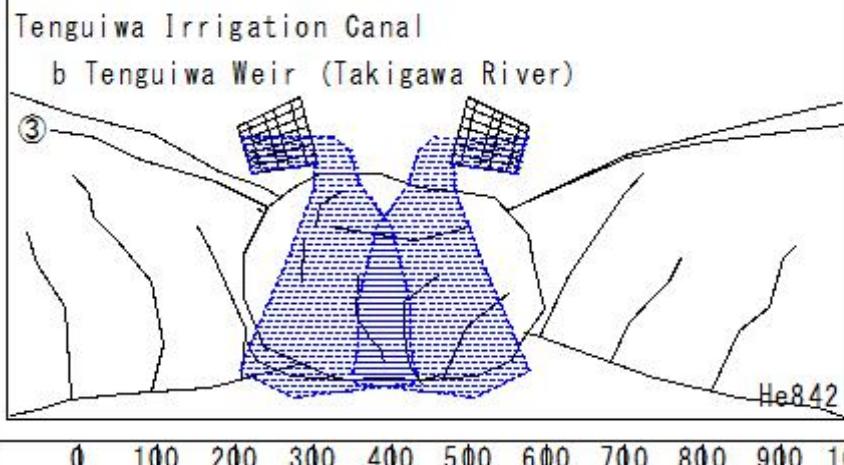
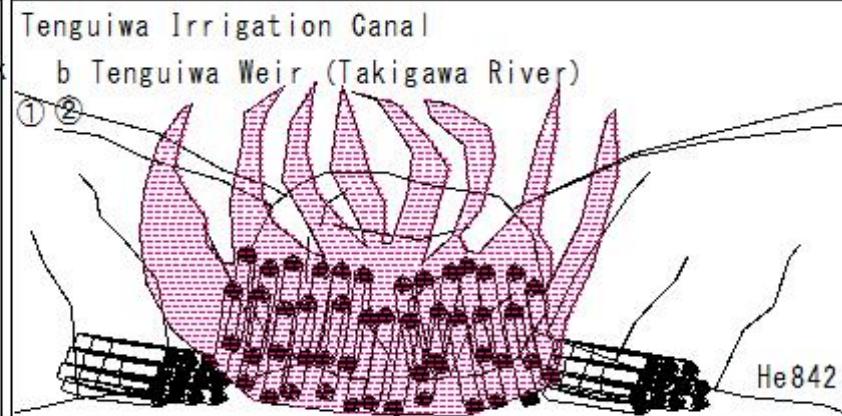


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(He842) Tenguiwa Irrigation Canal(Gunma)

(He842) Tenguiwa Irrigation Canal (Gunma)

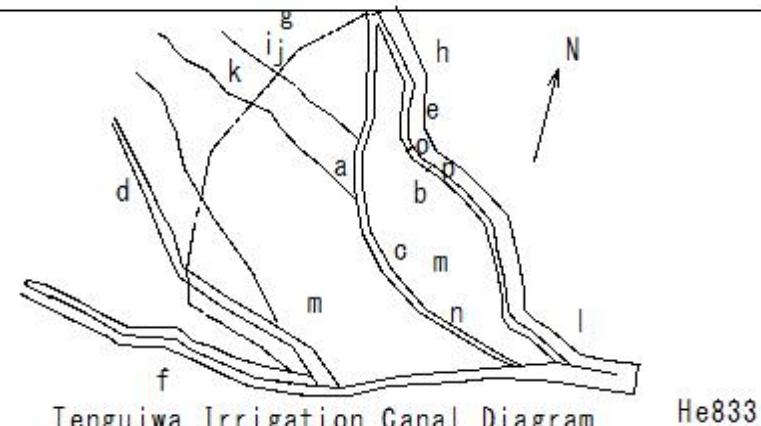
- ① Prepare firewood and a large amount of water.
- ② Once ready, stack the firewood around the rock and light a fire.
- ③ Immediately after the fire goes out, pour the water you prepared onto the rock while it's still hot.
- ④ This will split the rock.



(He843) Tenguiwa Irrigation Canal(Gunma)

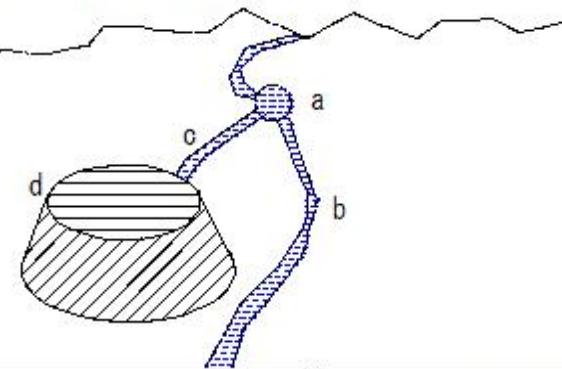
(He843) Tenguiwa Irrigation Canal (Gunma)

Tenguiwa Irrigation Canal g Shibukawa City
Daikanbori Test Site h Kitatachibana Village
Tenguiwa Weir Irrigation District
a Etchubori i Yoshioka Village
b Tenguiwa Weir (Takigawa River) k Maebashi City
c Daikanbori j Gunma Town l Isesaki City
d Inokawa River e Tone River f Karasukawa River
o Shimonida and Hagiwara Nishiyokote n Goryo
p Intermediate test site m Tamamura Town
Takikawa Village Chronicle He833



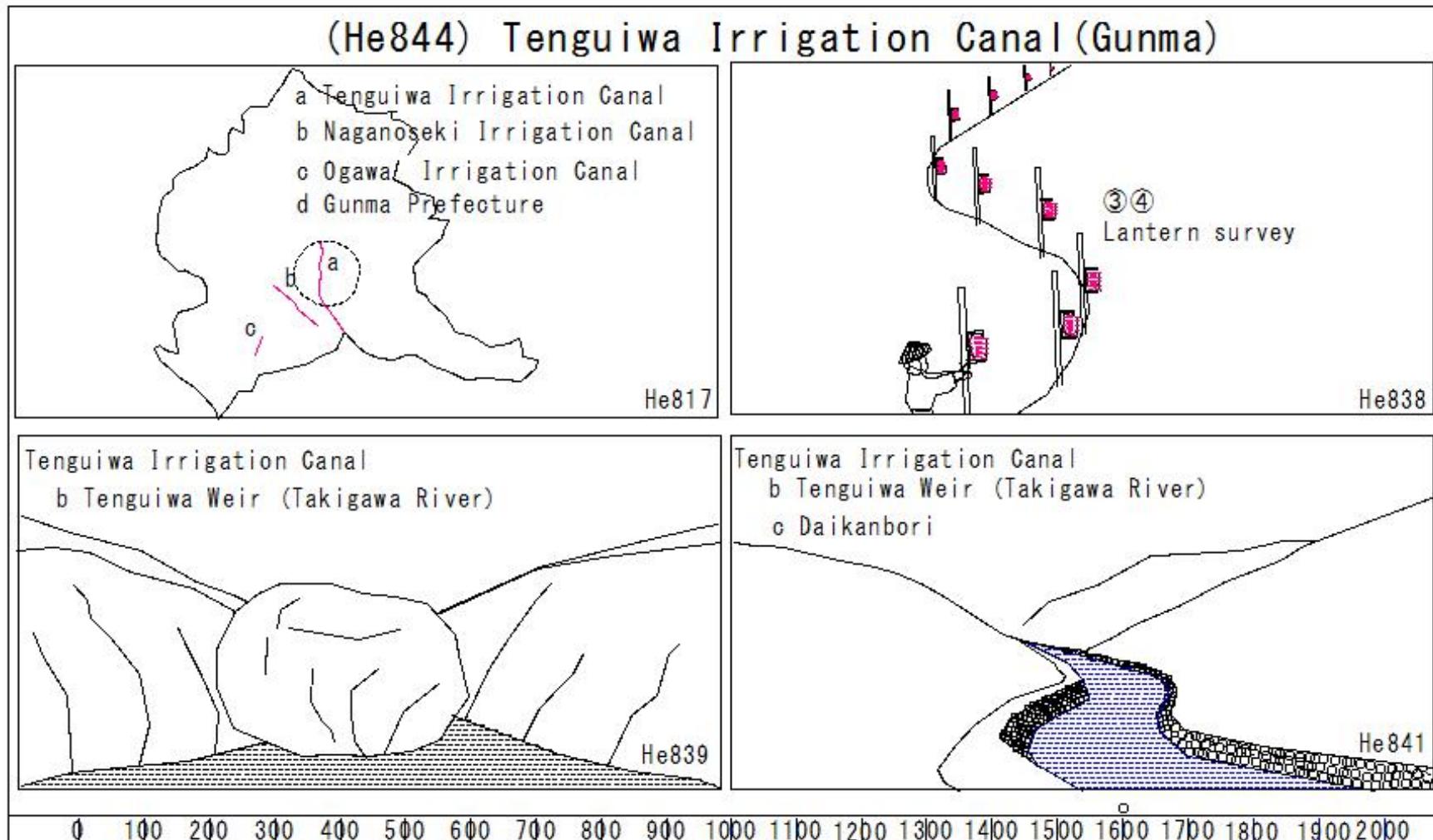
Tenguiwa Irrigation Canal
a Intake (Urushibara Village)
b Tone River
c Irrigation Canal
d Soja Domain

Tenguiwa Irrigation Canal

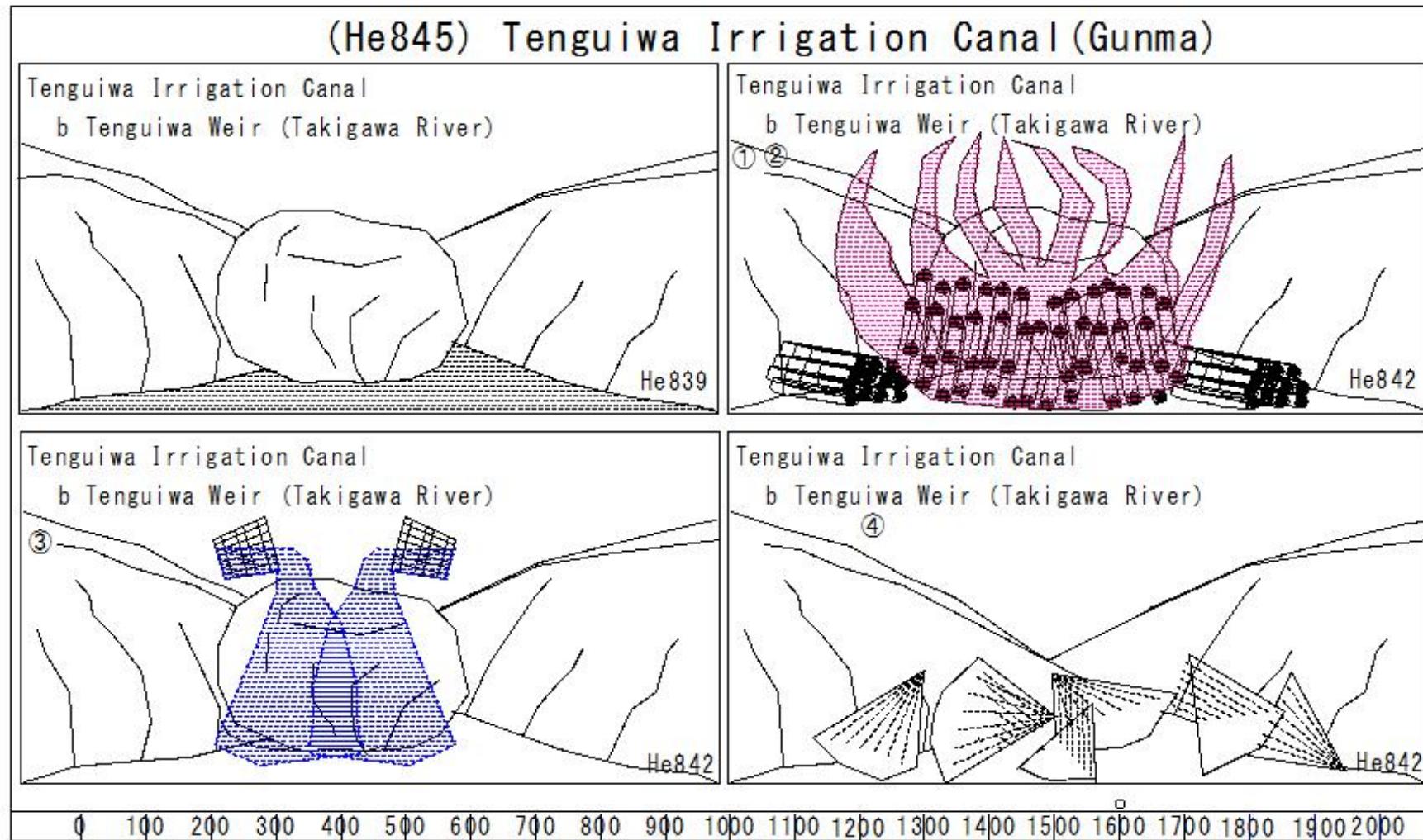


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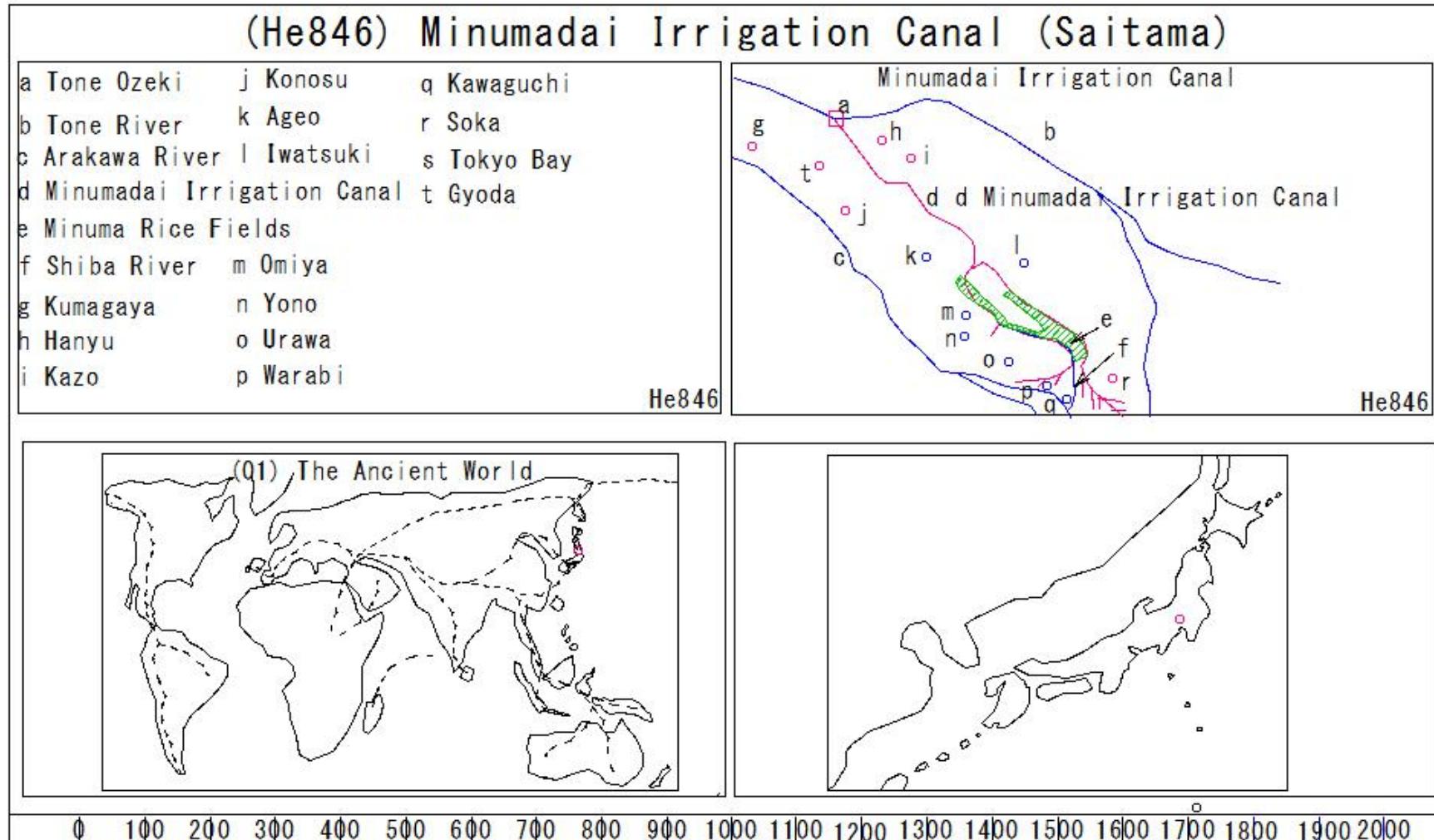
(He844) Tenguiwa Irrigation Canal(Gunma)



(He845) Tenguiwa Irrigation Canal(Gunma)



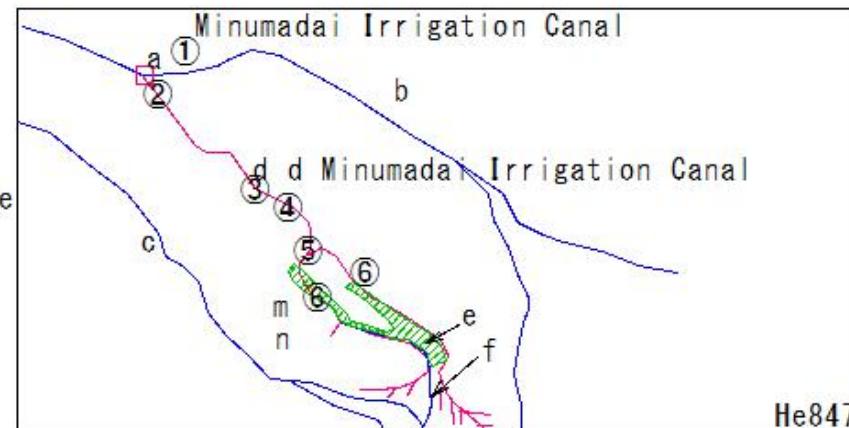
(He846) Minumadai Irrigation Canal (Saitama)



(He847) Minumadai Irrigation Canal (Saitama)

(He847) Minumadai Irrigation Canal (Saitama)

- ① Route of the Minumadai Irrigation Canal
- ② How the Minumadai Irrigation Canal flows into the original "Hoshi-River"
- ③ How the Hoshi River and Minumadai Irrigation Canal split
 - a. Hachiken Weir (Water that passes through Hachiken Weir flows downstream as the Minumadai Irrigation Canal)
 - b. Jujurokuken Weir (Water that passes through Jujurokuken Weir joins the Hoshi River)
- ④ Structure of the Fuse-koshi
- ⑤ Kawarabuki Kaketoi
- ⑥ How the Minumadai Irrigation Canal splits along the edge of the Omiya Plateau
 - a. East edge
 - b. West edge
- ⑦ Water from the eastern and western edges drainsthrong rice paddies and into the Shiba River
- ⑧ Measuring land using a water collection device

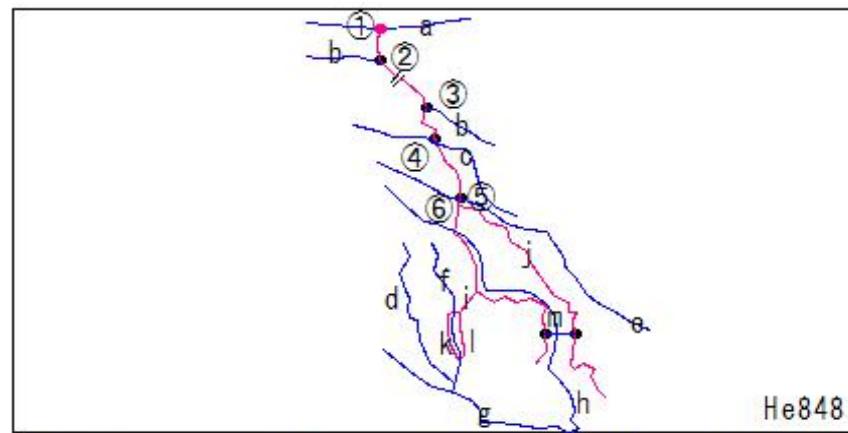


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(He848) Minumadai Irrigation Canal (Saitama)

(He848) Minumadai Irrigation Canal (Saitama)

- ① Intake
- ② Confluence with Hoshigawa River
- ③ Jurokuken Weir and Hachiken Weir
- ④ Shibayama Siphon
- ⑤ Kawarabuki Kaketoi
- ⑥ East-West Branch of Minumadai Irrigation Canal
- a Tone River
- b Hoshigawa River
- c Motoarakawa River
- d Kamo River
- e Ayase River
- f Konuma River
- g Arakawa River
- h Shiba River
- i Takanuma Irrigation Canal
- j Eastern Edge of Minumadai Irrigation Canal
- k Western Edge of Takanuma Irrigation Canal
- l Eastern Edge of Takanuma Irrigation Canal
- m Minuma Tsusenbori Canal
- n Irrigation Canal —
- o River —



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(He849) Minumadai Irrigation Canal (Saitama)

(He849) Minumadai Irrigation Canal (Saitama)

A timeline of the Minumadai Irrigation Canal

1716 (Kyoho 1) Kyoho Reforms Begin

- ① The 8th Shogun, Tokugawa Yoshimune
- ② The "Kyoho Reforms" were initiated with the aim of rebuilding the post-Kyoho government.
- ③ Policies to promote agriculture were also implemented.

1727 (Kyoho 12)

- ① Construction of the Minumadai Irrigation Canal Begins
- ② The Minuma Reservoir was drained by order of the Edo Shogunate for land reclamation and new rice paddy development.
- ③ Construction of a new irrigation canal (Minumadai Irrigation Canal) began.
- ④ Izawa Yasobei was in charge of planning and construction.

1728 (Kyoho 13) Minumadai Irrigation Canal Completed

- ① By effectively utilizing the flow of the Hoshigawa River.
- ② By reducing artificial excavation and other measures.
- ③ the Minumadai Irrigation Canal, approximately 60 km long, was completed in just six months.

1731 (16th year of the Kyoho era)

- ① The Minuma Tsunenburi canal is completed, and waterway transportation develops.
- ② The Minuma Tsunenburi canal, connecting the eastern and western edges of the Minuma Daiyosui Canal with the Shibakawa River, is completed.
- ③ Rice and vegetables harvested in Minuma were transported by boat to Edo, and fertilizer and daily necessities were transported on the way back.

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(He850) Minumadai Irrigation Canal (Saitama)

(He850) Minumadai Irrigation Canal (Saitama)

A timeline of the Minumadai Irrigation Canal

(1931-) 200 years of waterway transportation

- ① Waterway transportation on the Minuma Daiyosui Canal continued for approximately 200 years, from the Edo period through the early Showa era.
- ② It supported distribution and agriculture.

1982 (57th year of the Showa era) National Historic Site

- ① The Minuma Tsunenburi canal is designated a National Historic Site as a testament to the civil engineering technology and history of distribution in the Edo period.

2019 (1st year of the Reiwa era) Registered as a World Heritage Site for Irrigation Structures

- ① Registered as a World Heritage Site for Irrigation Structures.
- ② It is highly regarded worldwide as a historic waterway.

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(He851) Minumadai Irrigation Canal (Saitama)

(He851) Minumadai Irrigation Canal (Saitama)

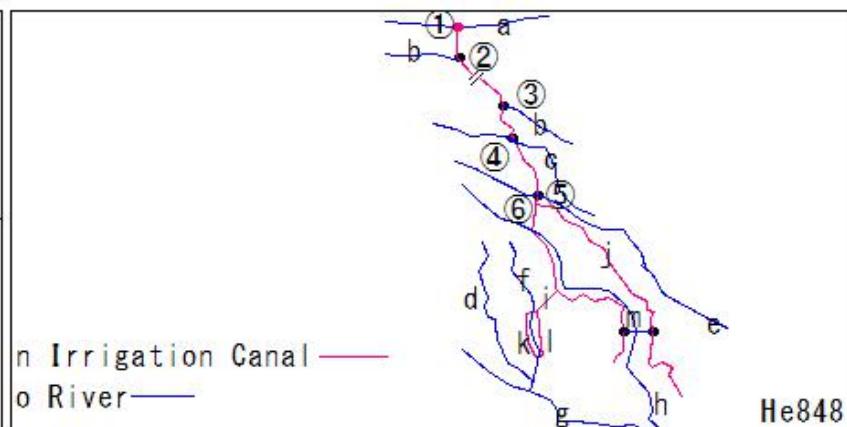
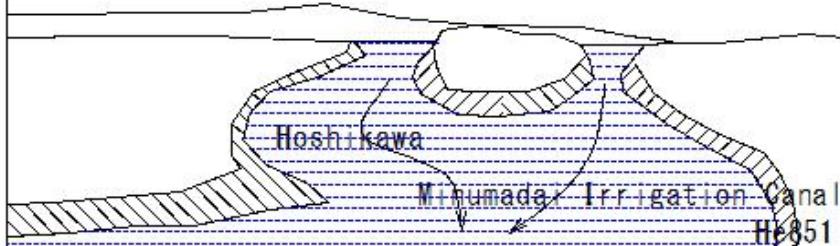
- ① Intake
- ② Confluence with Hoshigawa River
- ③ Jurokuken Weir and Hachiken Weir
- ④ Shibayama Siphon
- ⑤ Kawarabuki Kaketoi
- ⑥ East-West Branch of Minumadai Irrigation Canal
- a Tone River
- b Hoshigawa River
- c Motoarakawa River
- d Kamo River

He848

- e Ayase River
- f Konuma River
- g Arakawa River
- h Shiba River
- i Takanuma Irrigation Canal
- j Eastern Edge of Minumadai Irrigation Canal
- k Western Edge of Takanuma Irrigation Canal
- l Eastern Edge of Takanuma Irrigation Canal
- m Minuma Tsusenbori Canal

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- ② The Minumadai Irrigation Canal flows into the original "Hoshikawa" river.



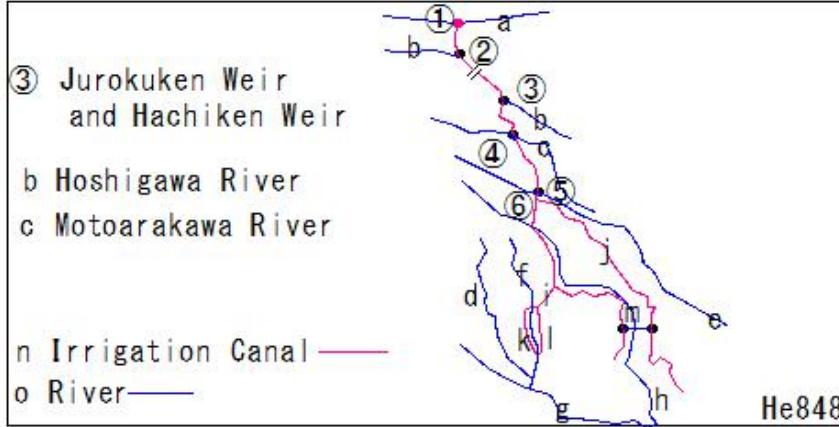
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(He852) Minumadai Irrigation Canal (Saitama)

(He852) Minumadai Irrigation Canal (Saitama)

- ① Intake
- ② Confluence with Hoshigawa River
- ③ Jurokuken Weir and Hachiken Weir
- ④ Shibayama Siphon
- ⑤ Kawarabuki Kaketoi
- ⑥ East-West Branch of Minumadai Irrigation Canal
- a Tone River
- b Hoshigawa River
- c Motoarakawa River
- d Kamo River

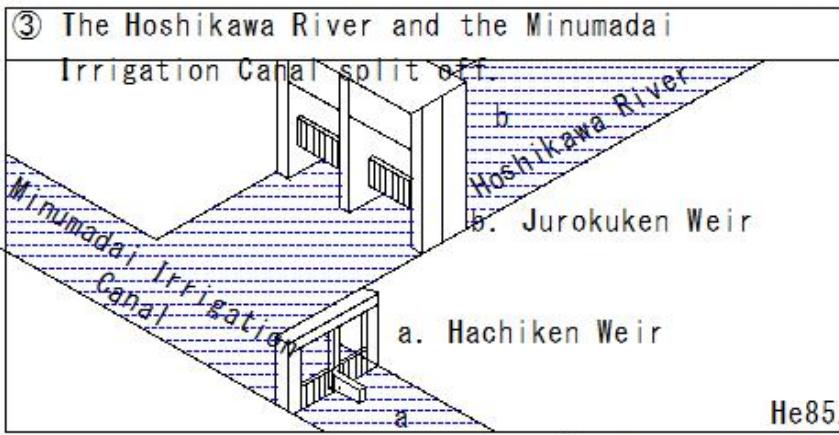
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- ③ The Hoshikawa River and the Minumadai Irrigation Canal split off.
- a. Hachiken Weir (Water that passes through Hachiken Weir flows downstream as the Minumadai Irrigation Canal).
 - b. Jurokuken Weir (Water that passes through Jurokuken Weir joins the Hoshikawa River).

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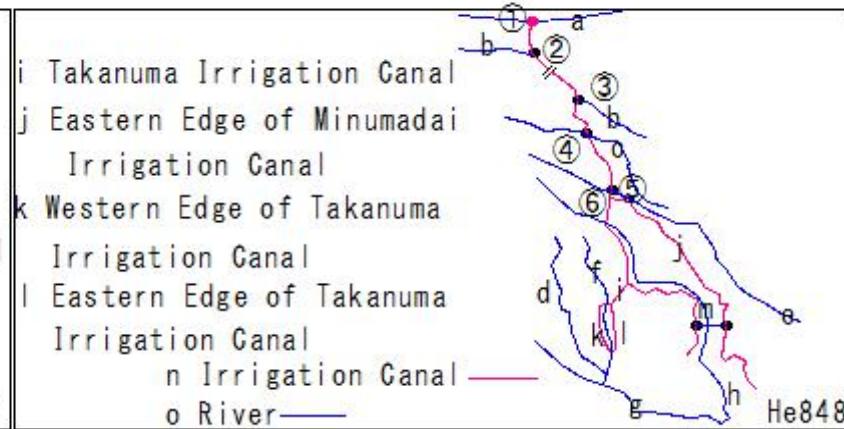
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(He853) Minumadai Irrigation Canal (Saitama)

(He853) Minumadai Irrigation Canal (Saitama)

① Intake	
② Confluence with Hoshigawa River	
③ Jurokuken Weir and Hachiken Weir	
④ Shibayama Siphon	
⑤ Kawarabuki Kaketoi	
⑥ East-West Branch of Minumadai Irrigation Canal	
a Tone River	e Ayase River
b Hoshigawa River	f Konuma River
c Motoarakawa River	g Arakawa River
d Kamo River	h Shiba River

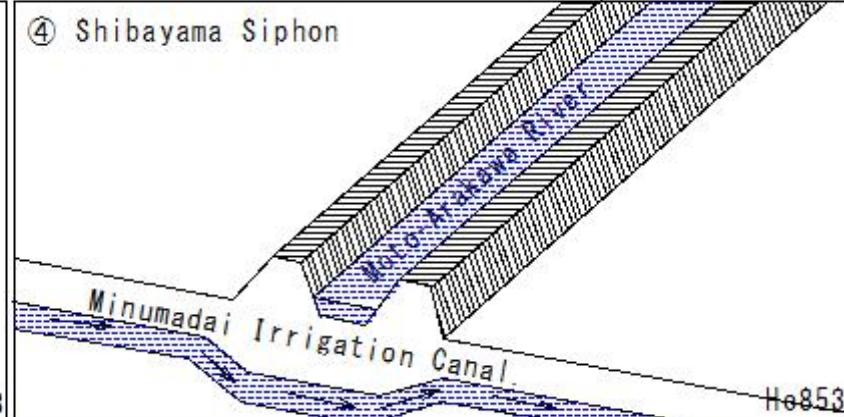
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④ Shibayama Siphon
① The intersection of the Moto-Arakawa River and the Minumadai Irrigation Canal.
② Water is dropped from a higher place to a lower place.
③ A system pushes water back up to its original level.
④ A waterway passes under the riverbed

He853



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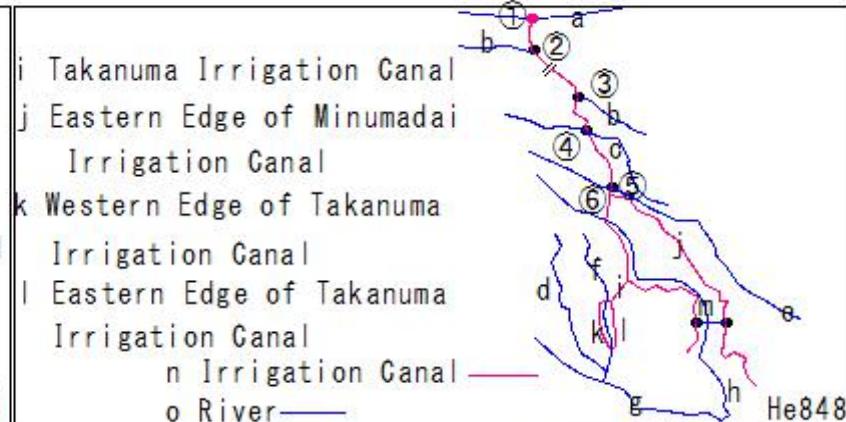
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(He854) Minumadai Irrigation Canal (Saitama)

(He854) Minumadai Irrigation Canal (Saitama)

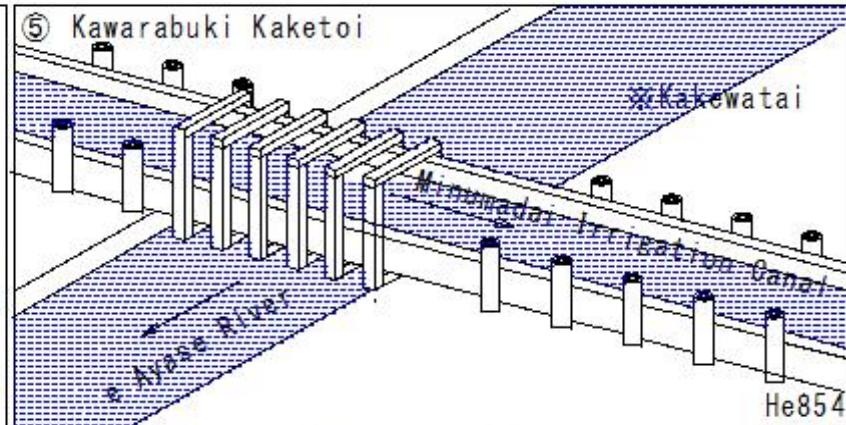
① Intake	
② Confluence with Hoshigawa River	
③ Jurokuken Weir and Hachiken Weir	
④ Shibayama Siphon	
⑤ Kawarabuki Kaketoi	
⑥ East-West Branch of Minumadai Irrigation Canal	
a Tone River	e Ayase River
b Hoshigawa River	f Konuma River
c Motoarakawa River	g Arakawa River
d Kamo River	h Shiba River

He848



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⑤ Kawarabuki Kaketoi	
① Wooden structures such as kakewatai were built using the most advanced construction techniques of the time.	
② When waterways were run over rivers, bridge-like structures called "kakewatai" were built. For example, in Kawarabuki, Ageo City, Saitama Prefecture, there was a "Kakewatai" (tile-roofed kakewatai) where the Minumadai Irrigation Canal crossed the Ayase River.	He854



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(He855) Minumadai Irrigation Canal (Saitama)

(He855) Minumadai Irrigation Canal (Saitama)

① Intake

② Confluence with Hoshigawa River

③ Jurokuken Weir and Hachiken Weir

④ Shibayama Siphon

⑤ Kawarabuki Kaketoi

⑥ East-West Branch of Minumadai Irrigation Canal

a Tone River

e Ayase River

b Hoshigawa River

f Konuma River

c Motoarakawa River g Arakawa River

d Kamo River

h Shiba River

i Takanuma Irrigation Canal

j Eastern Edge of Minumadai Irrigation Canal

k Western Edge of Takanuma Irrigation Canal

l Eastern Edge of Takanuma Irrigation Canal

n Irrigation Canal

o River

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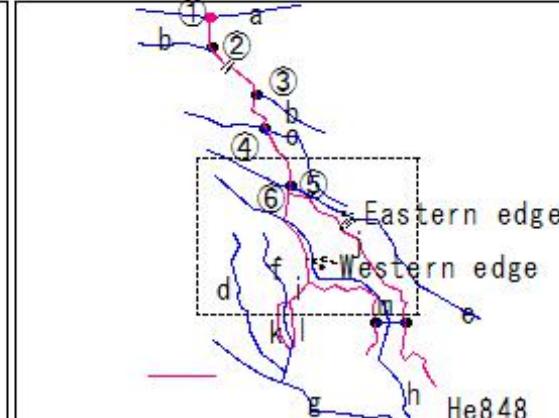
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⑥ East-West Branch of

the Minumadai Irrigation Canal

⑥ The Minumadai Irrigation Canal branches along the edge of the Omiya Plateau.

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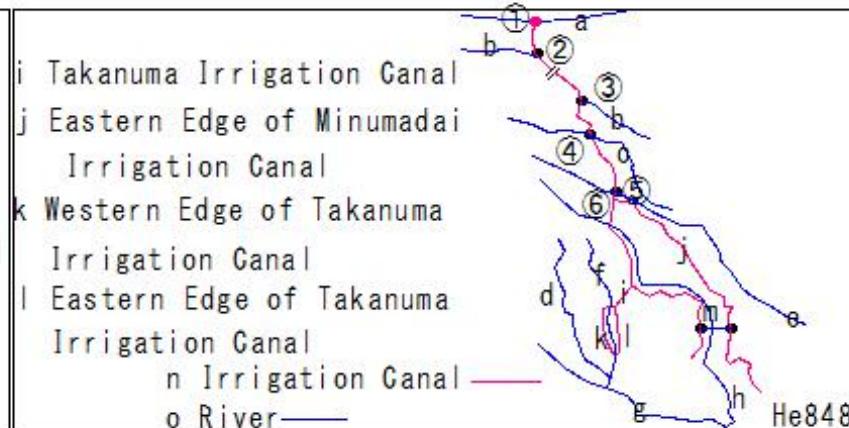
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(He856) Minumadai Irrigation Canal (Saitama)

(He856) Minumadai Irrigation Canal (Saitama)

① Intake	
② Confluence with Hoshigawa River	
③ Jurokuken Weir and Hachiken Weir	
④ Shibayama Siphon	
⑤ Kawarabuki Kaketoi	
⑥ East-West Branch of Minumadai Irrigation Canal	
a Tone River	e Ayase River
b Hoshigawa River	f Konuma River
c Motoarakawa River	g Arakawa River
d Kamo River	h Shiba River

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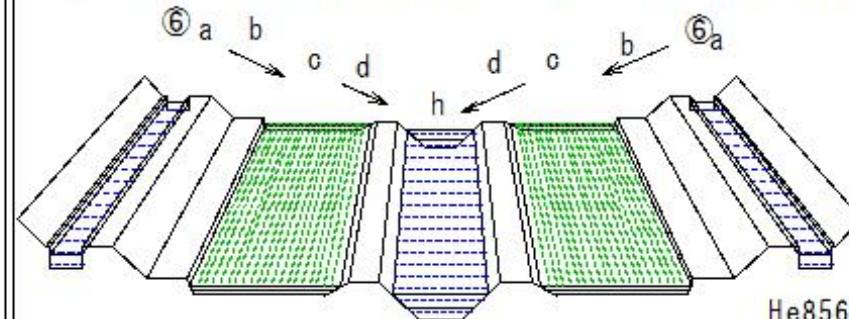


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⑦ Water from the eastern and western edges
drains through rice paddies into the Shiba River
• East-West Branch of Minumadai Irrigation Canal
h Shiba River
a Irrigation Canal
b Water Supply
c Rice Paddies
d Drainage

He856

⑦ Water from the eastern and western edges
drains through rice paddies into the Shiba River



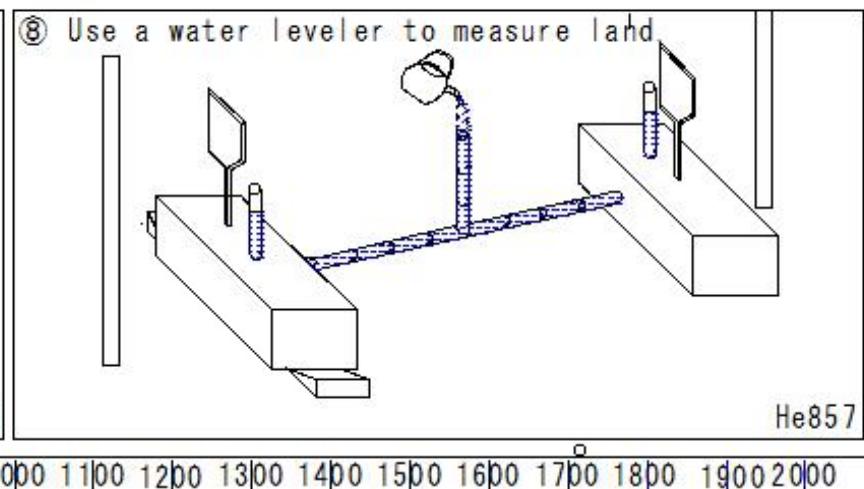
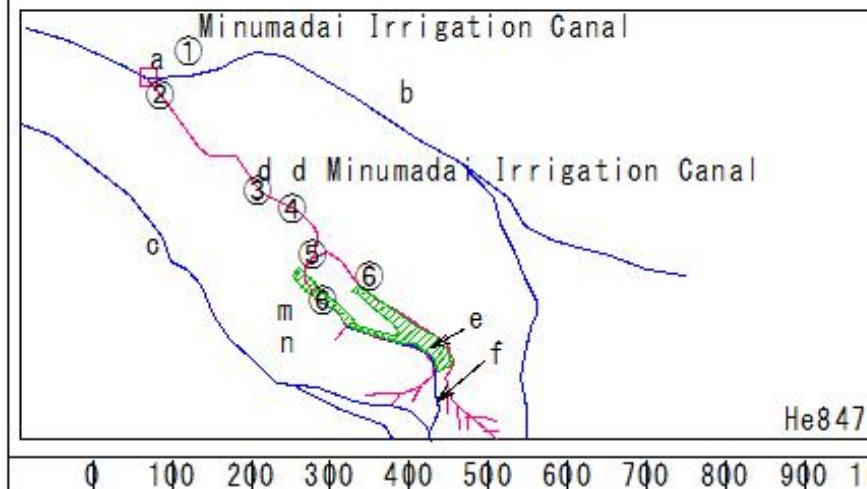
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(He857) Minumadai Irrigation Canal (Saitama)

(He857) Minumadai Irrigation Canal (Saitama)

- ⑧ Use a water leveler to measure land.
- ① Izawa Yasobei utilized the civil engineering skills he acquired in the Kishu domain
② and used a surveying tool called a "water leveler"
③ to accurately measure the elevation difference of the land.
④ Using this tool, Yasobei drew sufficient water from the Tone River
⑤ and devised the optimal route to allow the water to flow naturally even in low-lying areas
like Minuma.

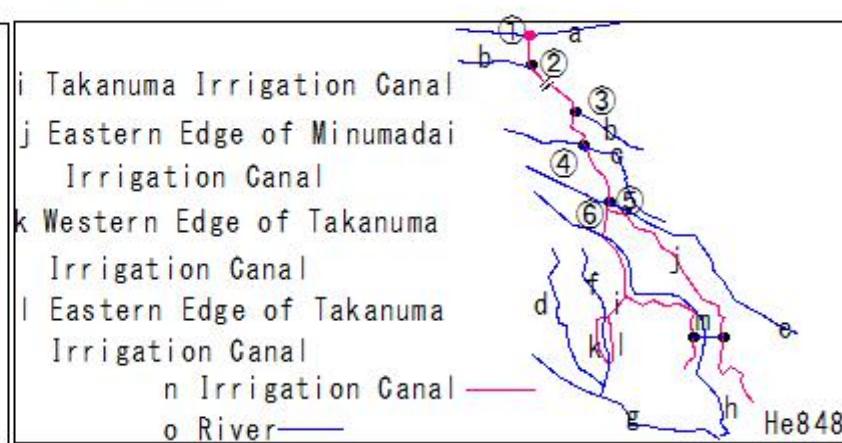


(He858) Minumadai Irrigation Canal (Saitama)

(He858) Minumadai Irrigation Canal (Saitama)

- ① Water from the Tone River was taken in Gyoda.
- Using the surveying techniques of Tamenaga's time, this location was selected as a place where water from the Tone River could be steadily taken in.
 - This is roughly where the Tone Great Weir is currently located.
 - The Tone Great Weir is a modern structure, a weir used to take water from the Tone River and direct it to Tokyo and other areas.
 - The surveying techniques used by Tamenaga during the Edo period are roughly the same as the locations selected for stable water intake using current surveying techniques.
 - This speaks to the advanced surveying techniques of the time.

① Intake
② Confluence with Hoshigawa River
③ Jurokuken Weir and Hachiken Weir
④ Shibayama Siphon
⑤ Kawarabuki Kaketoi
⑥ East-West Branch of Minumadai Irrigation Canal
a Tone River
b Hoshigawa River
c Motoarakawa River
d Kamo River
e Ayase River
f Konuma River
g Arakawa River
h Shiba River



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(He859) Minumadai Irrigation Canal (Saitama)

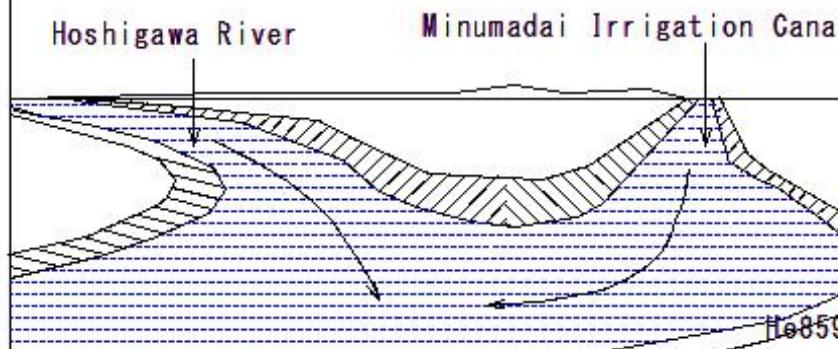
(He859) Minumadai Irrigation Canal (Saitama)

② Confluence with Hoshigawa River

It merges with the Hoshigawa River and uses the Hoshigawa River's course from then on

- Approximately 2.5 km from the intake, in Omi, Gyoda City
- The Minumadai Irrigation Canal merges with the existing Hoshigawa River.
- This merger was made by Tamenaga to shorten the construction time for the Minumadai Irrigation Canal.
- The Minumadai Irrigation Canal will flow along this Hoshigawa River.

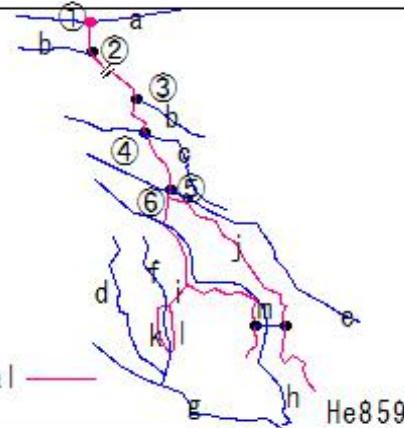
② Confluence with Hoshigawa River



② Confluence with Hoshigawa River

b Hoshigawa River

n Irrigation Canal
o River



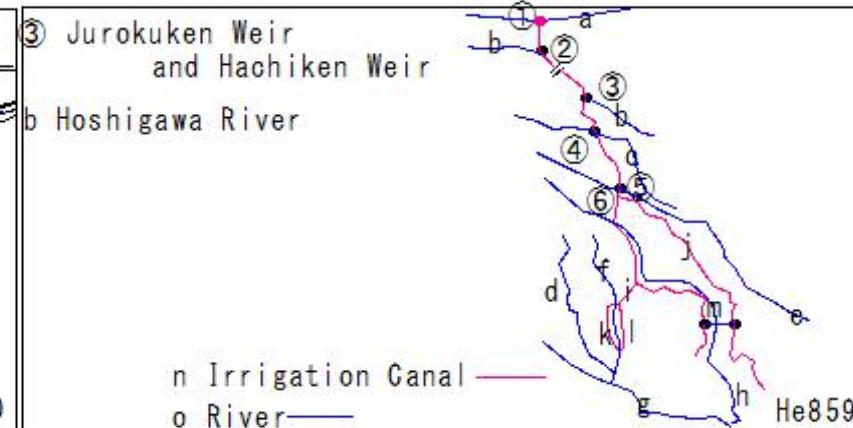
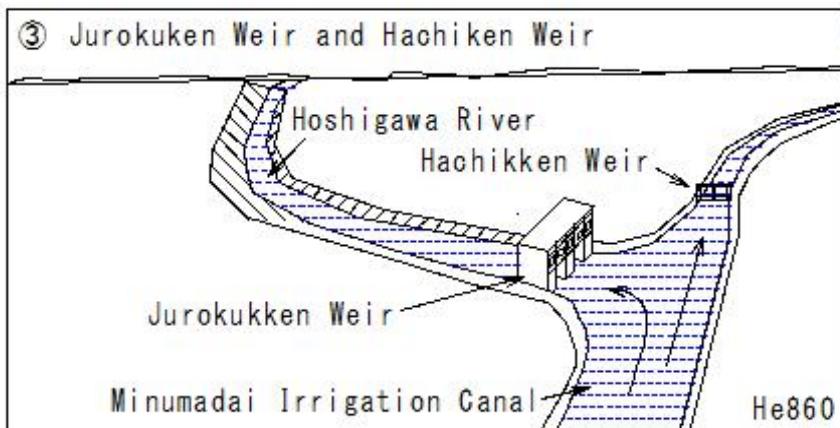
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(He860) Minumadai Irrigation Canal (Saitama)

(He860) Minumadai Irrigation Canal (Saitama)

③ Jurokuken Weir and Hachiken Weir

- ③ The Hoshigawa River is separated by the Jurokukken Weir and the Hachikken Weir.
- Approximately 17 km after merging with the Hoshigawa River,
 - the Minumadai Irrigation Canal branches off from the Hoshigawa River in Shobu-cho, Kuki City.
 - The Jurokukken Weir is located on the Hoshigawa River side.
 - When water is needed on the Minumadai Irrigation Canal side (spring to summer), the Hachikken Weir is opened.
 - The Jurokukken Weir is closed, ensuring that sufficient water is supplied to the Minumadai Irrigation Canal and downstream rice fields.
 - The reverse operation is performed when water is not needed on the Minumadai Irrigation Canal side.

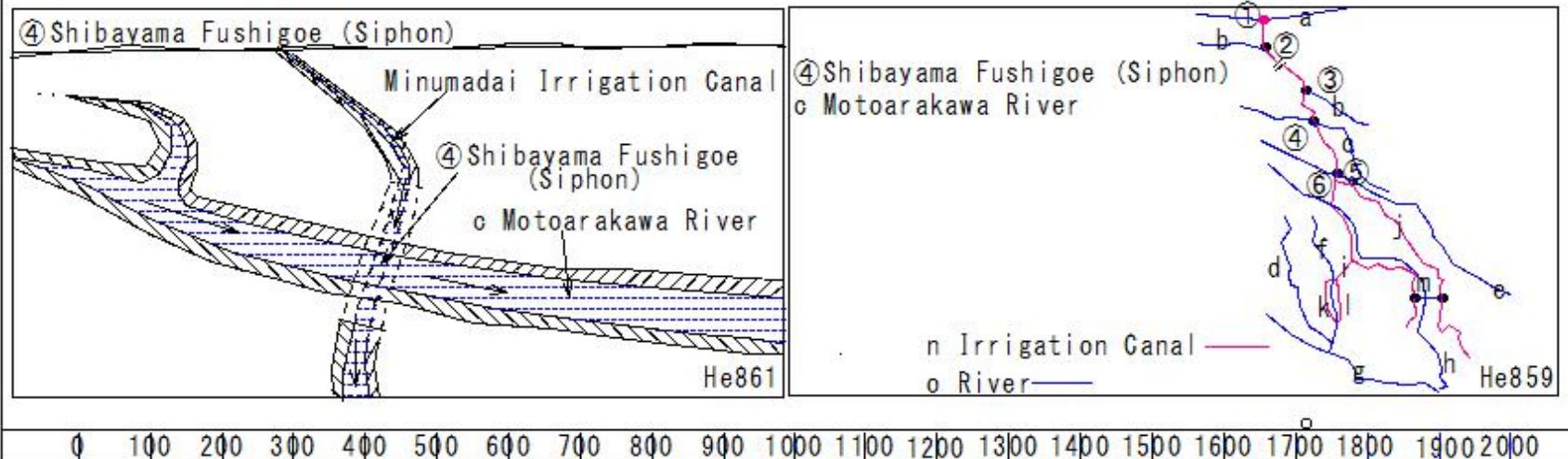


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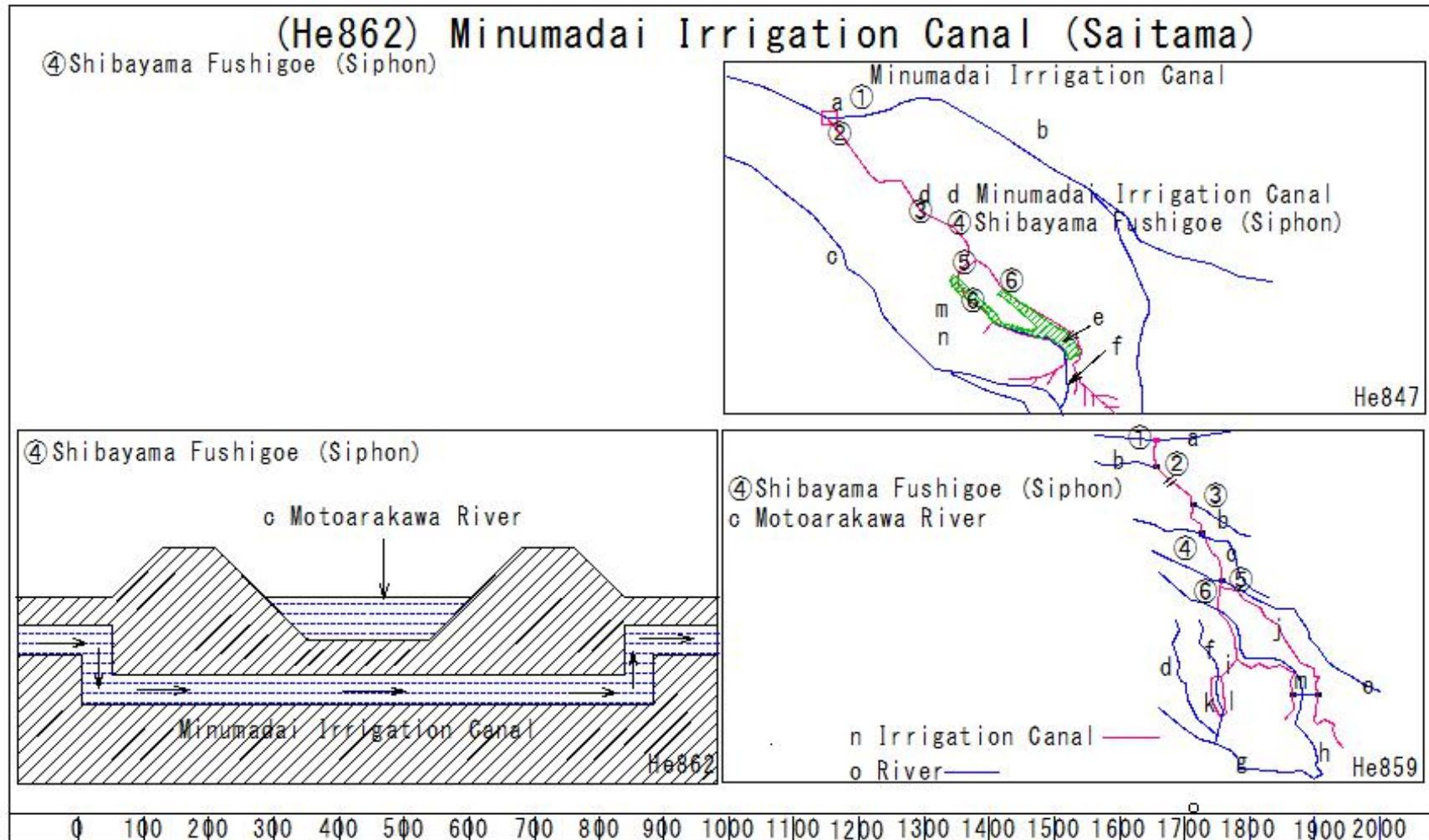
(He861) Minumadai Irrigation Canal (Saitama)

(He861) Minumadai Irrigation Canal (Saitama)

- ④ Shibayama Fushigoe (Siphon)
- ① Approximately 3.3 km from Jyurokuken-seki and Hachiken-seki, the Minumadai Irrigation Canal intersects with the Moto-Arakawa River in Shibayama, Shiraoka City.
- ② At this intersection, the water taken in at grade would be lost.
- ③ Because a grade crossing would result in the loss of water.
- ④ the canal passes under the Moto-Arakawa River (Shibayama Fushigoe).
- ⑤ A channel is buried in the riverbed, allowing the canal to pass under the river in a siphon-like fashion.
- ⑥ Because the canal crosses while lying down, it's called "Shibayama Fushigoe."



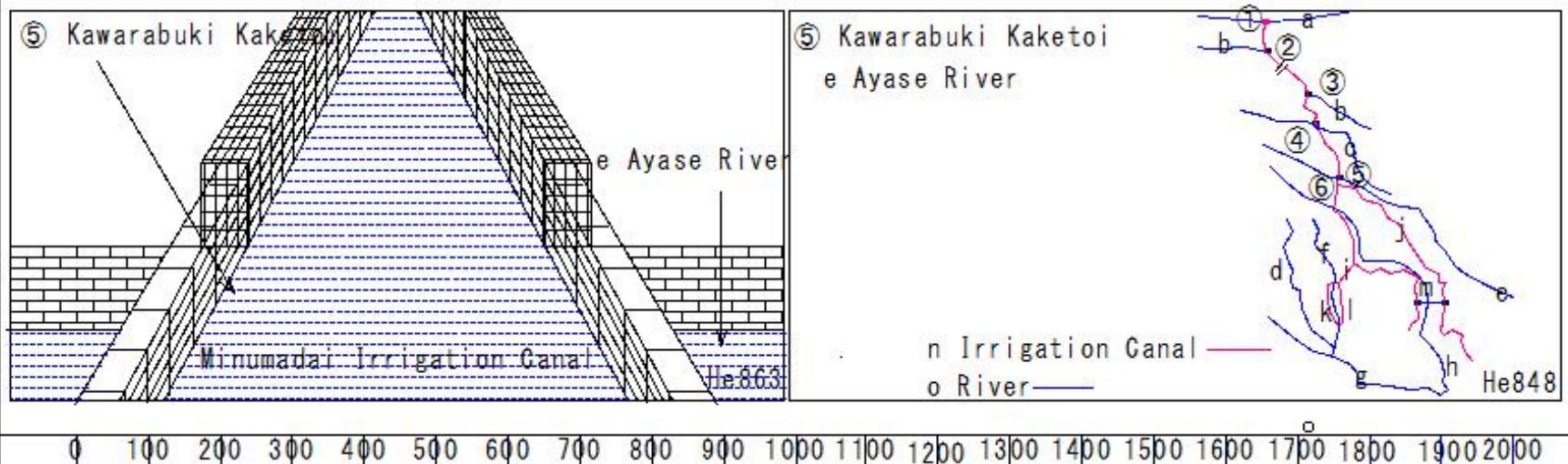
(He862) Minumadai Irrigation Canal (Saitama)



(He863) Minumadai Irrigation Canal (Saitama)

(He863) Minumadai Irrigation Canal (Saitama)

- ⑤ Kawarabuki Kaketoi
- ⑤ Passing over the Ayase River = Kawarabuki Kakewatari Irrigation Canal
- The Minumadai Irrigation Canal siphons under Shibayama Fushigoe.
 - It meets the existing Ayase River in Kawarabuki, Ageo City.
 - A Kakewatari Irrigation Canal is built over the river, and the Minumadai Irrigation Canal passes over the Ayase River.
 - This is the "Kawarabuki Kakewatari Irrigation Canal."
 - The Ayase River flows at a lower level than the Minumadai Irrigation Canal.
 - The ground was also soft, so the Kakewatari Irrigation Canal method was used.

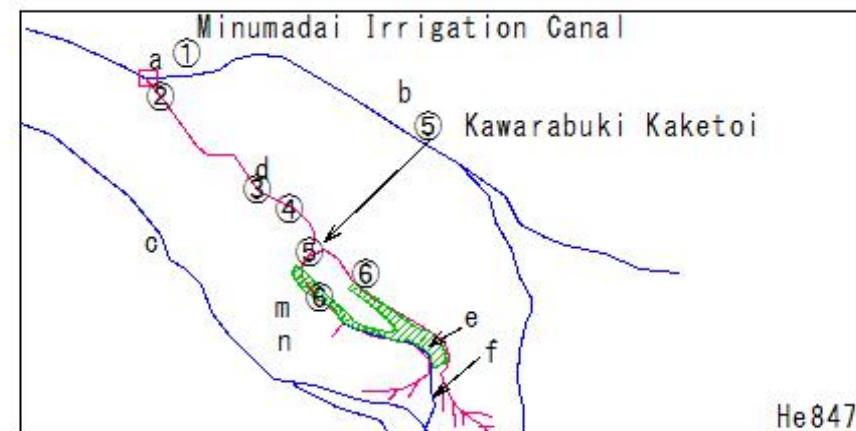


(He864) Minumadai Irrigation Canal (Saitama)

(He864) Minumadai Irrigation Canal (Saitama)

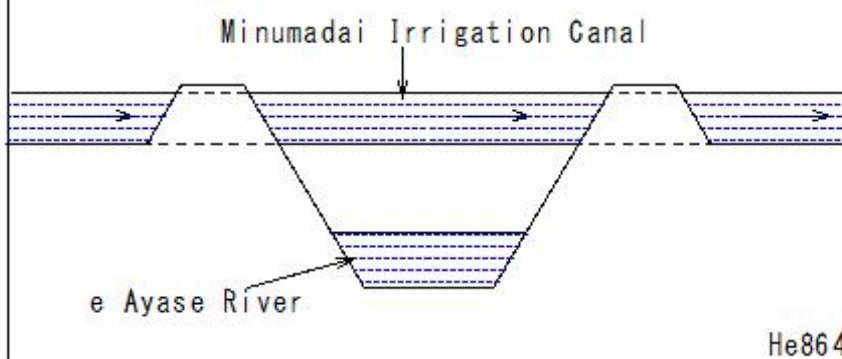
⑤ Kawarabuki Kaketoi

⑤ Passing over the Ayase River =
Kawarabuki Kakewatari Irrigation Canal



He847

⑤ Kawarabuki Kaketoi



⑤ Kawarabuki Kaketoi
e Ayase River

He864



n Irrigation Canal
o River

He848

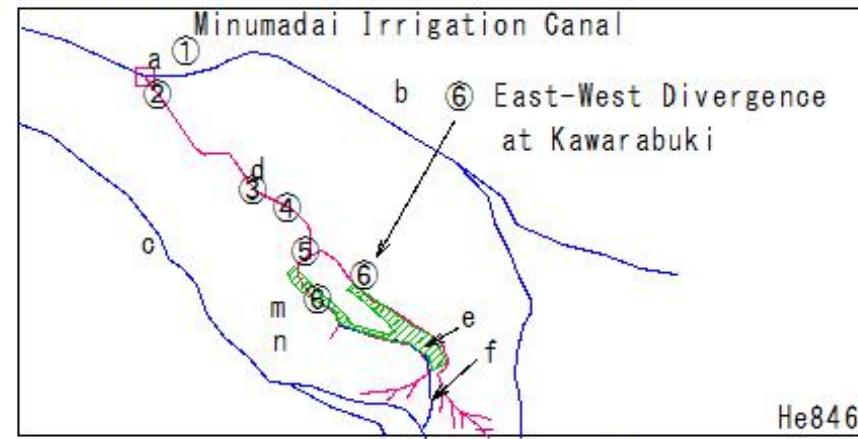
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(He865) Minumadai Irrigation Canal (Saitama)

(He865) Minumadai Irrigation Canal (Saitama)

⑥ East-West Divergence at Kawarabuki

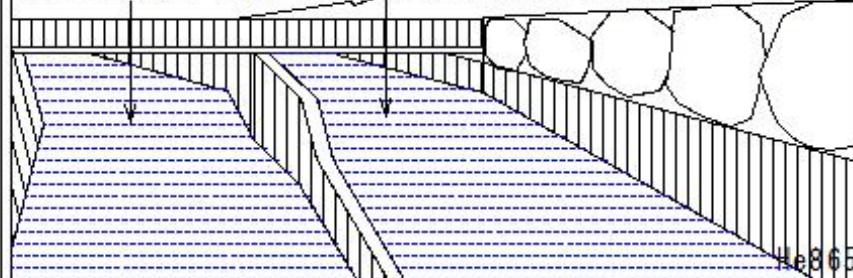
- After crossing the Ayase River at Kawarabuki, the Minumadai Irrigation Canal immediately divides into east and west flows.
- It efficiently diverges water from both sides of the Minuma rice fields.
- The western edge of the Minumadai Irrigation Canal flows on the west side of the Minuma rice fields.
- The eastern edge of the Minumadai Irrigation Canal flows on the east side.



⑥ East-West Divergence at Kawarabuki

The western edge of the Minumadai Irrigation Canal

The eastern edge of the Minumadai Irrigation Canal



⑥ East-West Divergence at Kawarabuki

j Eastern Edge of Minumadai Irrigation Canal

n Irrigation Canal
o River

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(He866) Minumadai Irrigation Canal (Saitama)

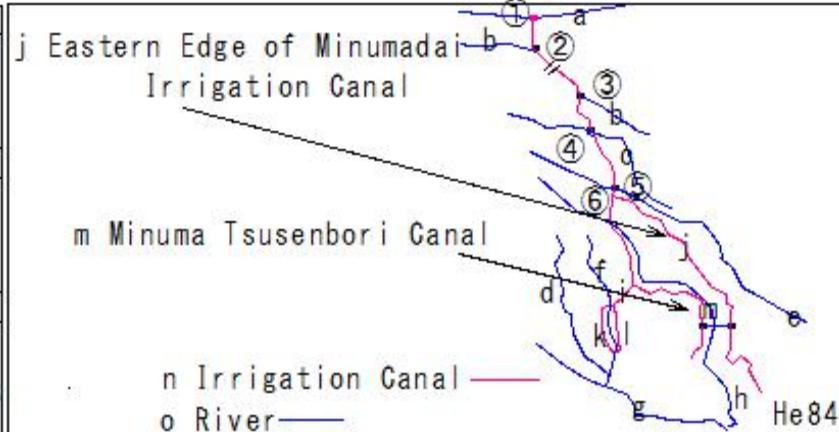
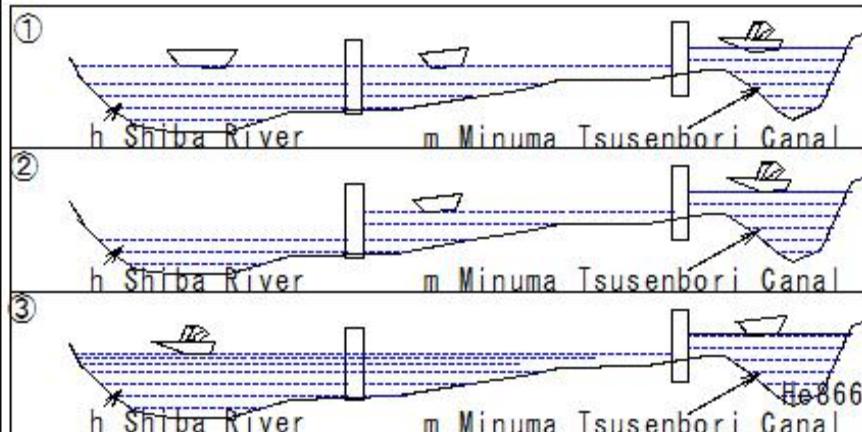
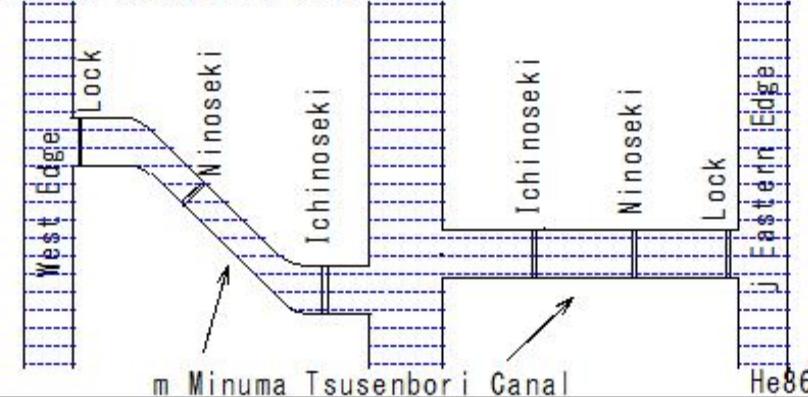
(He866) Minumadai Irrigation Canal (Saitama)

Minuma Tsusenbori Canal

- 1731 (Kyoho 16) • Izawa Yasobei Tamenaga
- A canal was constructed connecting the 3m drop between the Shiba River and the irrigation channel with two locks.
- Built 170 years before the excavation of the Panama Canal ⑤ Japan's oldest lock canal
- Used for 200 years, until 1931, to transport products and daily necessities
- Designated a National Historic Site

He866

Minuma Tsusenbori Canal



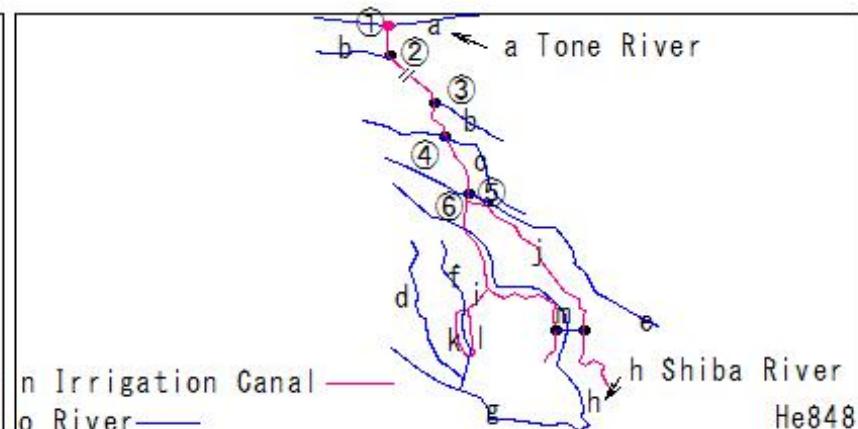
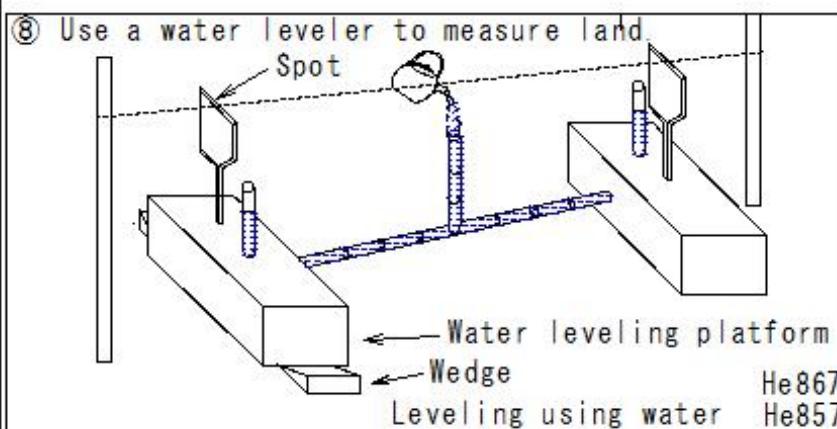
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(He867) Minumadai Irrigation Canal (Saitama)

(He867) Minumadai Irrigation Canal (Saitama)

Surveying Techniques (Water Levelers)

- Surveying Techniques (Water Levelers) Surveying for the excavation of the Minumadai Irrigation Canal
- Upstream from the Tone River
- Two separate surveys were conducted, one from the downstream side of the Shiba River, downstream of the Minuma Reservoir.
- The surveying was carried out using leveling equipment.
- The point where the surveys from the Tone River and Shiba River sides met.
- It is said that there was only a slight deviation of about 6 cm (2 sun).



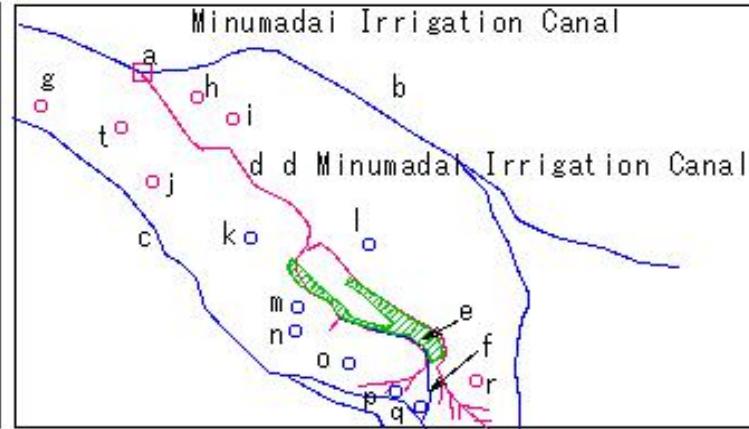
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(He868) Minumadai Irrigation Canal (Saitama)

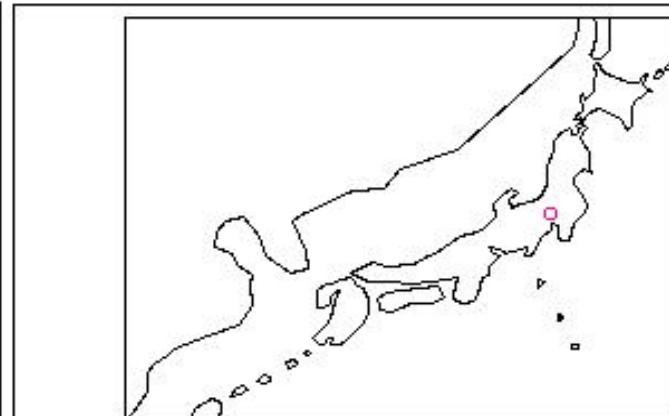
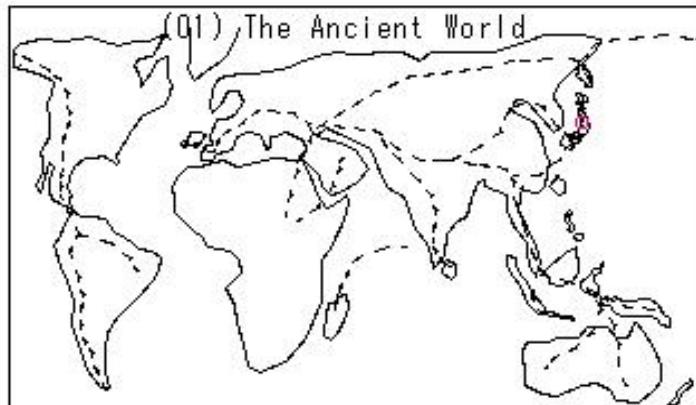
(He868) Minumadai Irrigation Canal (Saitama)

a Tone Ozeki	j Konosu	q Kawaguchi
b Tone River	k Ageo	r Soka
c Arakawa River	l Iwatsuki	s Tokyo Bay
d Minumadai Irrigation Canal	t Gyoda	
e Minuma Rice Fields		
f Shiba River	m Omiya	
g Kumagaya	n Yono	
h Hanyu	o Urawa	
i Kazo	p Warabi	

He846



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(He869) Minumadai Irrigation Canal (Saitama)

(He869) Minumadai Irrigation Canal (Saitama)

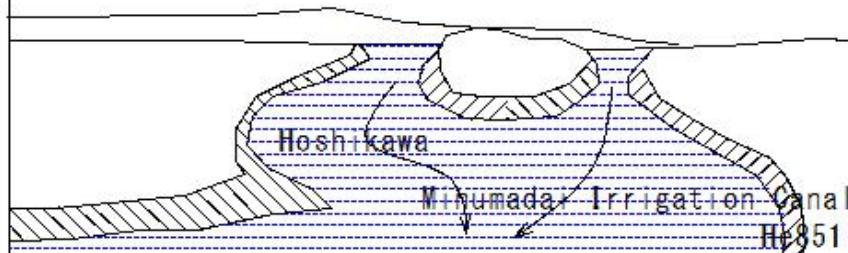
- ① Intake
- ② Confluence with Hoshigawa River
- ③ Jurokuken Weir and Hachiken Weir
- ④ Shibayama Siphon
- ⑤ Kawarabuki Kaketoi
- ⑥ East-West Branch of Minumadai Irrigation Canal
- a Tone River
- b Hoshigawa River
- c Motoarakawa River
- d Kamo River

He848

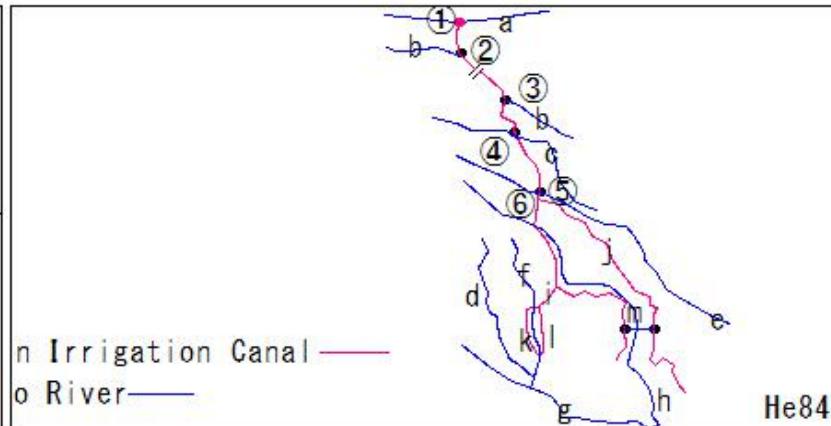
- e Ayase River
- f Konuma River
- g Arakawa River
- h Shiba River
- i Takanuma Irrigation Canal
- j Eastern Edge of Minumadai Irrigation Canal
- k Western Edge of Takanuma Irrigation Canal
- l Eastern Edge of Takanuma Irrigation Canal
- m Minuma Tsusenbori Canal

He848

- ② The Minumadai Irrigation Canal flows into the original "Hoshikawa" river.

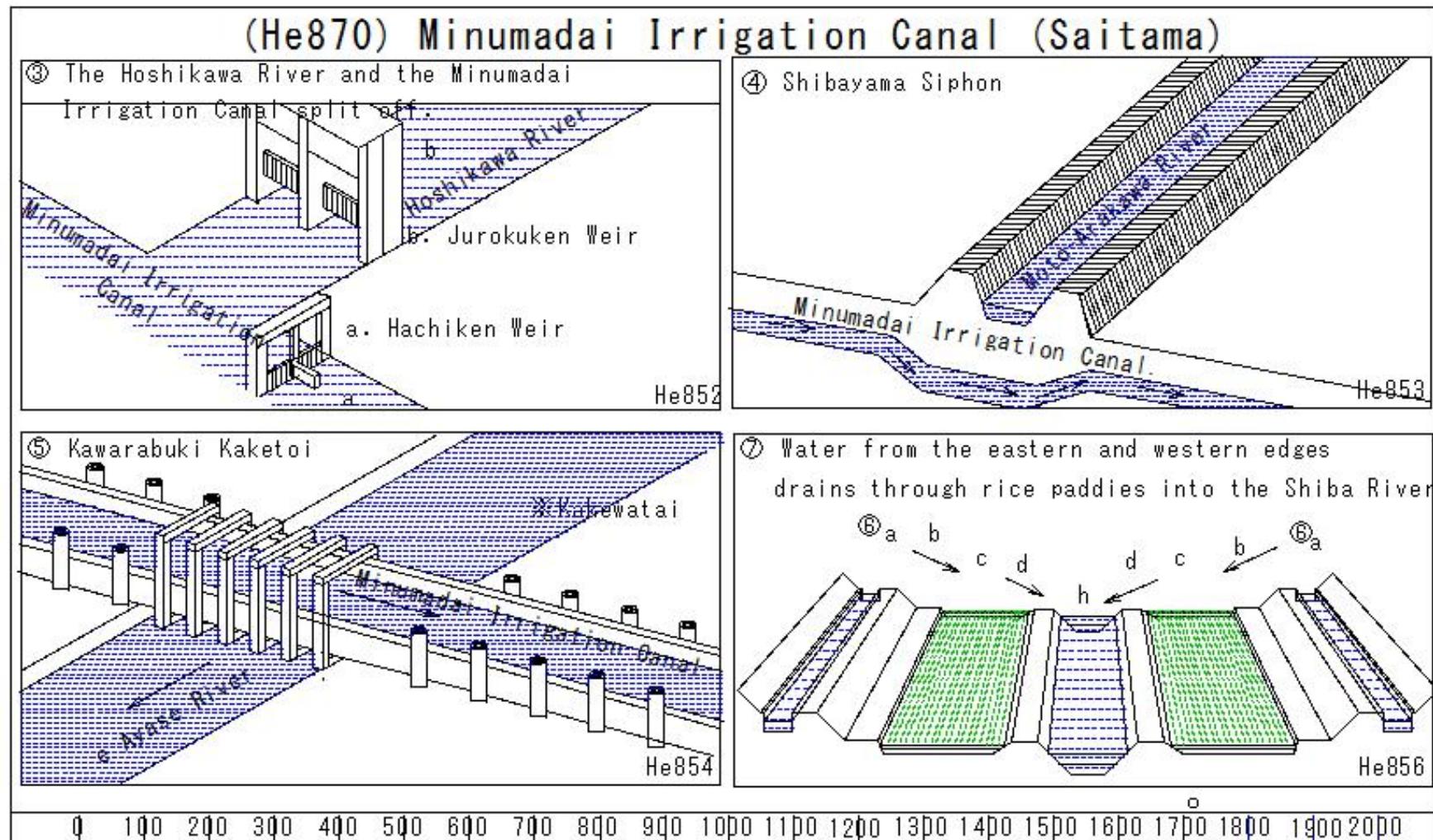


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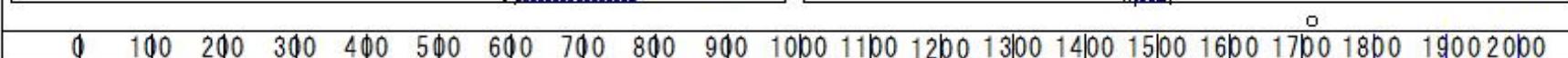
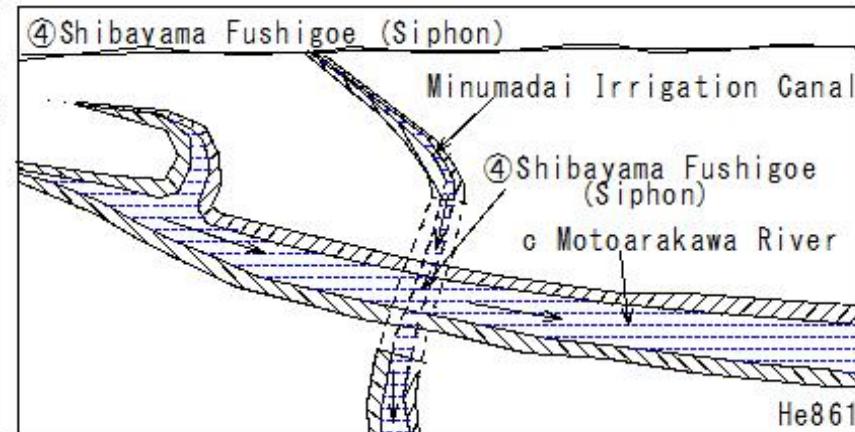
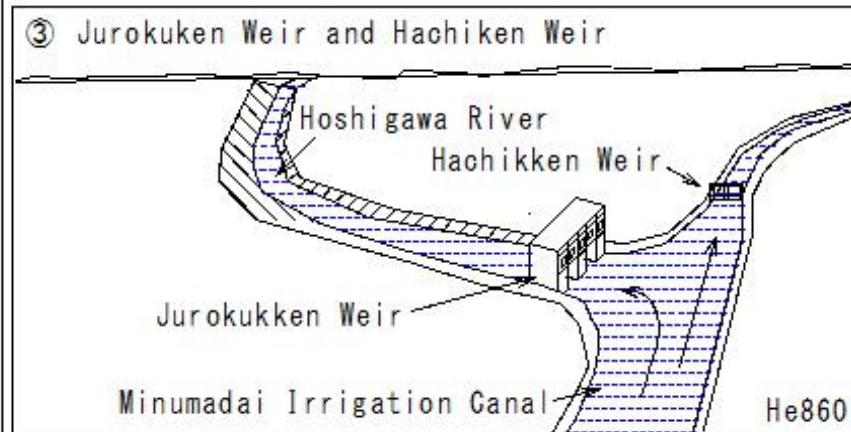
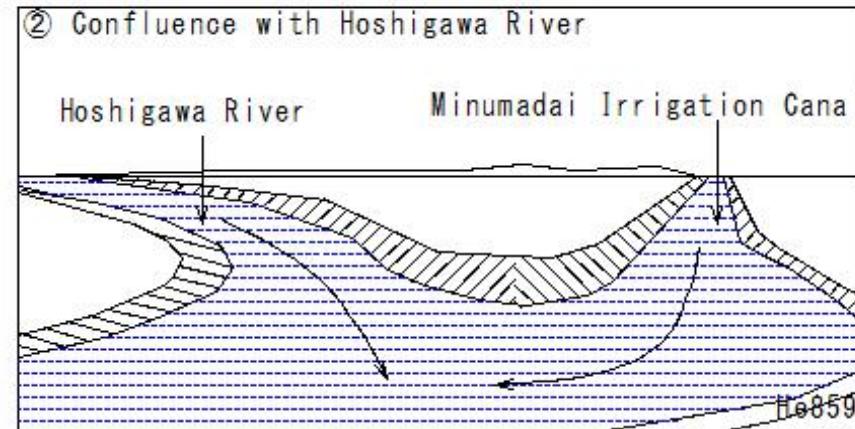
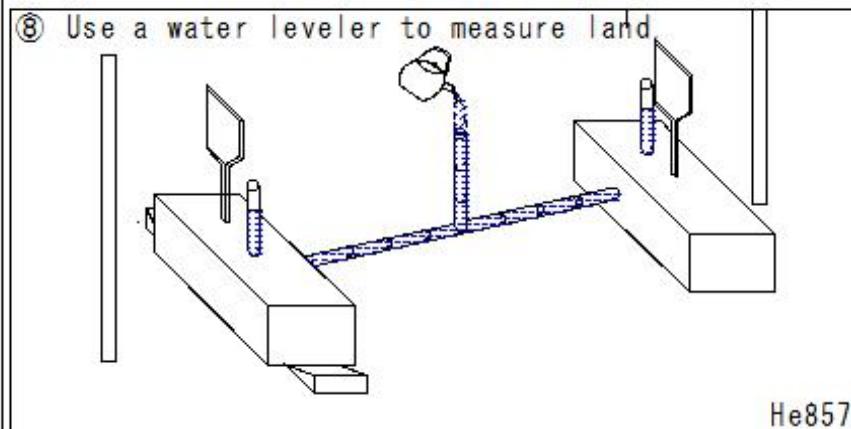
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(He870) Minumadai Irrigation Canal (Saitama)

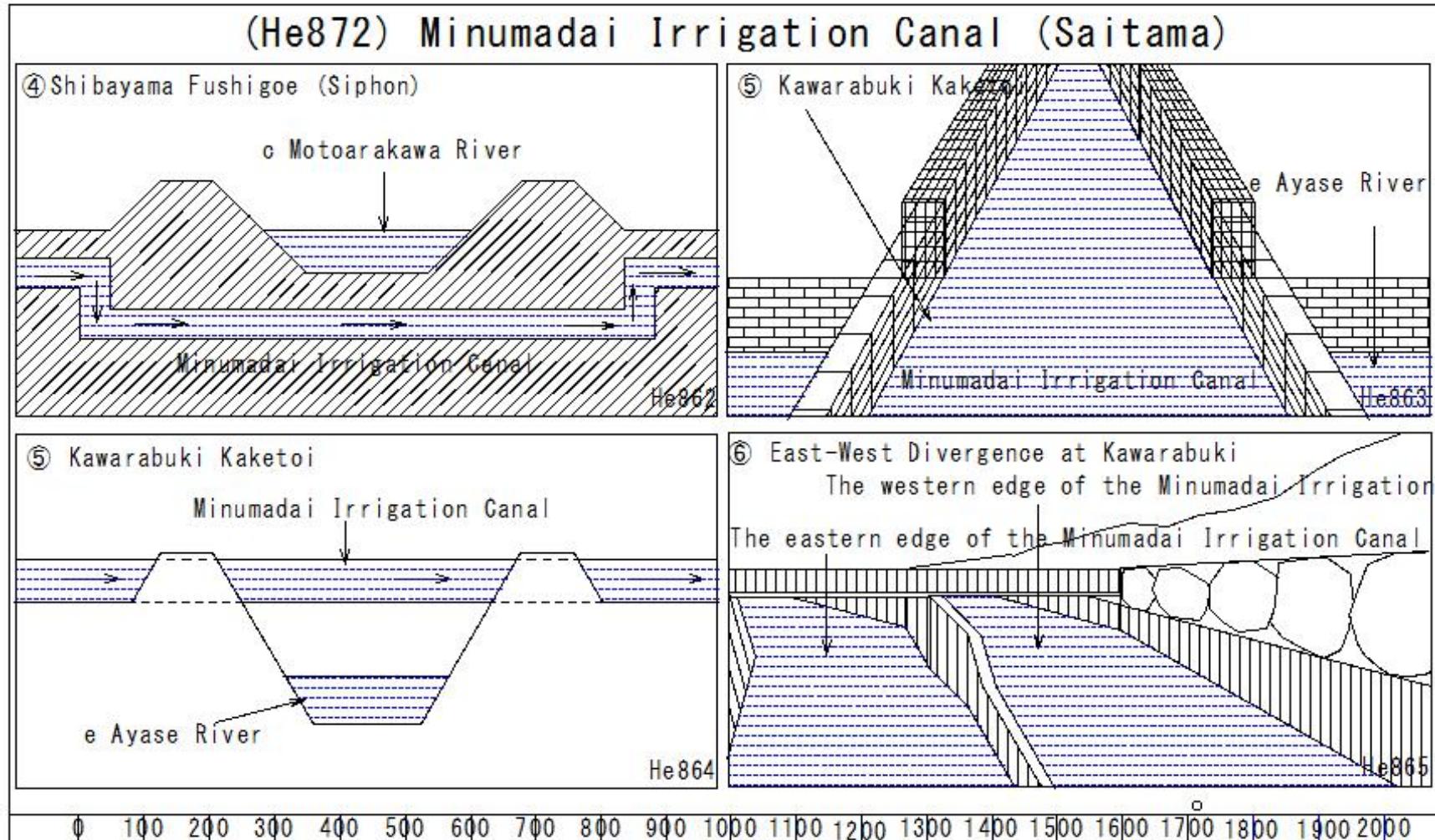


(He871) Minumadai Irrigation Canal (Saitama)

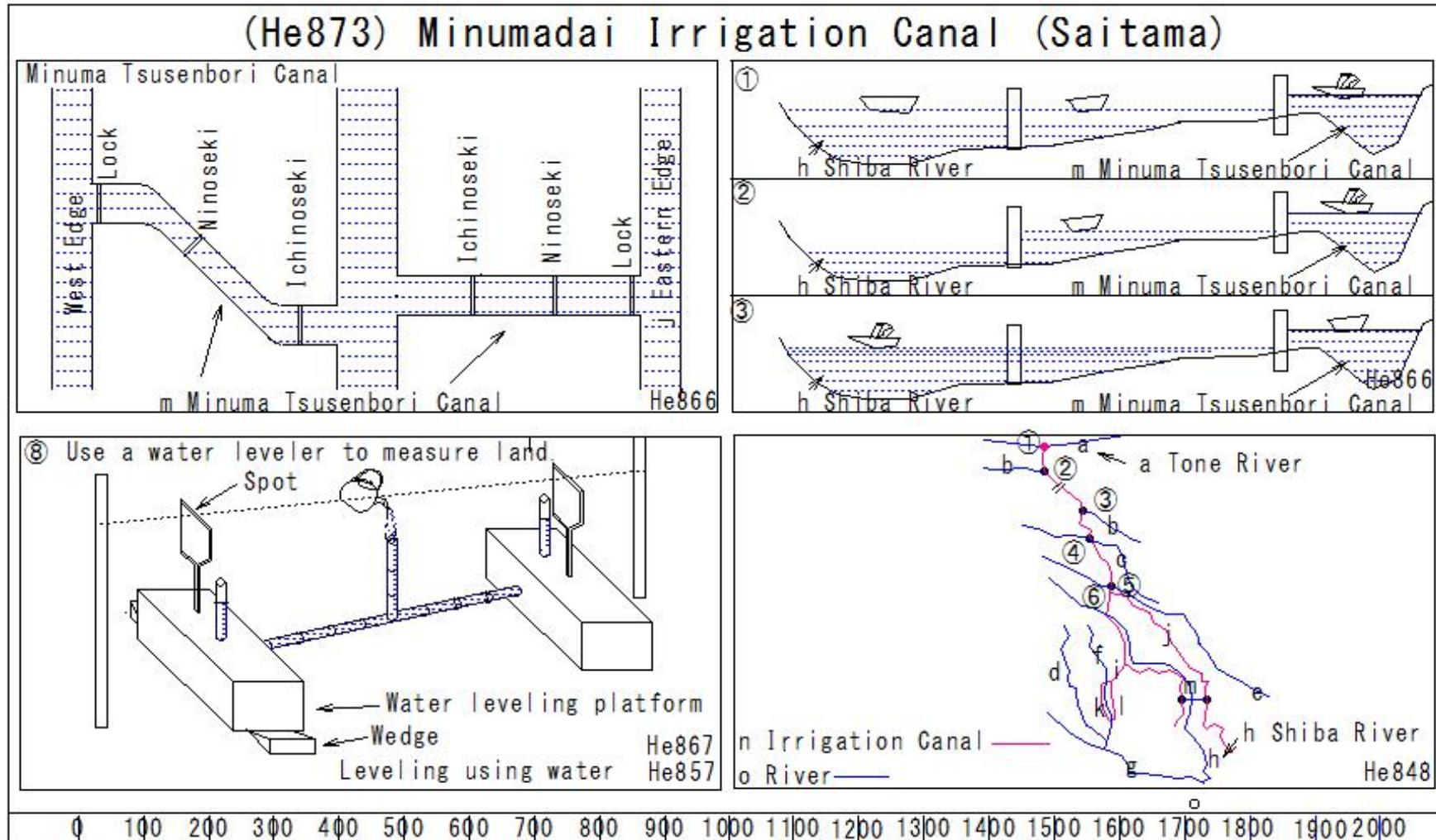
(He871) Minumadai Irrigation Canal (Saitama)



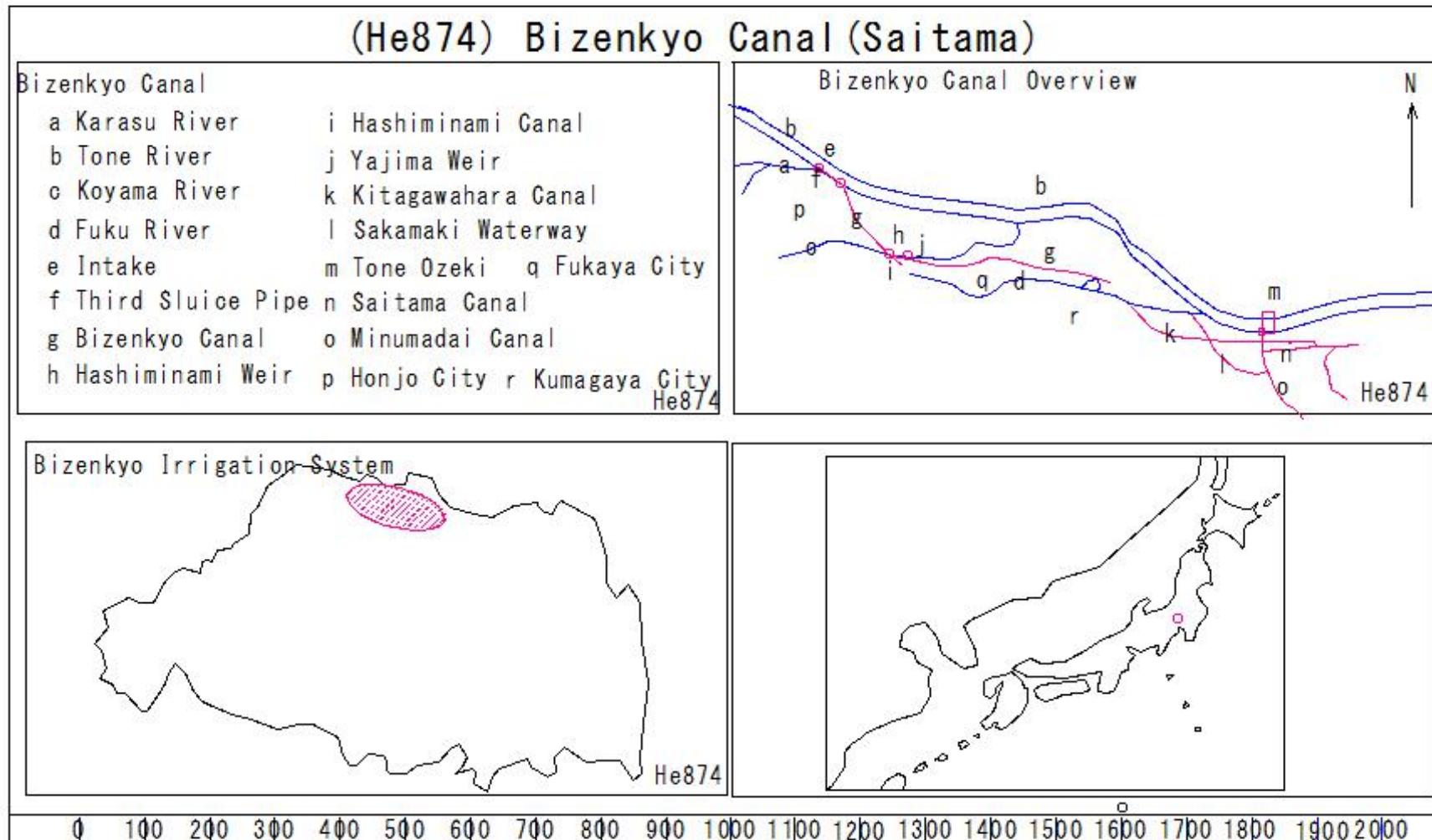
(He872) Minumadai Irrigation Canal (Saitama)



(He873) Minumadai Irrigation Canal (Saitama)



(He874) Bizenkyo Canal(Saitama)



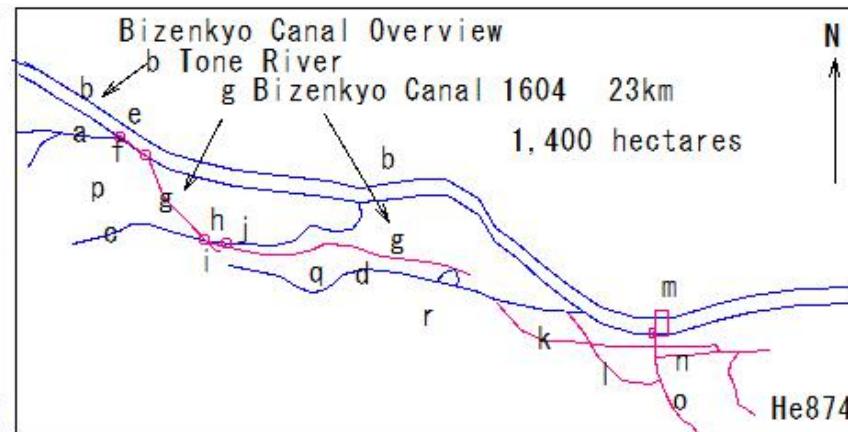
(He875) Bizenkyo Canal(Saitama)

(He875) Bizenkyo Canal (Saitama)

Bizenkyo Irrigation System g Bizenkyo Canal

- The Bizen Canal draws water from the Tone River.
- It flows through Honjo, Fukaya, and Kumagaya in northern Saitama Prefecture.
- It is an approximately 23km agricultural canal that supplies irrigation water to approximately 1,400 hectares of rice paddies on the right bank of the Tone River.
- It is one of the oldest irrigation canals in Saitama Prefecture, excavated in 1604 by Ina Bizenokami Tadatsugu, the head magistrate of the Edo Shogunate, in just one year.
- It is affectionately known as "Bizenbori" (Bizenbori) after Ina Bizenokami's official title.

Bizenkyo Canal	
a Karasu River	i Hashiminami Canal
b Tone River	j Yajima Weir
c Koyama River	k Kitagawahara Canal
d Fuku River	l Sakamaki Waterway
e Intake	m Tone Ozeki
f Third Sluice Pipe	n Saitama Canal
g Bizenkyo Canal	o Minumadai Canal
h Hashiminami Weir	p Honjo City
	q Fukaya City
	r Kumagaya City

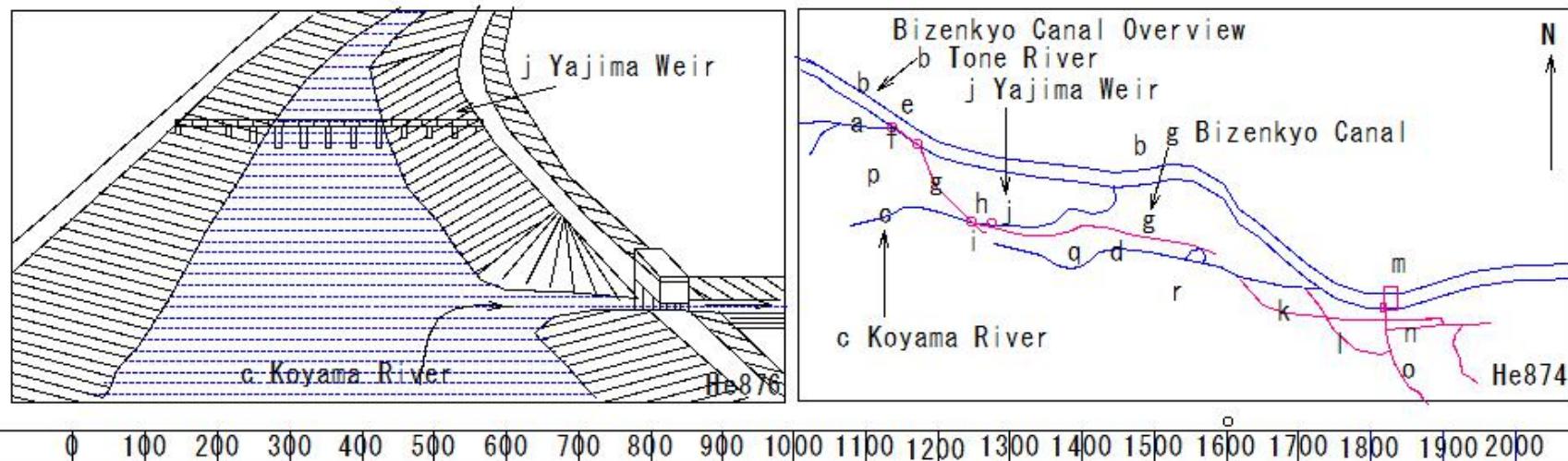


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(He876) Bizenkyo Canal(Saitama)

(He876) Bizenkyo Canal (Saitama)

- ① The foredrain irrigation channel utilizes part of the Koyama River's channel to store flowing water, creating the Yajima Weir, a reservoir-type structure.
- ② This efficient construction plan also utilizes drainage from the upstream area.
- ③ It utilizes the cutting-edge water management technology of the Kanto (Ina) style.

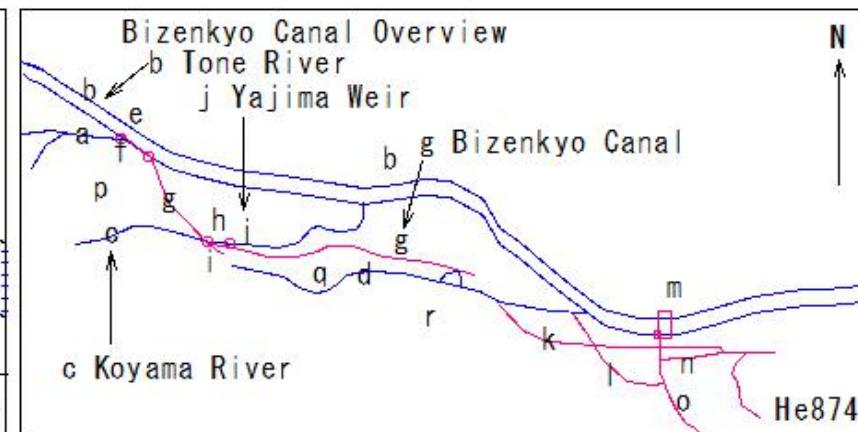
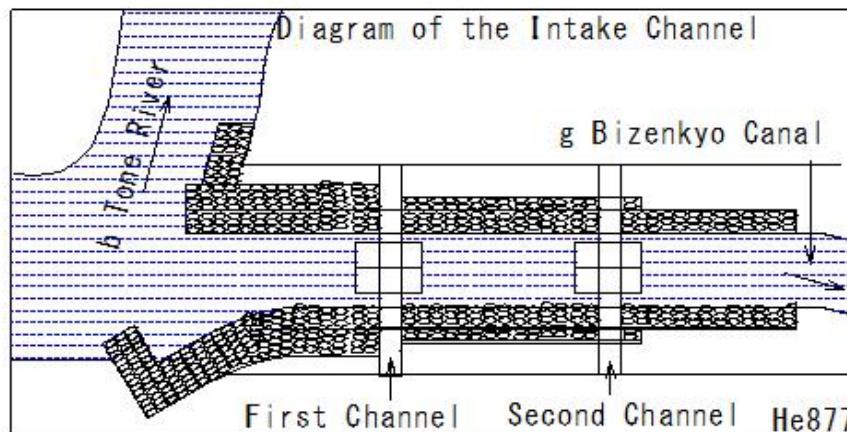


(He877) Bizenkyo Canal(Saitama)

(He877) Bizenkyo Canal (Saitama)

Bizen Canal Irrigation Channel

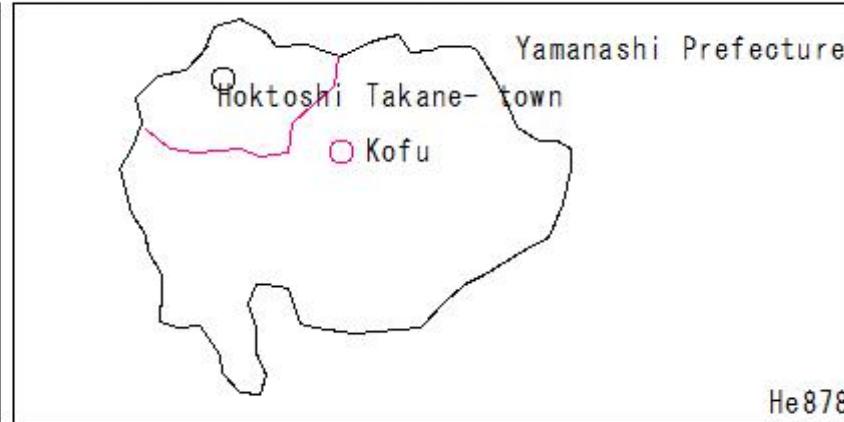
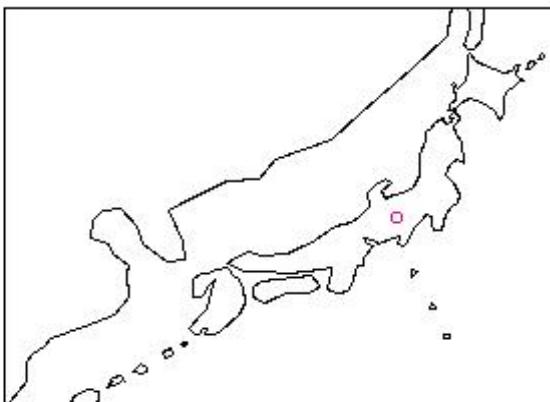
- ① In 1828 (Bunsei 11), conflict arose between upstream and downstream villages over how to deal with floods and water shortages.
- ② To resolve the conflict, stronger flood control measures were implemented.
- ③ The first channel was installed upstream of the intake, and the second channel was installed downstream.
- ④ These channels prevented the Tone River from overflowing and regulated the amount of water intake.



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(He878) Murayama Rokkamura-segi (Yamanashi)

(He878) Murayama Rokkamura-segi (Yamanashi)



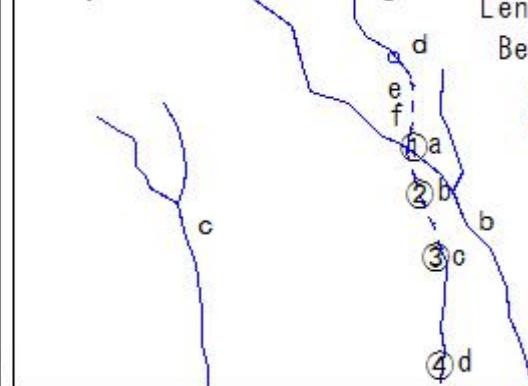
He878

Murayama Rokkamura-segi

- | | |
|-----------------------------------|----------------------|
| ① Intake | d Toryu Falls |
| ② Waterway Tunnel | e Higashizawa Intake |
| ③ Stairway Waterway | f Nishizawa Intake |
| ④ Natural Stone-Walled Waterway | |
| a Murayama Rokkamura-segi | |
| b Kawamata River | |
| c Hayakawa River | |
| g Small Hydroelectric Power Plant | |

Murayama Rokkamura-segi

Length L = 16km.
Beneficial
Area A = 473ha
1639



He878

He878

∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He879) Murayama Rokkamura-segi (Yamanashi)

(He879) Murayama Rokkamura-segi (Yamanashi)

Murayama Rokkamura-segi

- The Murayama Rokkamura-segi was excavated around 1639 (the 16th year of the Kan'ei era).
- It collected water from the Higashizawa and Nishizawa sections of the Kawamata River,
- built a 4km-long weir around the foot of the mountain, and channeled it to the Higashide Plateau.
- The water was then diverted through 10 sluice gates to irrigate six villages.
- However, due to the long detour, the weir frequently collapsed and leaked, resulting in water shortages.
- Since the Taisho era, the detour has been gradually eliminated,
- and various measures have been taken to prevent water leakage. As a result, the current weir provides abundant water to irrigate the downstream area.

Murayama Rokkamura-segi

- ① Intake
- ② Waterway Tunnel
- ③ Stairway Waterway
- ④ Natural Stone-Walled Waterway
- a Murayama Rokkamura-segi
- b Kawamata River
- c Hayakawa River
- d Toryu Falls
- e Higashizawa Intake
- f Nishizawa Intake

He878

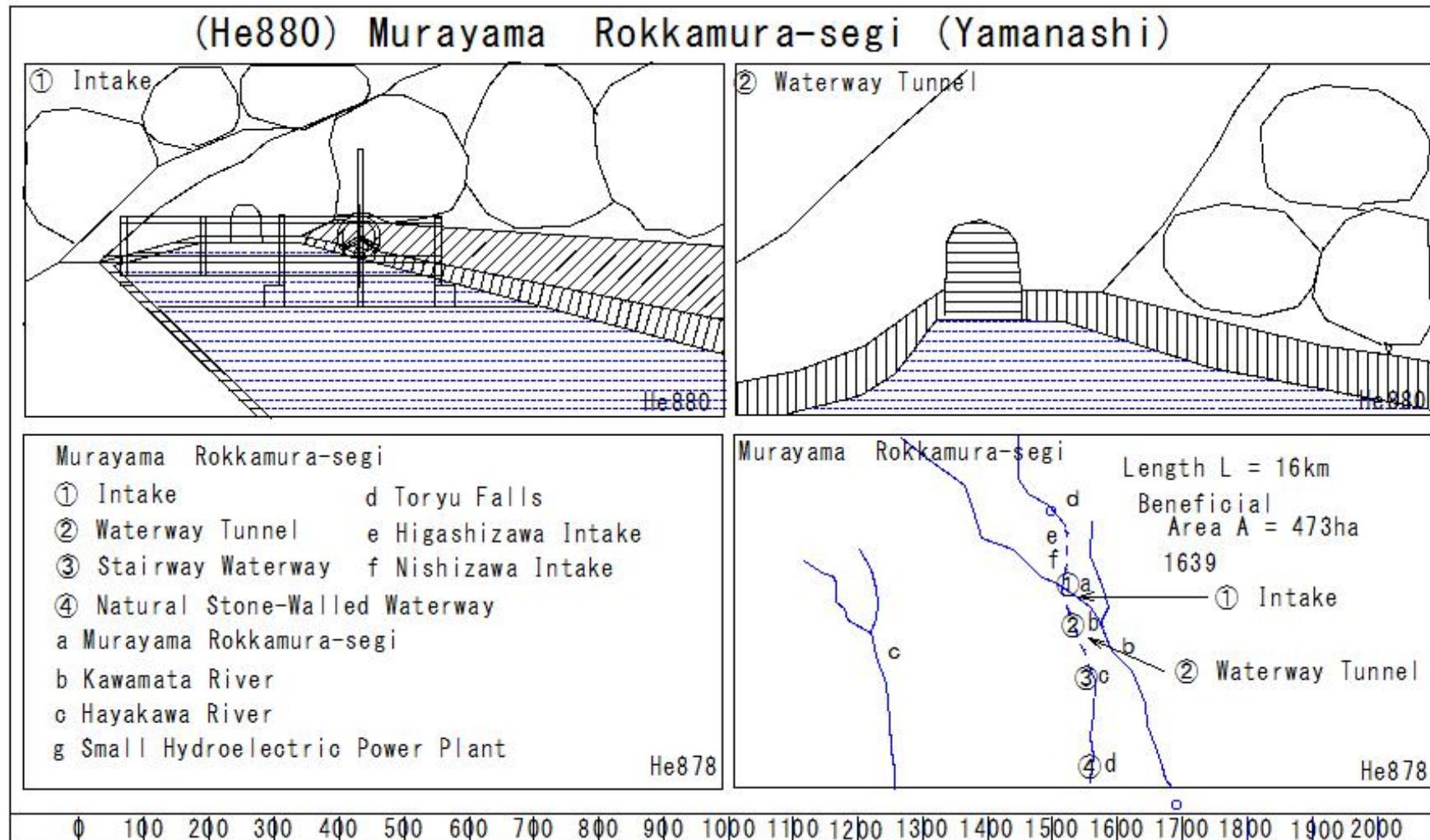
Murayama Rokkamura-segi

Length L = 16km
Beneficial Area A = 473ha
1639

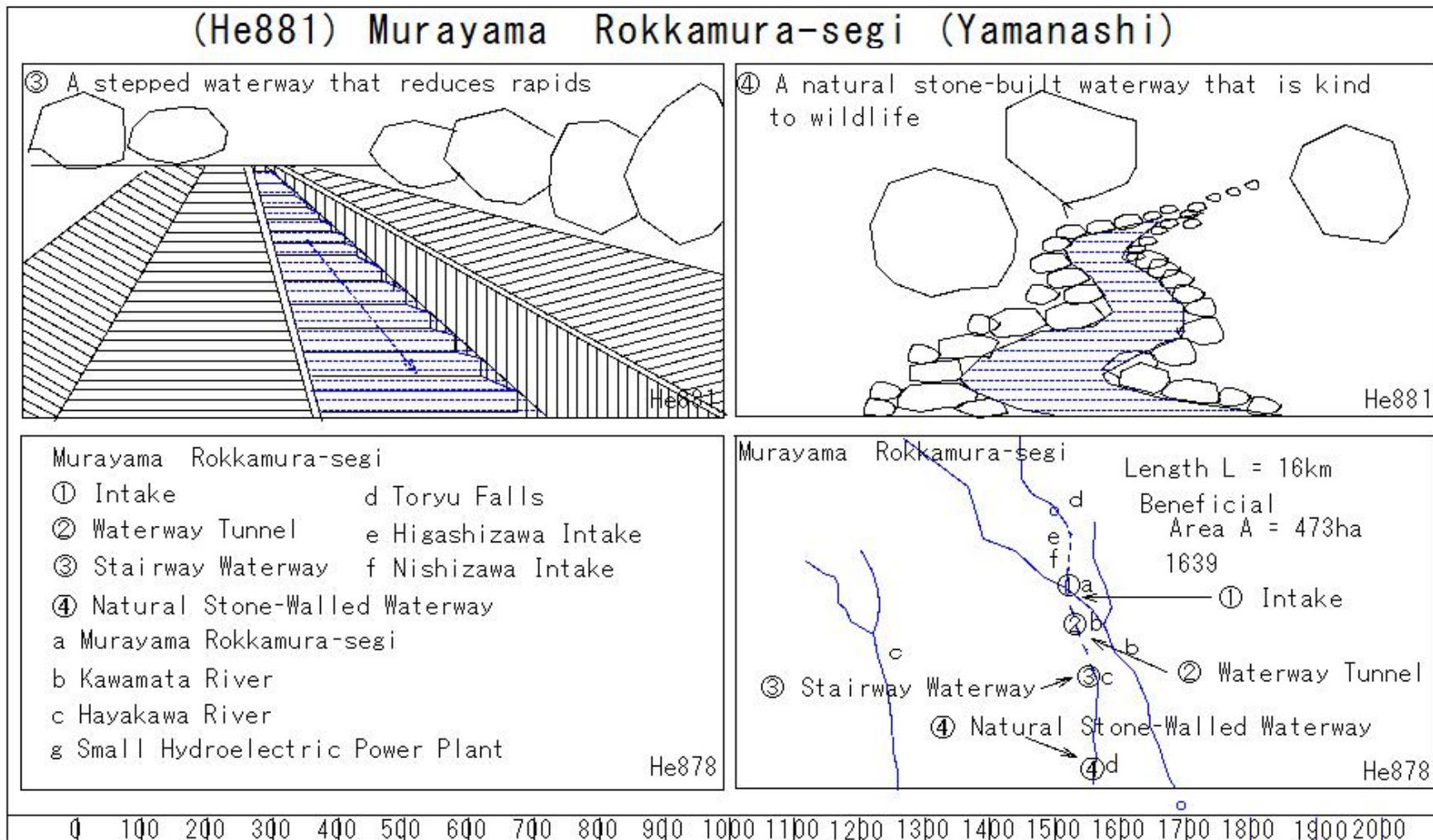
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(He880) Murayama Rokkamura-segi (Yamanashi)



(He881) Murayama Rokkamura-segi (Yamanashi)



(He882) Jikkasegi Irrigation System(Nagano)

(He882) Jikkasegi Irrigation System(Nagano)

Jikkasegi Irrigation System

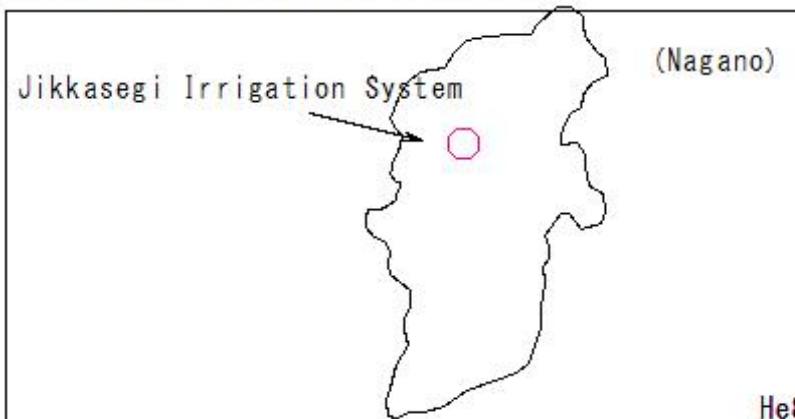
[Nagano Prefecture, Azumino City, Matsumoto City]

- ① An irrigation canal excavated in 1816
- ② Meticulous surveying using the most advanced leveling instruments of the time was carried out in 18 days ③ Detailed financial and work planning
- ④ Construction of the approximately 15km canal was completed in the astonishingly short time of just three months.
- ⑤ Different from the traditional "vertical weir" that directs water in the direction of the gradient
- ⑥ The concept of a "horizontal weir" that channels water along contour lines
- ⑦ Successfully diverted water to the barren central alluvial fan.
- ⑧ Crossing rivers and numerous existing canals at a gentle gradient of approximately 1:3000
- ⑨ Cotton and rice straw were used as cushioning to prevent leakage and subsidence
- ⑩ Various advanced technologies that are still relevant to modern canal repairs were adopted.

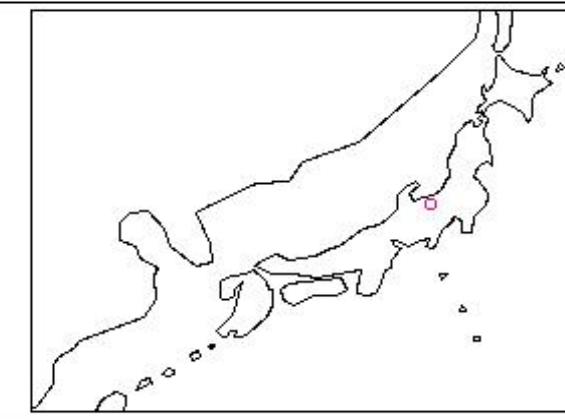
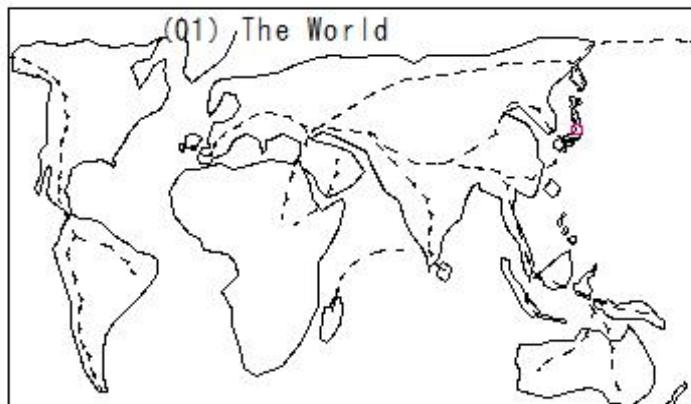
(He883) Jikkasegi Irrigation System(Nagano)

(He883) Jikkasegi Irrigation System(Nagano)

Jikkasegi Irrigation System(Nagano)
Advanced Technology
Azumino Alluvial Fan
Water Supply



He883



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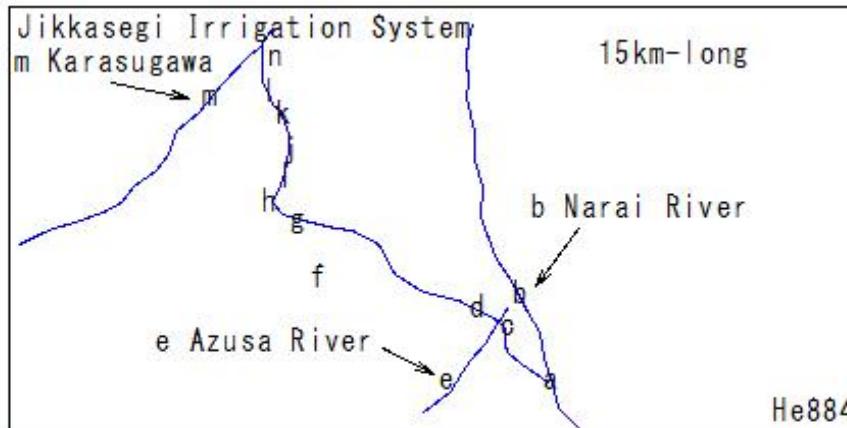
(He884) Jikkasegi Irrigation System(Nagano)

(He884) Jikkasegi Irrigation System(Nagano)

- ① An approximately 15km-long agricultural canal
- ② It draws water from the Narai River in Matsumoto City, crosses the Azusa River underground, and continues to the Karasu River
- ③ Selected as one of Japan's 100 Best Canals and a World Heritage Site for Irrigation Structures
- ④ Completed in 1816 (Bunka 13) during the late Edo period
- ⑤ Azumino is a complex alluvial fan consisting of several alluvial fans at the foot of the mountains
- ⑥ Precise surveying at the time made clever use of contour lines, allowing for an extremely gentle slope
- ⑦ It is characterized by the appearance of flowing toward the mountains

a Jikkasegi Headworks	j Kurio Regulating Weir
b Narai River	k Kashiwara Regulating Weir
c Azusa Siphon	l Hongo Regulating Weir
d Siphon Outlet	m Karasugawa
e Azusa River	n Spillway
f Azumino City	
g Intersection with the Mansui River	
h Omagari	
i Shitabori Regulating Weir	

He884

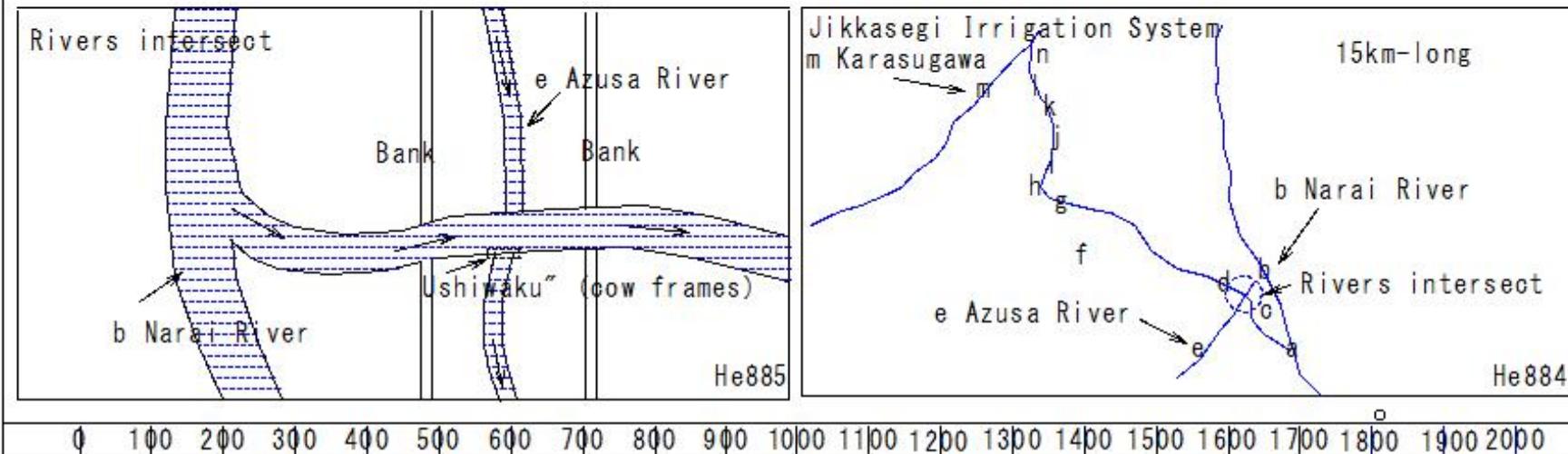


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(He885) Jikkasegi Irrigation System(Nagano)

(He885) Jikkasegi Irrigation System(Nagano)

- Rivers intersect ① Numerous obstacles. ② The weir crosses the mighty Azusa River.
③ People built long "jakago" (gabions), made of woven bamboo baskets filled with stones.
④ "ushiwaku" (cow frames), made by combining several gabions and bamboo frames,
dammed the water and created a cross between the river and the weir.
⑤ Water drawn from the Narai River crosses the river, and water from upstream
of the Azusa River flows between and above the ushiwaku.

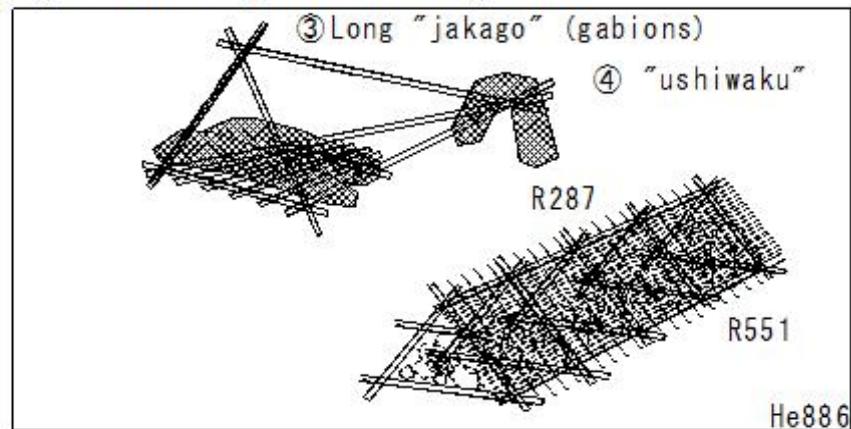


(He886) Jikkasegi Irrigation System(Nagano)

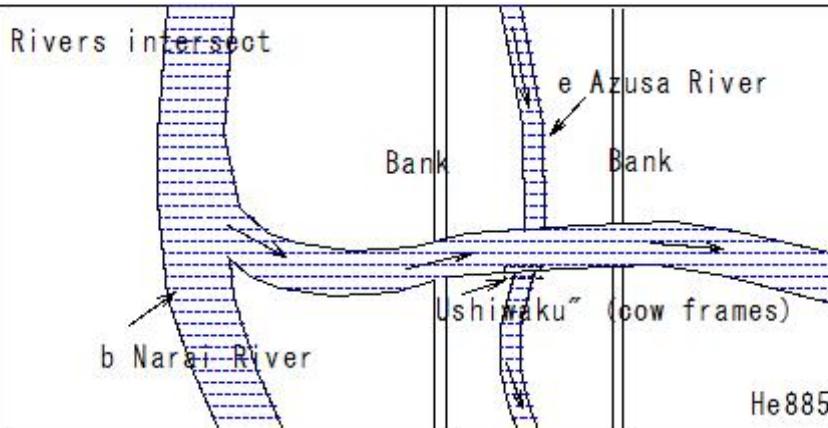
(He886) Jikkasegi Irrigation System(Nagano)

Rivers intersect

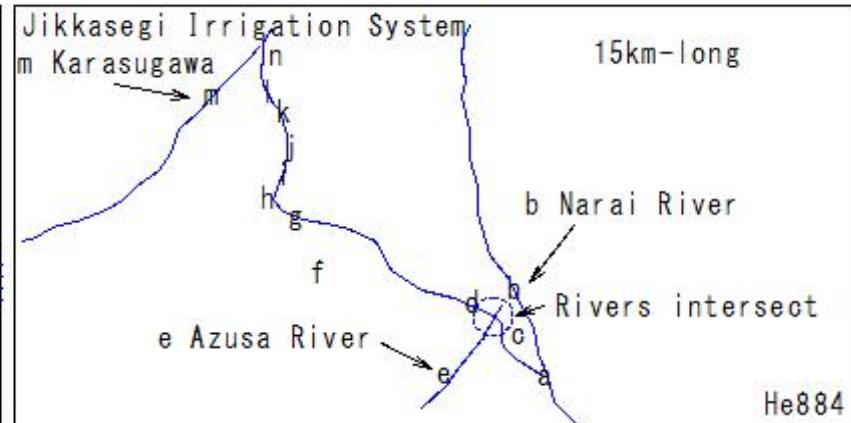
- ③ People built long "jakago" (gabions), made of woven bamboo baskets filled with stones.
- ④ "ushiwaku" (cow frames), made by combining several gabions and bamboo frames, dammed the water and created a cross between the river and the weir.



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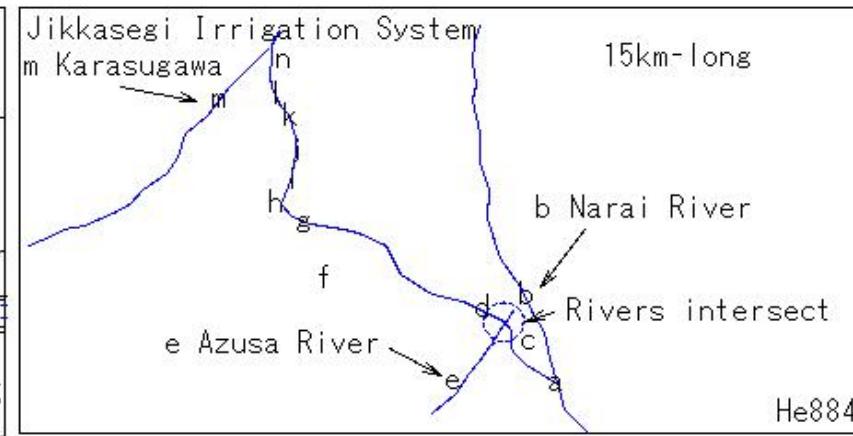
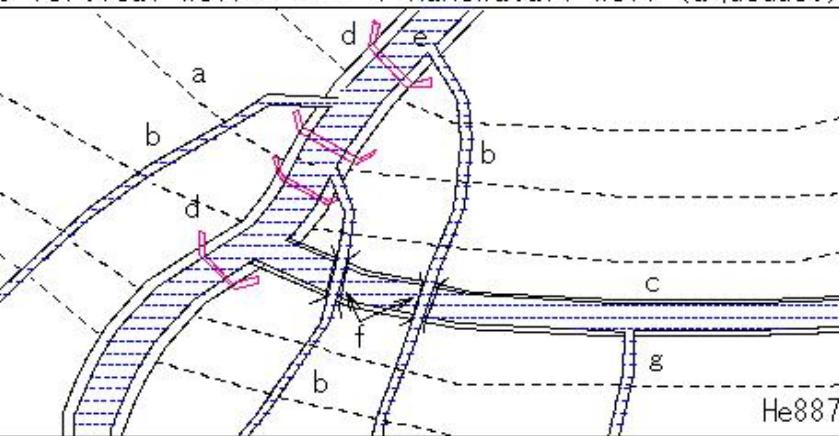
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(He887) Jikkasegi Irrigation System(Nagano)

(He887) Jikkasegi Irrigation System(Nagano)

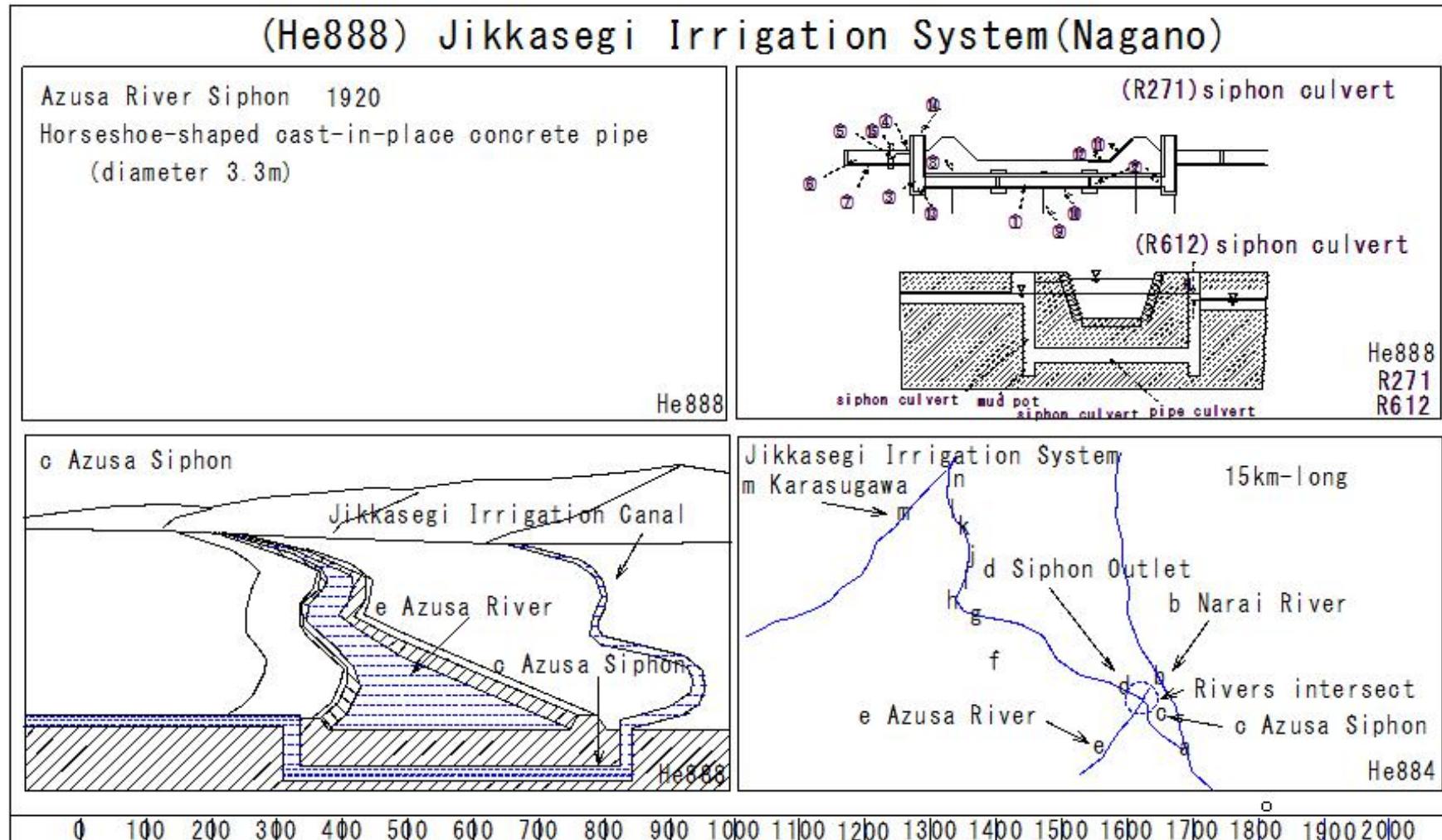
- ① The waterway flows almost parallel to the contour lines, sliding across the slope like a diagonal downhill slope.
- ② It was drawn in from the side. Naturally, this waterway intersects the existing weir at a right angle. ③ A waterway that flows straight down the slope is called a vertical weir.
- ④ The new waterway was called a horizontal weir. ⑤ Skillfully navigating the complex terrain.
- ⑥ It was drawn along the contour lines at a slight incline.
- ⑦ Excavating a horizontal weir required extremely advanced surveying and construction techniques.
- ⑧ Above all, it had to cross existing settlements and a network of waterways (vertical weirs).
- ⑨ It had to cross several rivers.

a Contour lines c Horizontal channel e River
 b Vertical weir d Weir f Kakewatari well (aqueduct)



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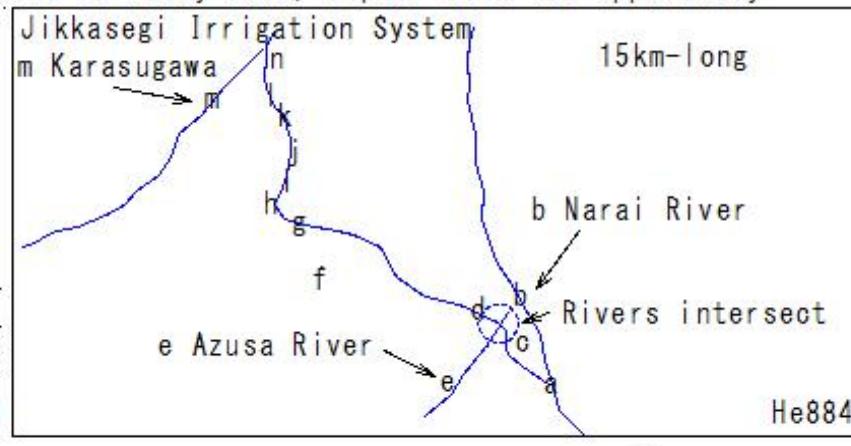
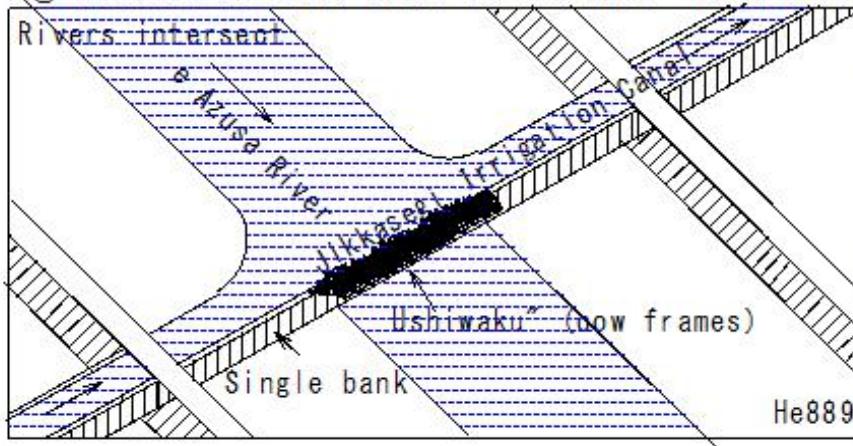
(He888) Jikkasegi Irrigation System(Nagano)



(He889) Jikkasegi Irrigation System(Nagano)

(He889) Jikkasegi Irrigation System(Nagano)

- ① Two rivers intersect!?
- ② The most difficult part of the construction of the Jikkasegi Irrigation Canal was the construction of crossing the Azusa River.
- ③ The construction of crossing the Azusa River.
- ④ The Azusa River is located between the Narai River and the area that draws water.
- ⑤ When drawing water from the Narai River, it is necessary to cross the river.
- ⑥ The Azusa River's riverbank was very wide. ⑦ A bank was built downstream. (a wooden frame).
- ⑧ The part of the Azusa River where the water flows is dammed with a tool called an ushiwaku
- ⑨ The water from the Jikkasegi Irrigation Canal was crossed. carried out many times.
- ⑩ Because it would break if the water level rose due to heavy rain, repair work was apparently

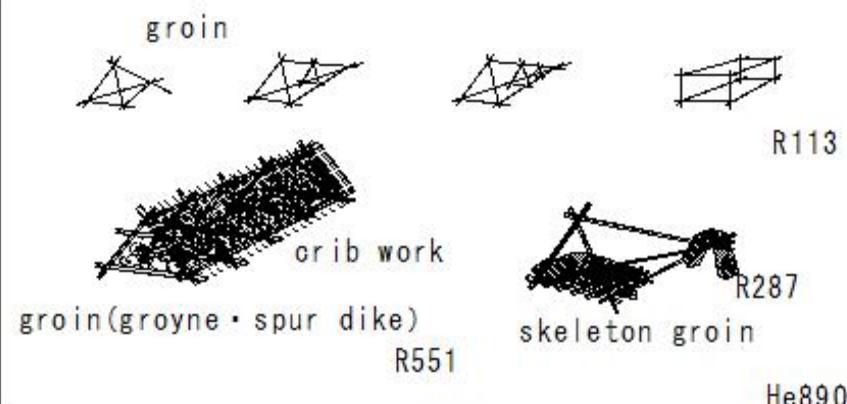


(He890) Jikkasegi Irrigation System(Nagano)

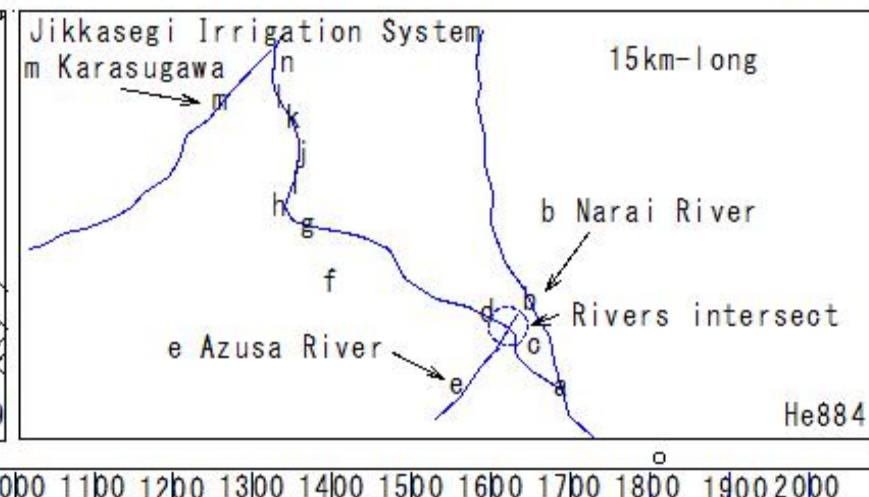
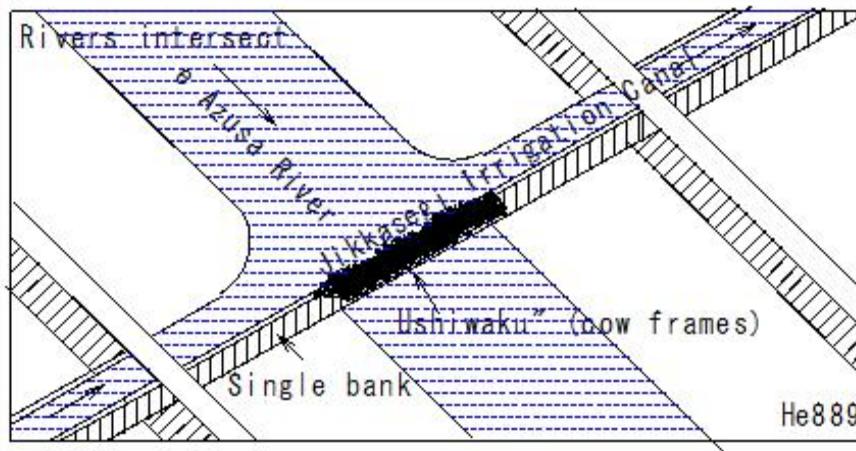
(He890) Jikkasegi Irrigation System(Nagano)

- ① Two rivers intersect!?
- ⑧ The part of the Azusa River where the water flows is dammed with a tool called an ushiwaku (a wooden frame).

He890



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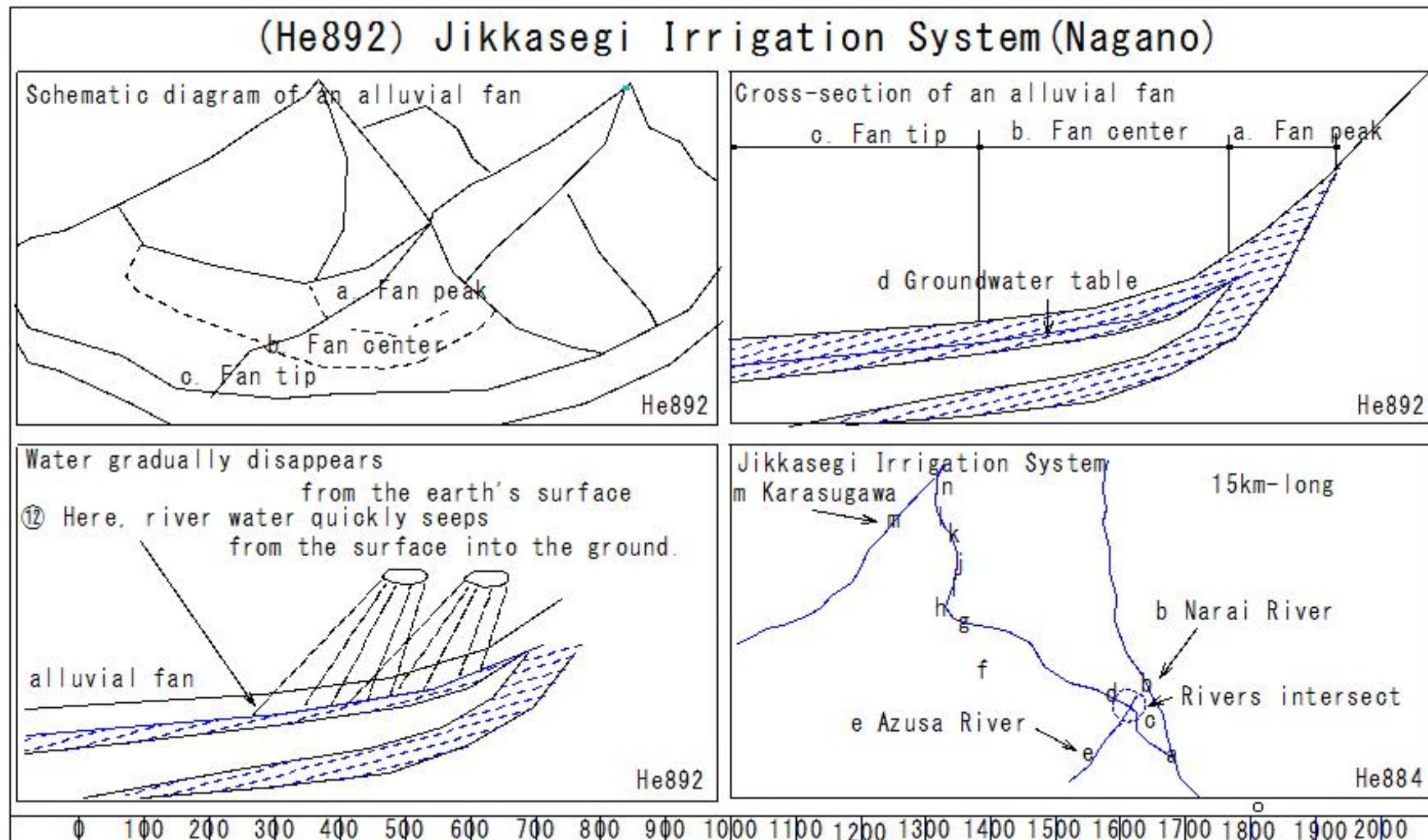
(He891) Jikkasegi Irrigation System(Nagano)

(He891) Jikkasegi Irrigation System(Nagano)

Water gradually disappears from the earth's surface

- ① The mystery of rivers gradually disappearing from the earth's surface!
- ② In Azumino, you can see the magic of nature as flowing rivers disappear. for example.
- ③ The Kurosawa River in the Misato region and the Karasu River in the Horigane/Hotaka region,
- ④ Several of Azumino's rivers originate in the Northern Alps.
- ⑤ Water disappears or drops dramatically along the way.
- ⑥ Why does water disappear along the way?...
- ⑦ The key to solving this mystery is "alluvial fan."
- ⑧ Sand and pebbles carried down from the mountains by the river.
- ⑨ They accumulate one after another in flat, open areas from steep slopes, creating alluvial fans.
- ⑩ The geology of alluvial fans is gravel, a mixture of pebbles and sand.
- ⑪ Azumino is a complex alluvial fan, with several overlapping alluvial fans.
- ⑫ Here, river water quickly seeps from the surface into the ground.
- ⑬ As a result, alluvial fans are unable to retain water and are low in nutrients.
- ⑭ It's the least suitable land for rice cultivation.
- ⑮ Azumino is home to endless expanses of lush rural landscapes, so why is it said to be the largest rice-producing region in Shinshu?

(He892) Jikkasegi Irrigation System(Nagano)

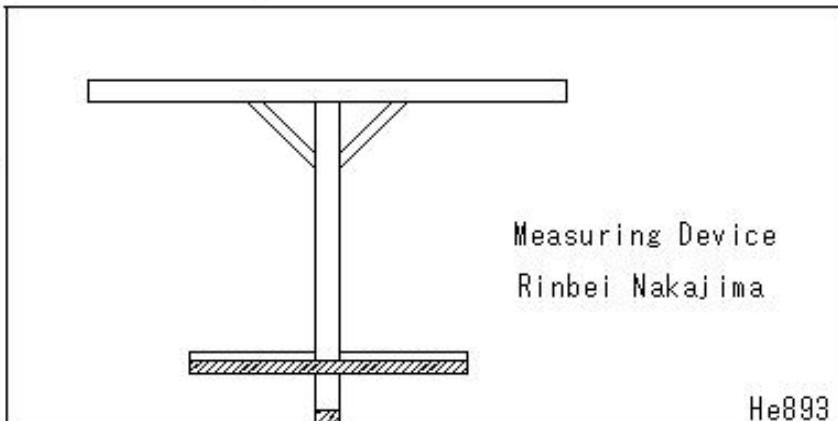


(He893) Jikkasegi Irrigation System(Nagano)

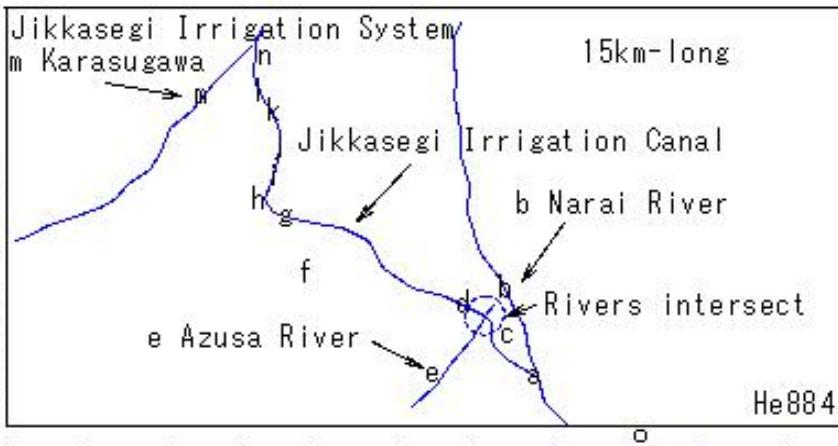
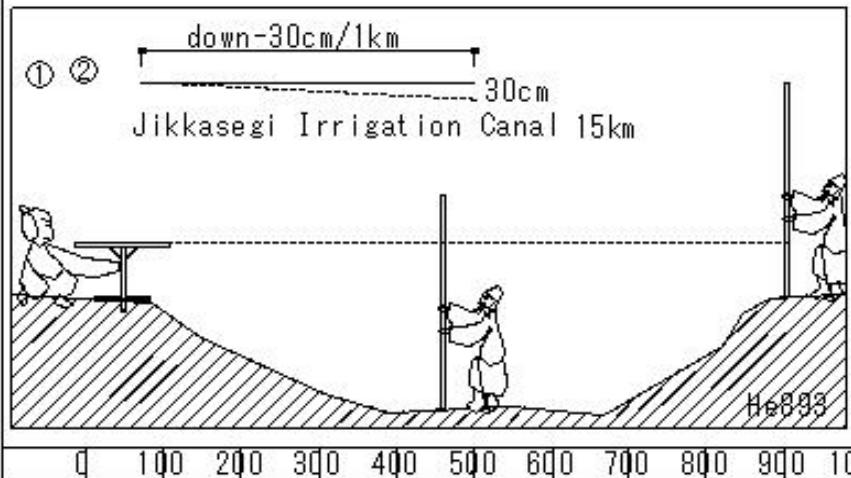
(He893) Jikkasegi Irrigation System(Nagano)

- ① The 15-kilometer dam was excavated roughly along the 570-meter contour line.
- ② This subtle slope has only a slight elevation change of just over 30 centimeters per kilometer.
- ③ A surprisingly simple wooden measuring device was used to measure the topography.
- ④ There is a record that the 15-kilometer length was surveyed in 18 days.
- ⑤ How on earth was the precise slope determined?

He893

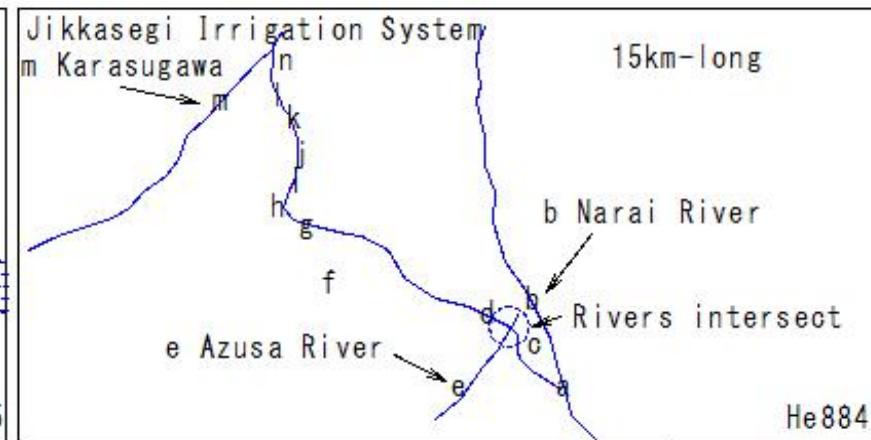
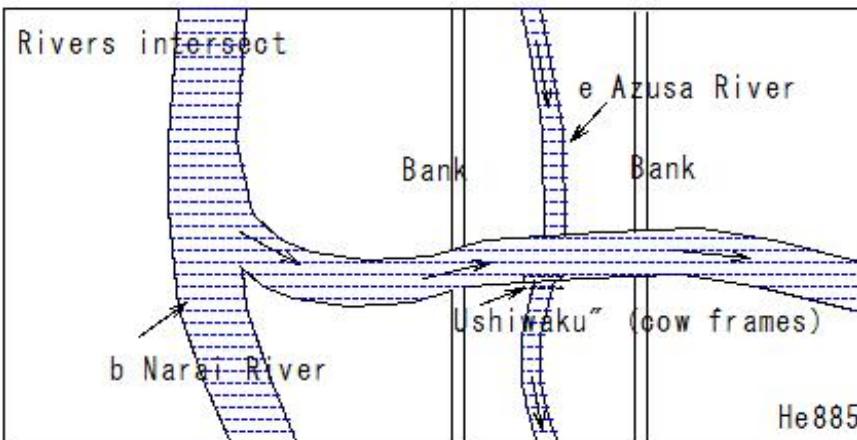
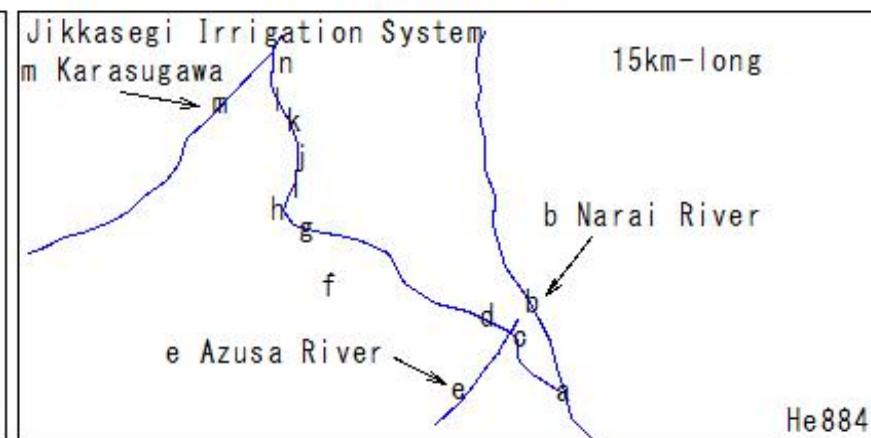
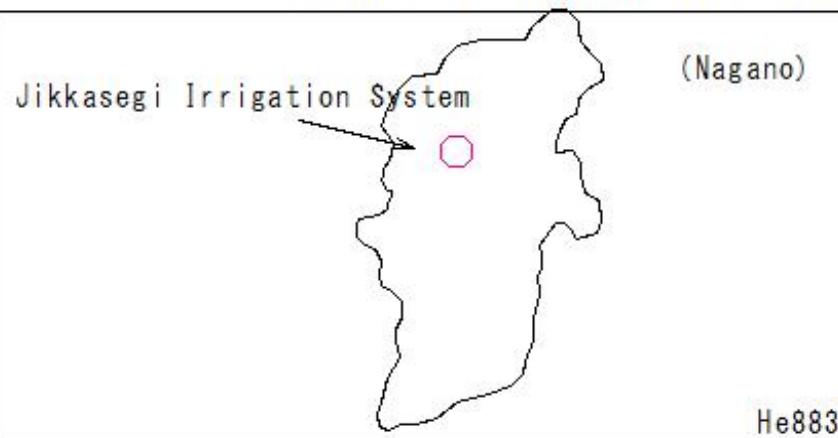


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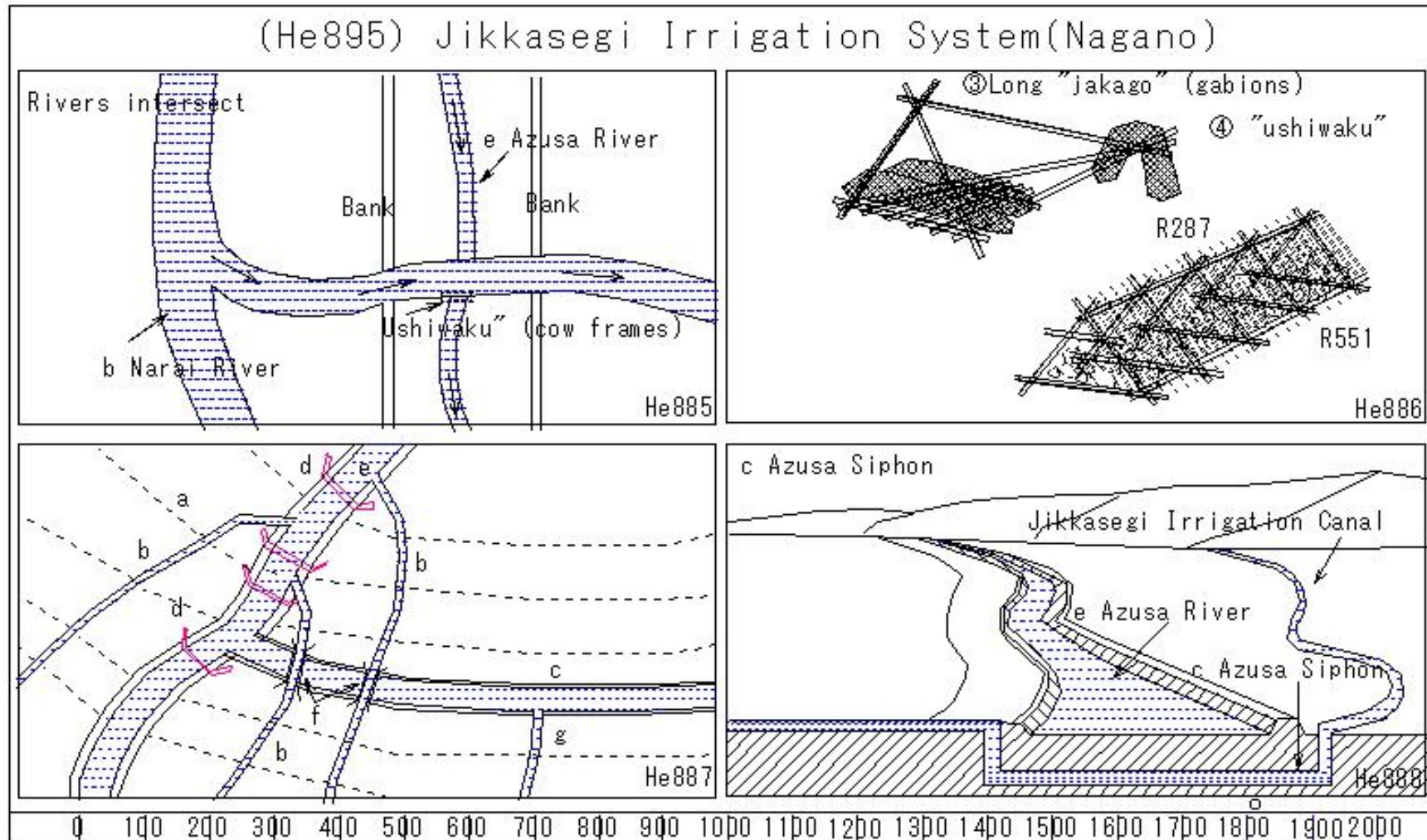
(He894) Jikkasegi Irrigation System(Nagano)

(He894) Jikkasegi Irrigation System(Nagano)

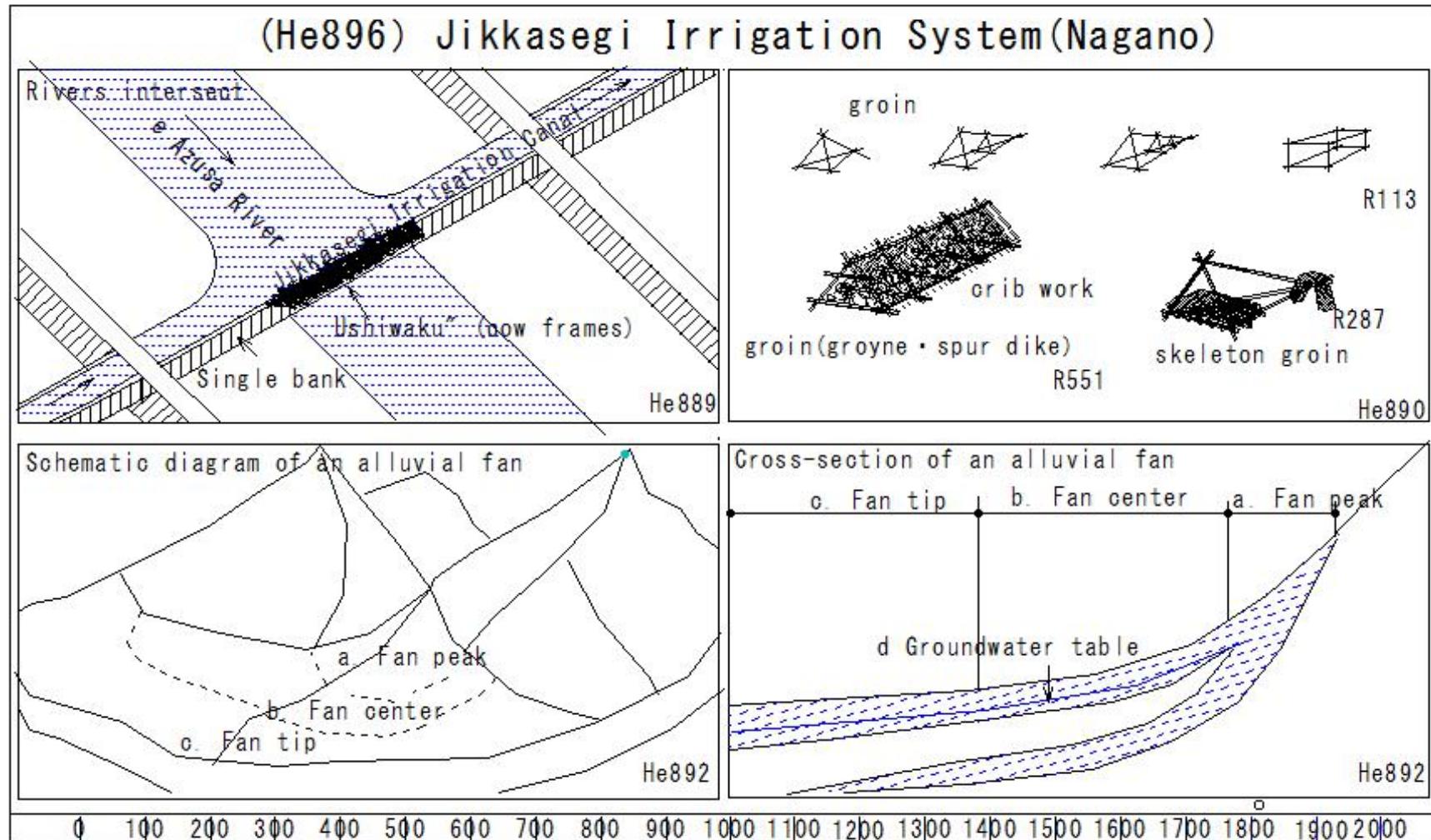


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(He895) Jikkasegi Irrigation System(Nagano)

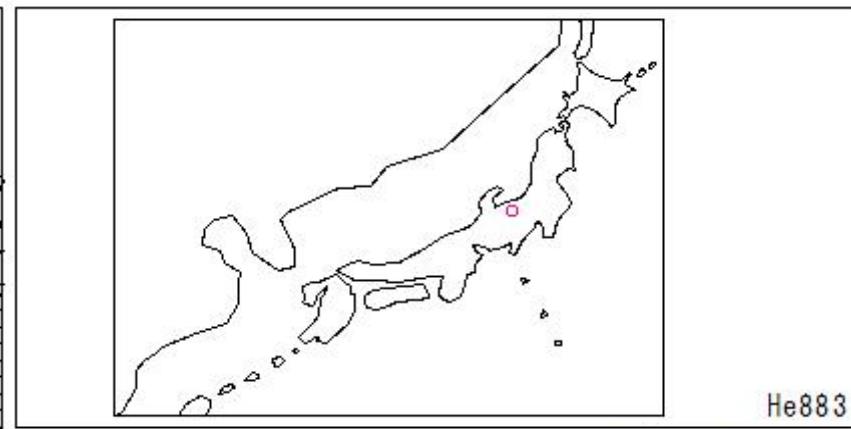
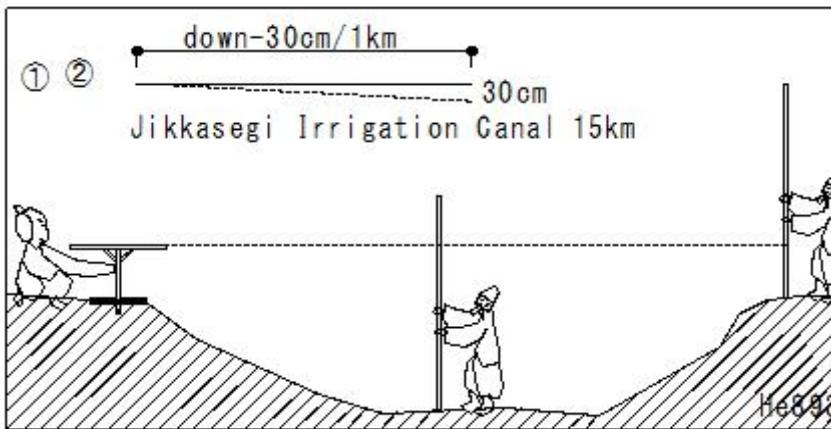
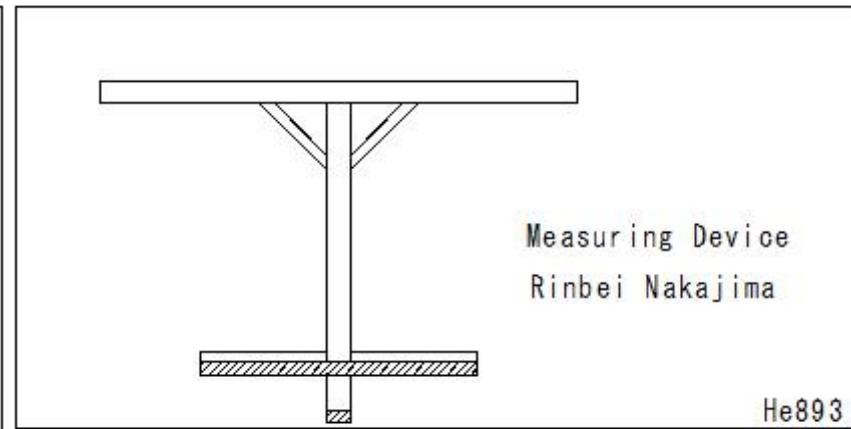
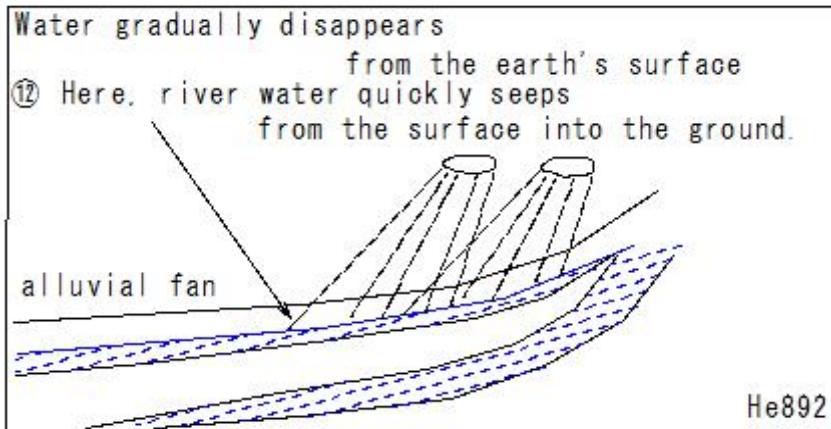


(He896) Jikkasegi Irrigation System(Nagano)



(He897) Jikkasegi Irrigation System(Nagano)

(He897) Jikkasegi Irrigation System(Nagano)



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(He898) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He898) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Global Heritage Irrigation Structures

[Takinoyu-segi and Ohkawara-segi] (Chino City)

Overview of Registered Facility

Takinoyu-segi: Year of Construction: 1785, Total Length: 13.5 km, Irrigated Area: 456 ha

Ohkawara-segi: Year of Construction: 1792, Total Length: 14.4 km, Irrigated Area: 315 ha

- ① The "Kurikoshi-segi" water system, planned by Yosen Sakamoto.
- ② connects multiple rivers flowing east and west with irrigation canals
- ③ sequentially transports surplus water from relatively high-flow rivers in the north to water-scarce areas in the south
- ④ along the route Irrigating agricultural land
- ⑤ For example, in areas with large elevation differences, an artificial waterfall is created as a drop structure.
- ⑥ Kurikoshi-segi(a waterway-based structure combining a river and a waterway)

(He899) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He899) Takinoyu-segi and Ohkawara-segi Irrigation System

Global Heritage Irrigation Structures

[Takinoyuseki Weir and Okawara Weir] (Chino City)

Overview of Registered Facility

Takinoyuseki Weir: Year of Construction: 1785, Total Length: 13.5 km, Irrigated Area: 456 ha

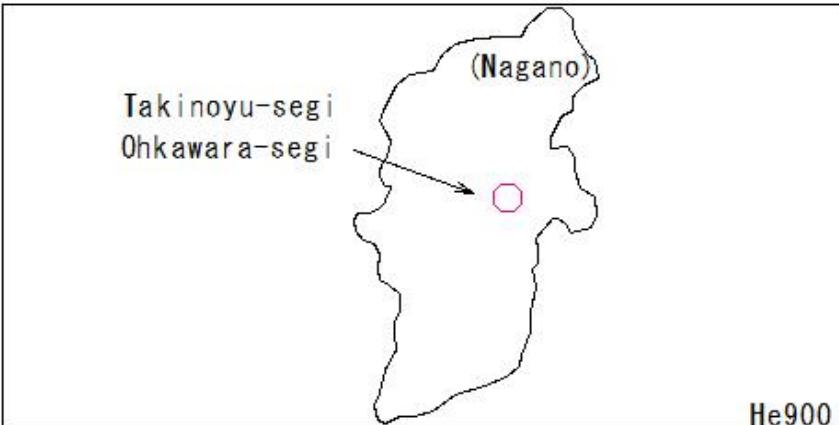
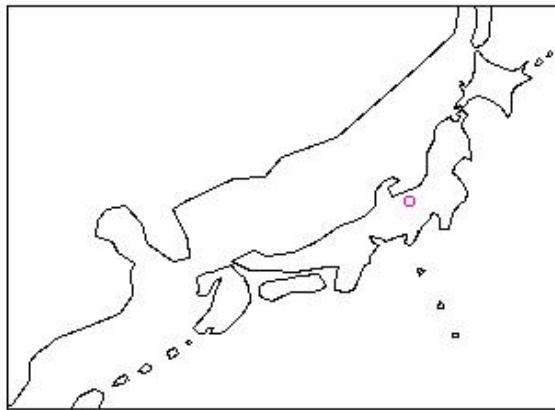
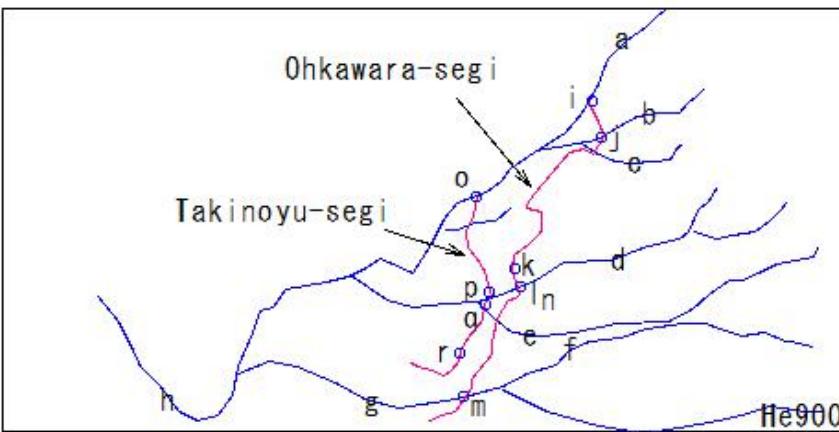
Okawara Weir: Year of Construction: 1792, Total Length: 14.4 km, Irrigated Area: 315 ha

- ① The "Kurikoshiseki" water system, planned by Yosen Sakamoto.
- ② connects multiple rivers flowing east and west with irrigation canals
- ③ sequentially transports surplus water from relatively high-flow rivers in the north to water-scarce areas in the south
- ④ along the route Irrigating agricultural land
- ⑤ For example, in areas with large elevation differences, an artificial waterfall is created as a drop structure.
- ⑥Kurikoshi-zeki (a waterway-based structure combining a river and a waterway)

(He900) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He900) Takinoyu-segi and Ohkawara-segi Irrigation System

a	Takinoyu River	j	Intersection with Maruoto River
b	Maruoto River	k	Stone-built Waterway
c	Yudachi River	l	Otome Falls
d	Shibukawa River	m	Otomitaki Falls
e	Kadonagawa River	n	Replenishment from Shibukawa
f	Naruiwa River	o	Takinoyu-segi Intake
g	Yanagawa River	p	Yugiri Falls
h	Kamikawa River	q	Waterway carved out of rock
i	Ohkawara-segi Intake	r	Statue of Sakamoto Yoson
			He900

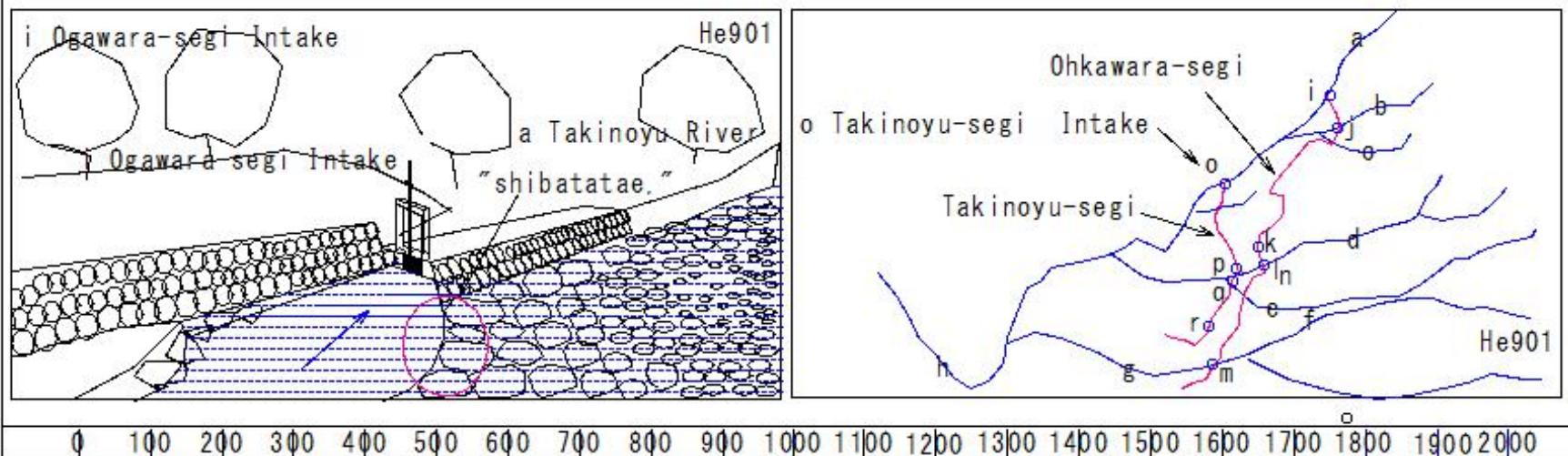


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(He901) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He901) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

- ① The intake structure from the Takinoyu River is called "shibatatae," and water is taken from the river by damming it with a small embankment made of wood and stone.
- ② The structure does not allow for the entire amount of water to be taken. Even today, it is maintained and maintained by the beneficiaries.
- ③ A structure almost identical to that at the time of excavation.
- ④ The water source is the Takinoyu River, which flows out of Mt. Tateshina.
- ⑤ The 10.4km Takinoyu-segi was completed in 1785, and the 12.5km Ogawara Weir was completed in 1792.



(He902) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

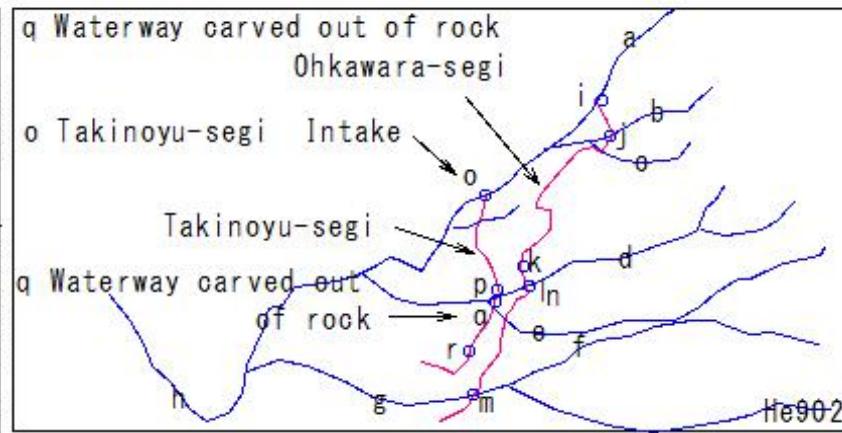
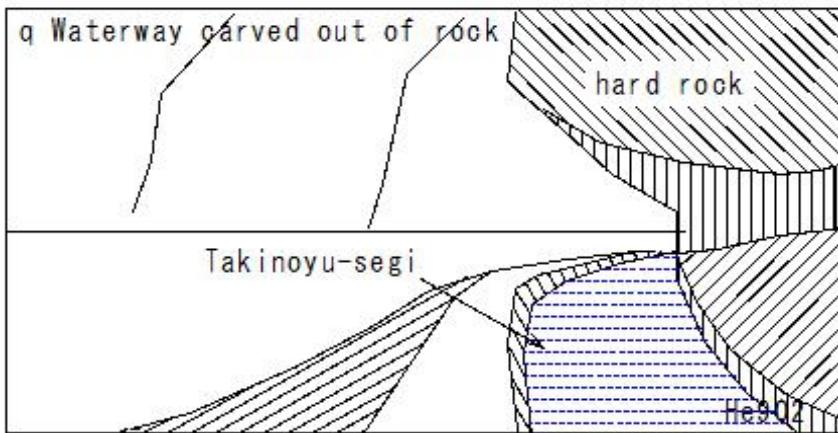
(He902) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

q Waterway carved out of rock

- ① On steep slopes along rivers, waterways are carved out of hard rock.
- ② and great effort is required to ensure a cross-section large enough for water to flow.

a Takinoyu River	j Intersection with Maruoto River
b Maruoto River	k Stone-built Waterway
c Yudachi River	l Otome Falls
d Shibukawa River	m Otomitaki Falls
e Kadonagawa River	n Replenishment from Shibukawa
f Naruiwa River	o Takinoyu-segi Intake
g Yanagawa River	p Yugiri Falls
h Kamikawa River	q Waterway carved out of rock
i Ohkawara-segi Intake	r Statue of Sakamoto Yoson

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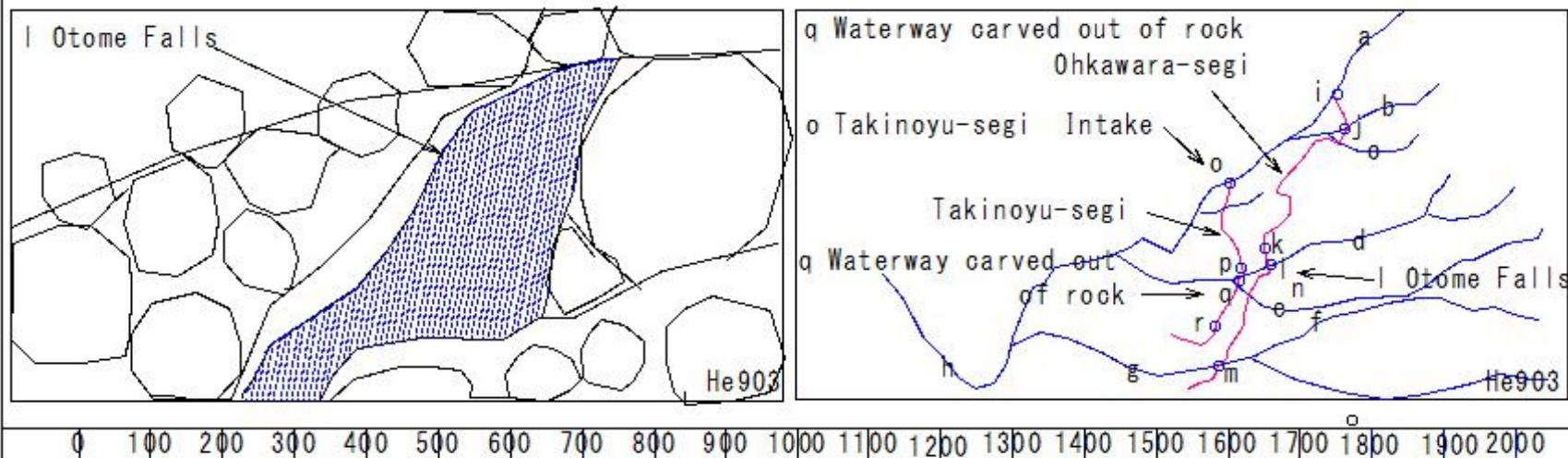
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(He903) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He903) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

I Otome Falls Artificial Waterfalls

- ① Both weirs have artificial waterfalls where they cross deep river valleys.
- ② They drop the water down the steep cliffs of the riverbanks in one gorge.
- ③ The reduced-energy, collected water is carried across an aqueduct.
- ④ The water is then conveyed downstream along with replenishment water from the river.
- ⑤ These unique structures make use of the natural topography.

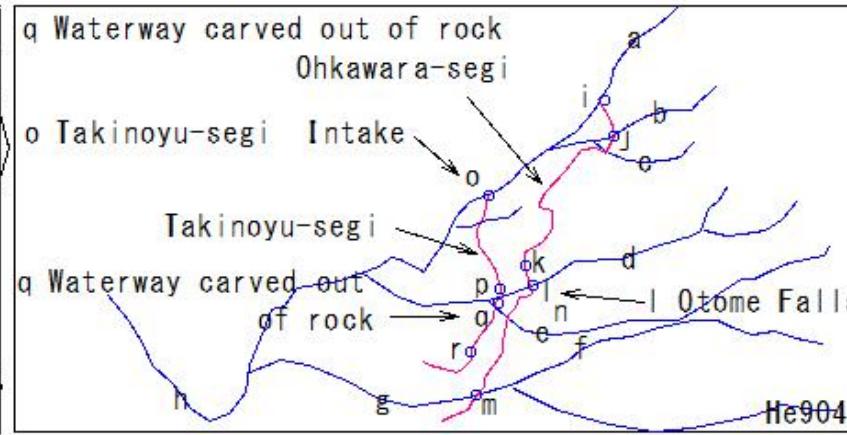
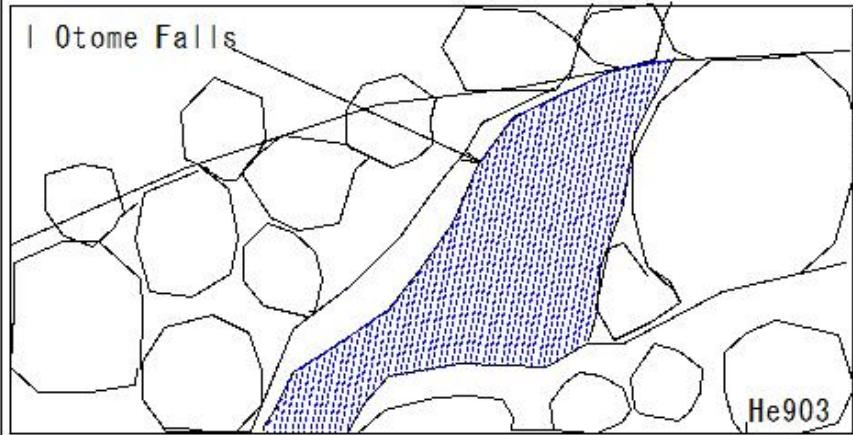
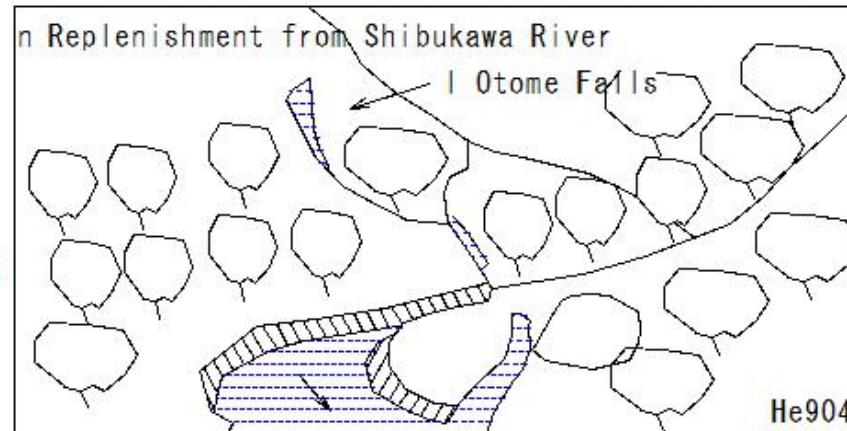


(He904) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He904) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

l Otome Falls Artificial Waterfalls
n Replenishment from Shibukawa River

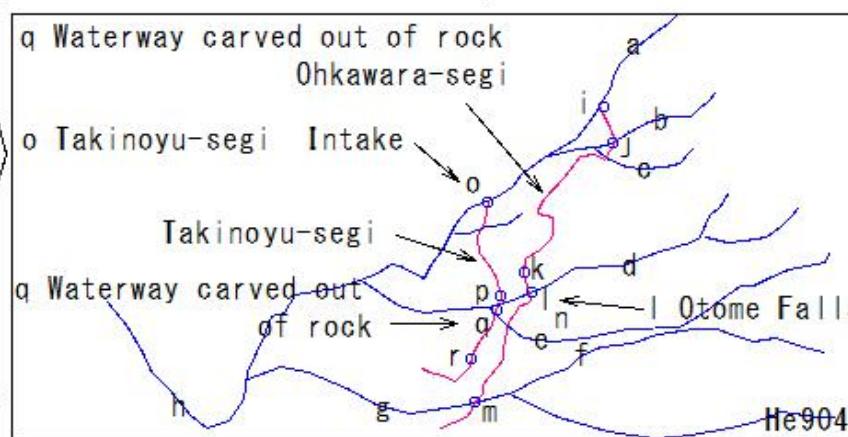
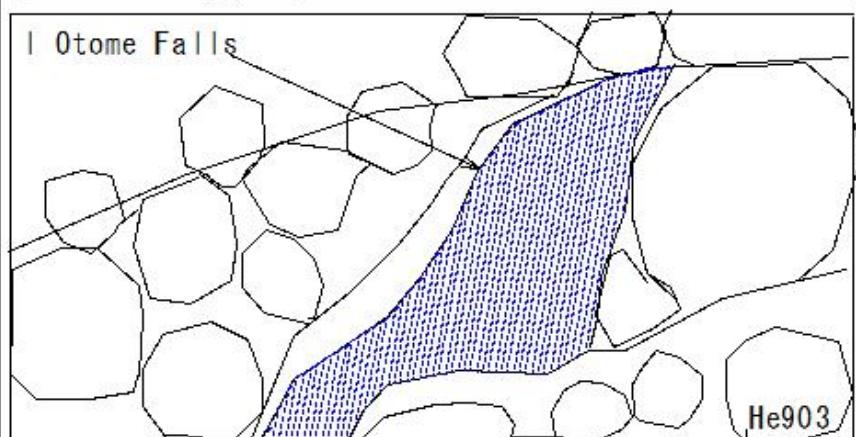
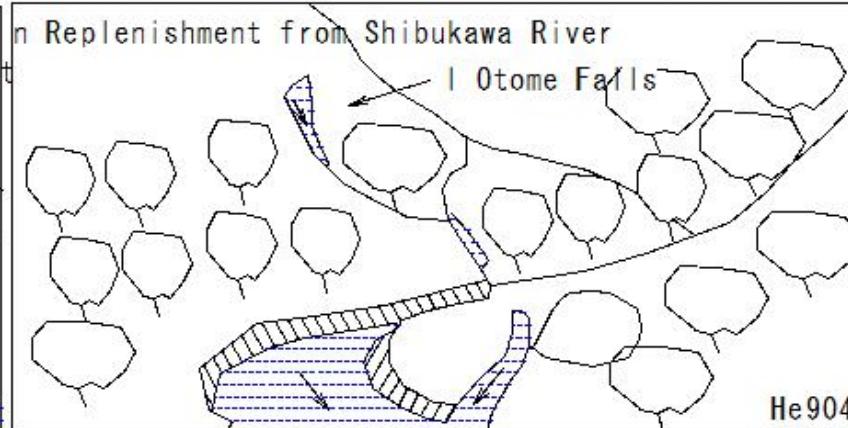
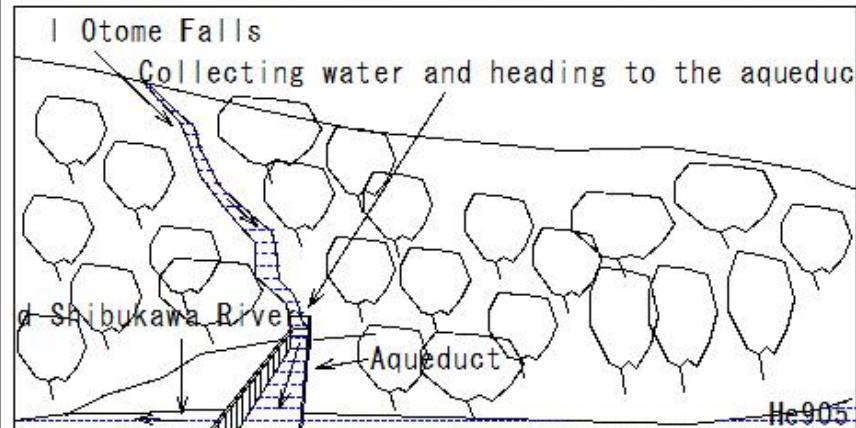
- ① Both weirs have artificial waterfalls where they cross deep river valleys.
- ② They drop the water down the steep cliffs of the riverbanks in one gorge.
- ③ The reduced-energy, collected water is carried across an aqueduct.
- ④ The water is then conveyed downstream along with replenishment water from the river.



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(He905) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He905) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)



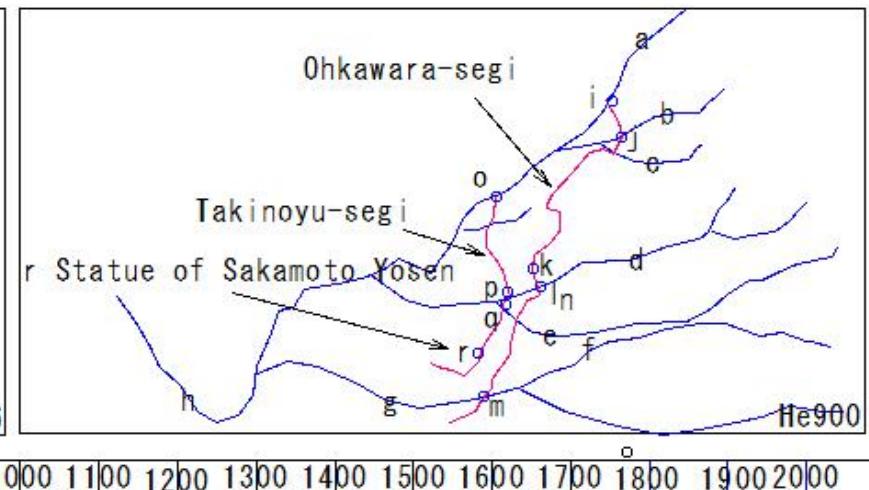
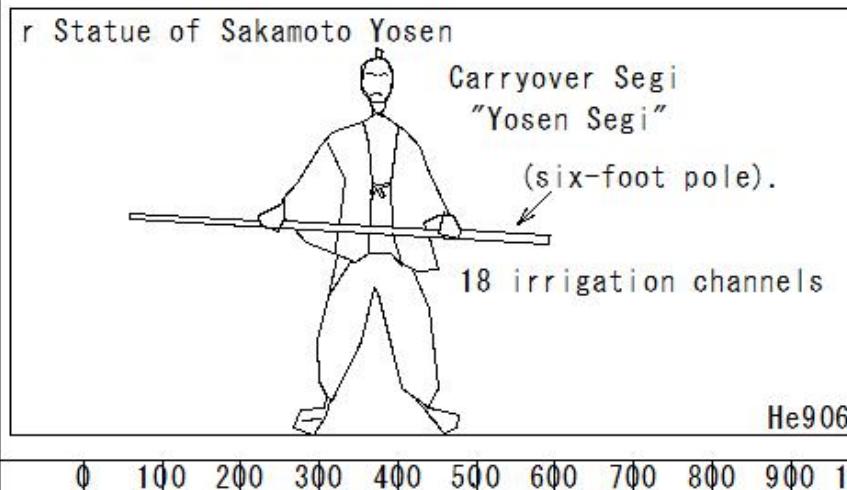
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(He906) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He906) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Sakamoto Yosen r Statue of Sakamoto Yosen

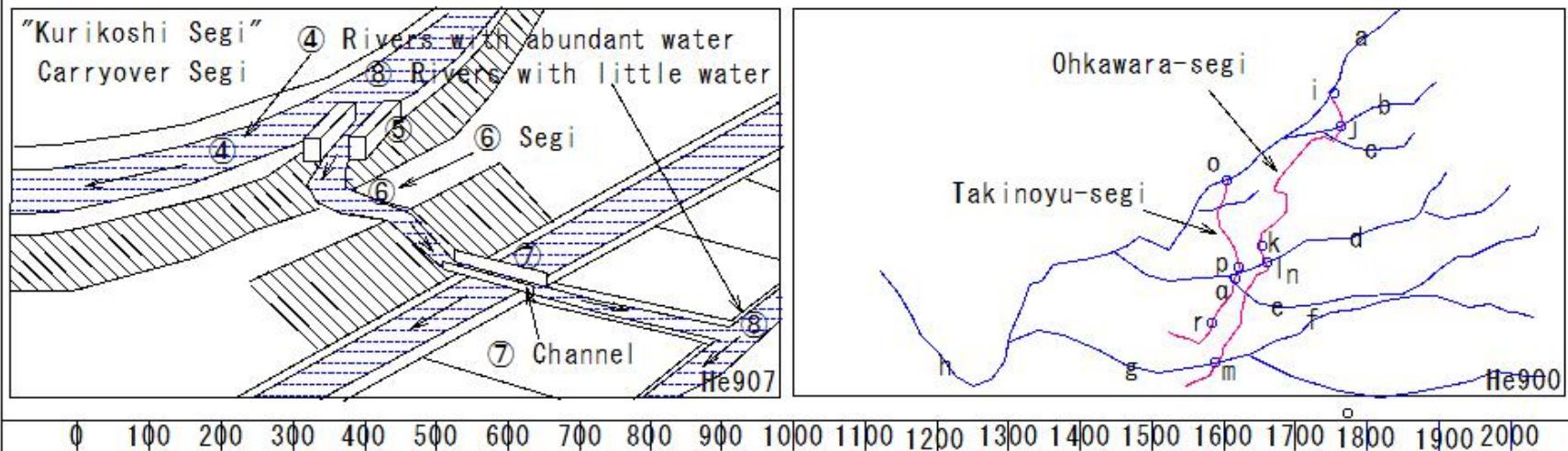
- ① Sakamoto Yosen was born in 1736 in Suwa Tazawa Village (present-day Miyagawa, Chino City).
- ② He spent over 40 years building irrigation channels in the Suwa Domain, centered around present-day Chino City and Hara Village.
- ③ He built over 18 irrigation channels.
- ④ He is known as a "Yosen Segi"
- ⑤ He is holding a "rokushaku bo" (six-foot pole).
- ⑥ It is six feet (1.8 meters) long.
- ⑦ He uses this pole to check whether the width of the seki is six feet.



(He907) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He907) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

- ① A "Kurikoshi Segi" is a system that connects multiple rivers flowing east to west with an irrigation canal.
- ② By sequentially sending surplus water from relatively high-flow rivers such as the Takinoyu River and Shibukawa River in the north to water-scarce areas in the south,
- ③ it irrigates farmland along the canal.
- ④ Rivers with abundant water ⑤ Intake ⑥ Segi ⑦ Channel ⑧ Rivers with little water



(He908) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He908) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

A gutter that crosses a river

- ① In wide areas, a "ditch" is used.
- ② A bridge that carries water is used.
- ③ Channel

A gutter that crosses a river

① Channel

② River

③ Bridge

④ River

⑤ River

⑥ River

⑦ River

⑧ River

⑨ River

⑩ River

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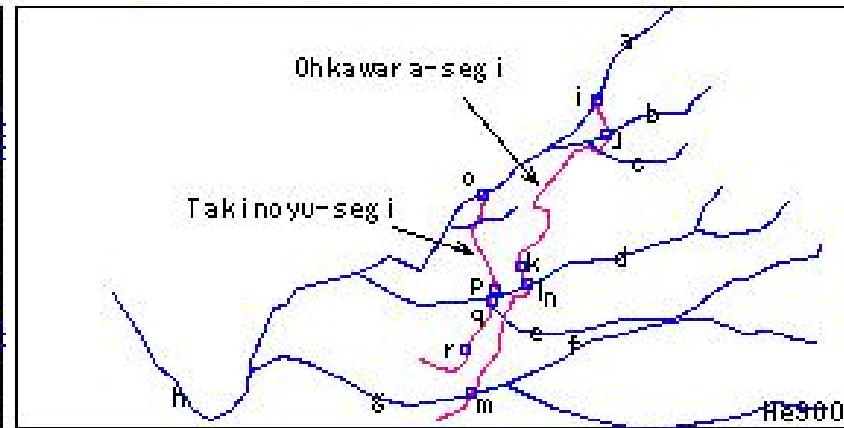
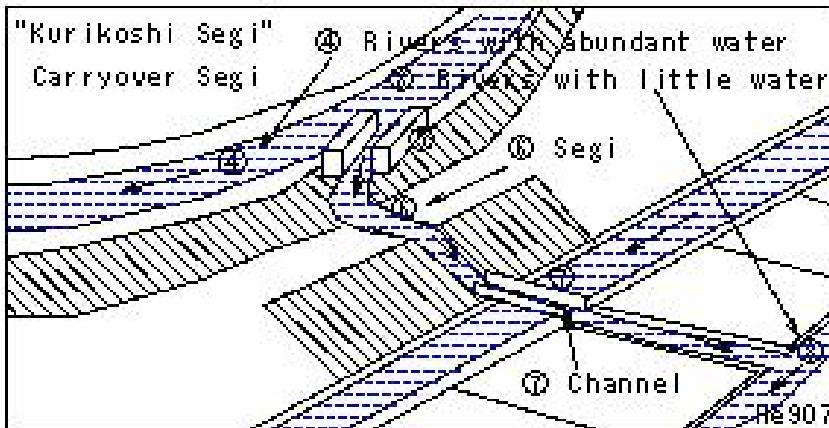
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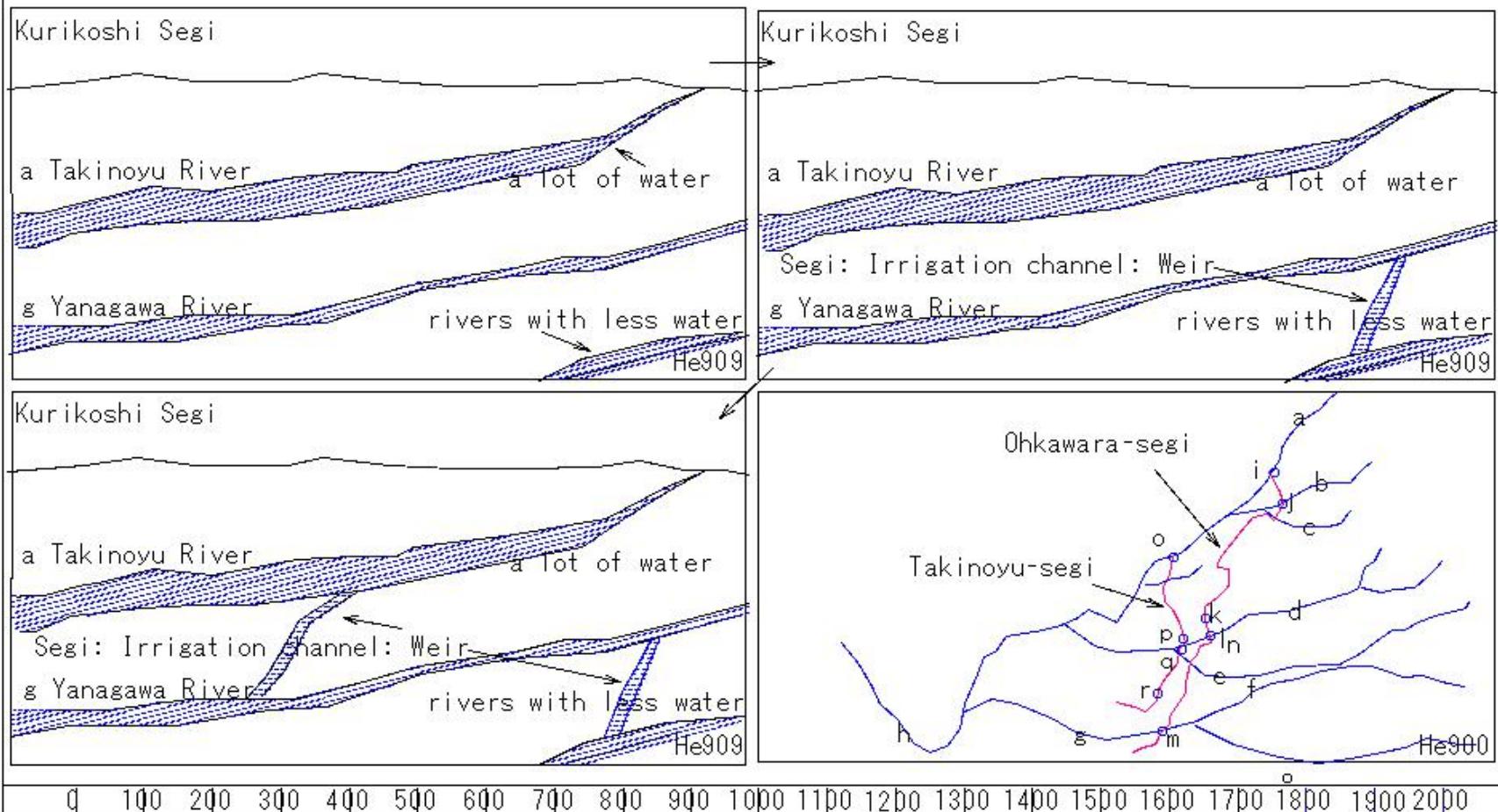


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(He909) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He909) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

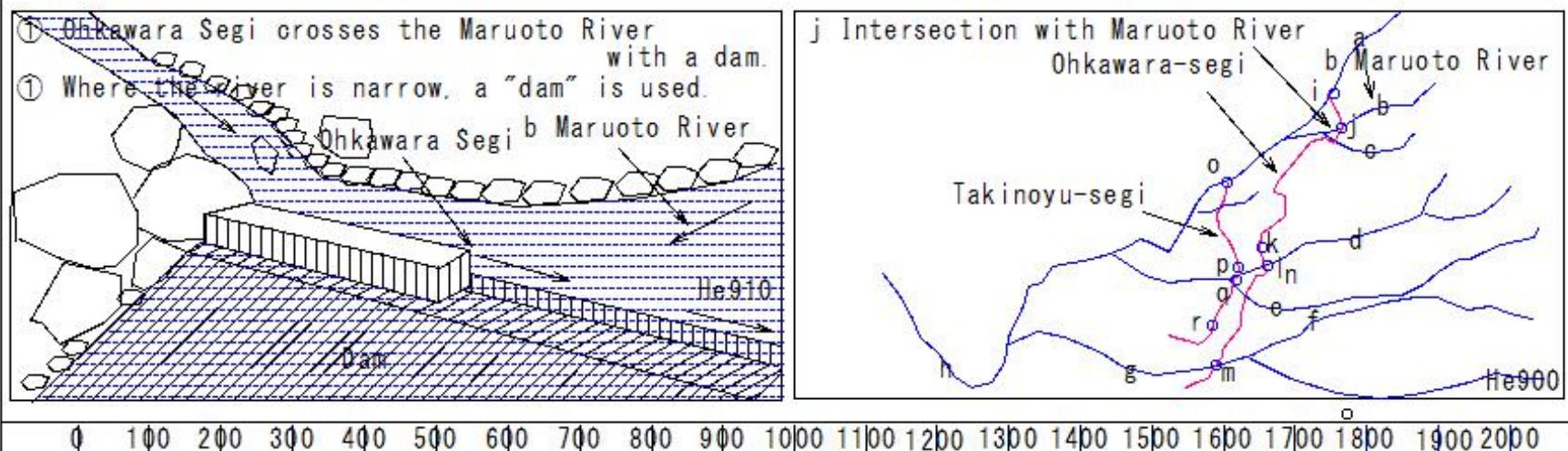


(He910) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He910) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

A strait crossing a natural river.

- ① Where the river is narrow, a "dam" is used.
- ② Where the river is wide, a bridge called a "toi" is used to allow water to pass through.
- ③ Ichinose Segi, Tsubonohata Segi, Yanagawa, Mimura Segi crosses the Yumifuri River using a system called a "siphon."

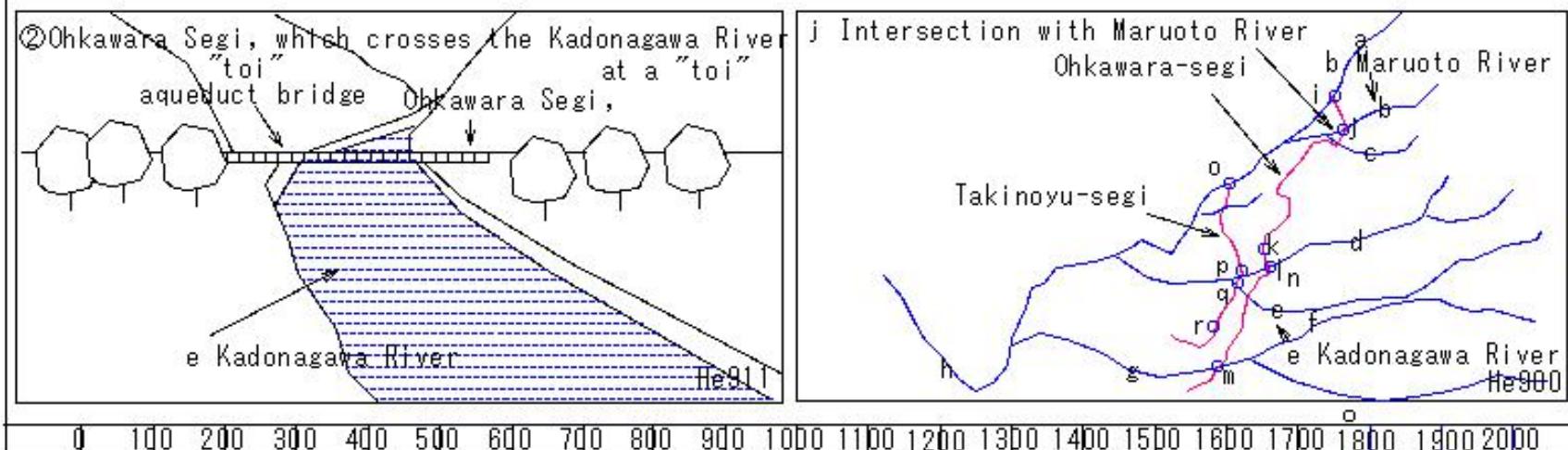


(He911) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He911) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

A strait crossing a natural river.

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- ③ Ichinose Segi, Tsubonohata Segi, Yanagawa. Mimura Segi crosses the Yumifuri River using a system called a "siphon."

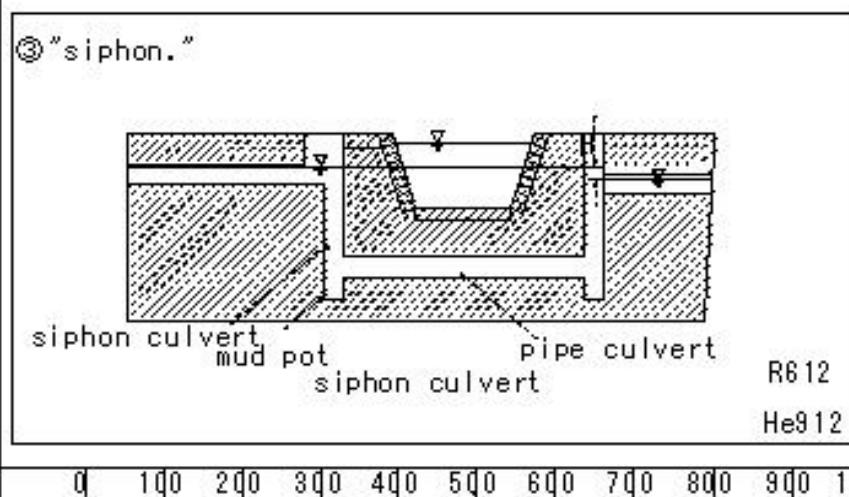
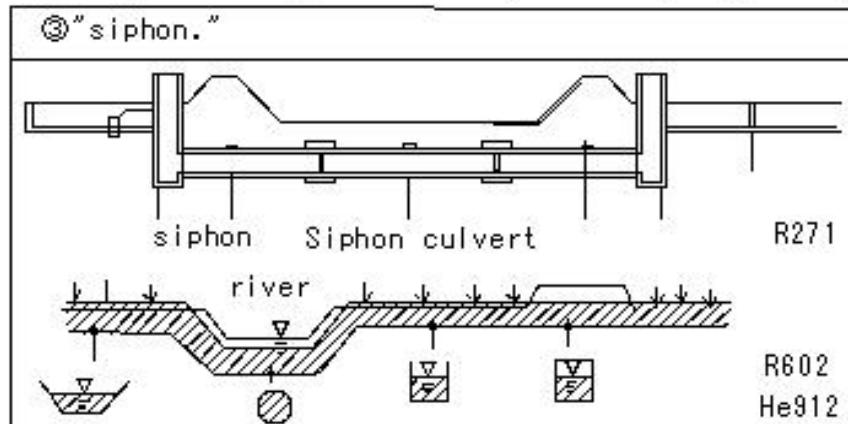


(He912) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He912) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

A strait crossing a natural river.

- ① Where the river is narrow, a "dam" is used.
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- ③ Ichinose Segi, Tsubonohata Segi, Yanagawa.
Mimura Segi crosses the Yumifuri River using a system called a "siphon."

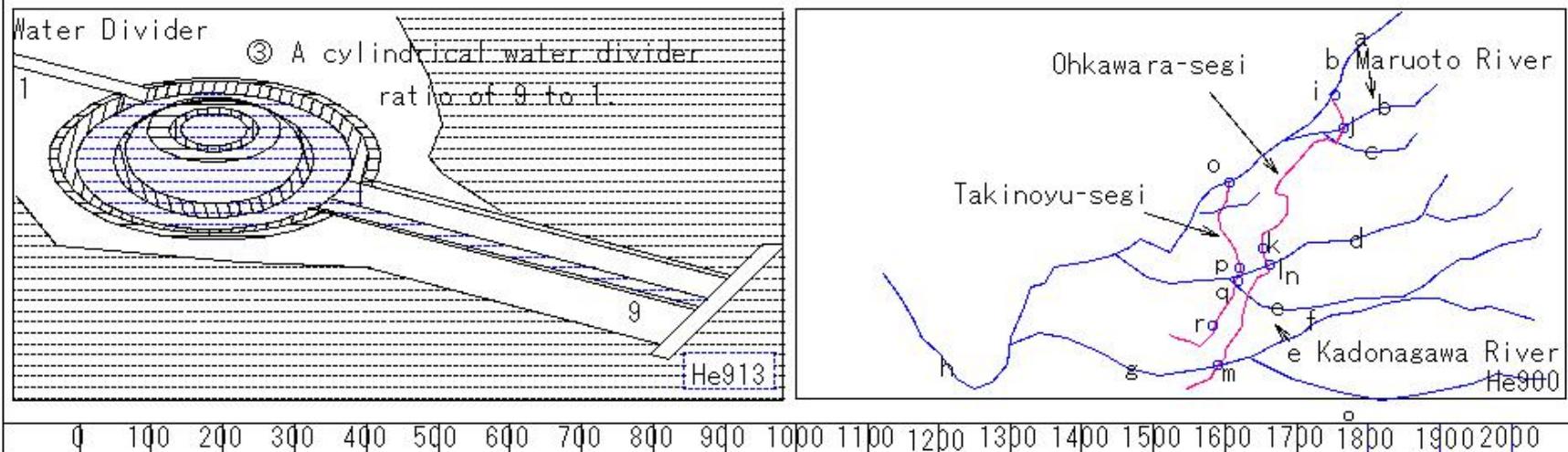


(He913) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He913) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Water Divider

- ③ A cylindrical water divider that divides water at a ratio of 9 to 1.
- ① Water drawn through the segishi was divided among several villages to irrigate their rice fields.
- ② The amount of water allocated to each village determined how much rice each village could produce,
- ③ it was a very important matter for each village.
- ④ A method for properly dividing the designated amount of water was devised and
is still in use today.

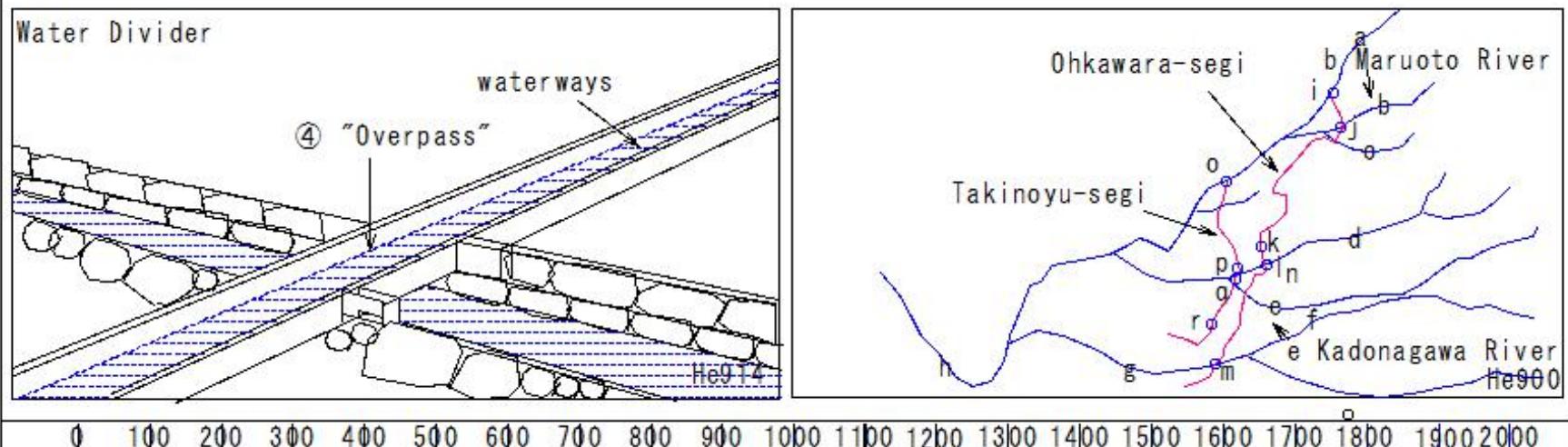


(He914) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He914) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Water Divider

- ④ "Overpass"
- ⑤ On the other hand, some segis do not share their water with other villages from start to finish.
- ⑥ The Tachibana River Otokoto Segi and Sengazawa Shin Segi (Koroku Segi) have "overpasses" between their waterways to prevent the water from mixing.



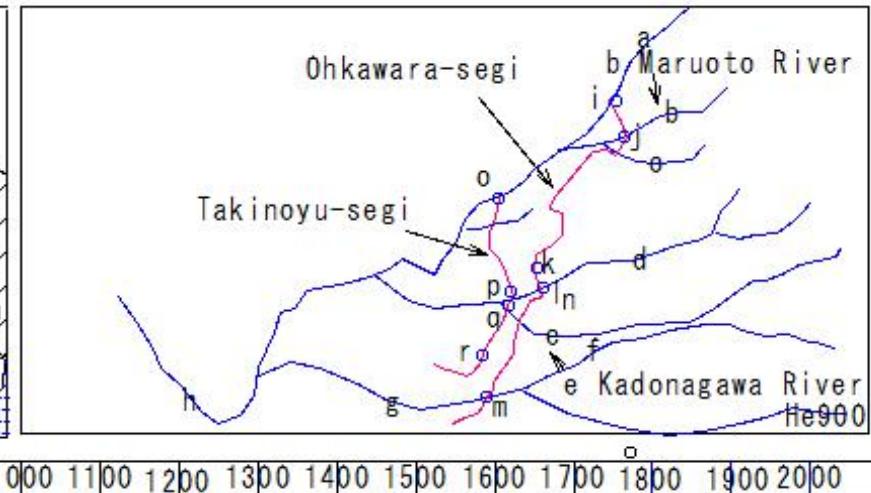
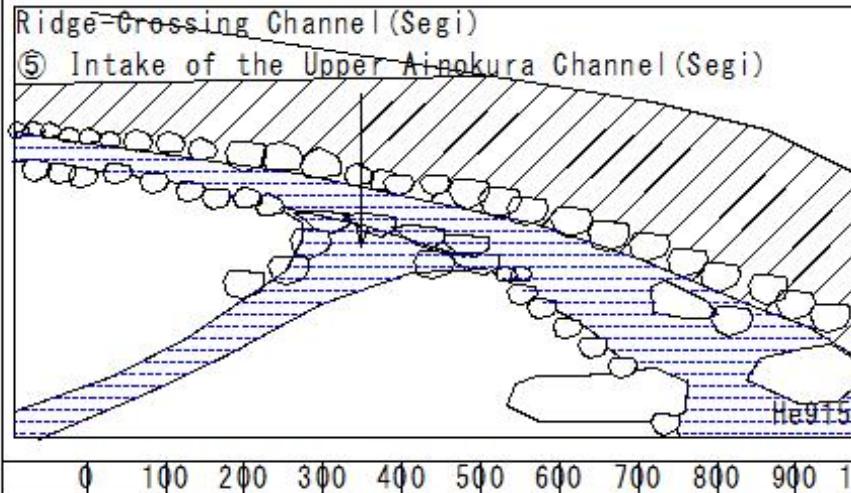
(He915) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He915) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Ridge-Crossing Channel (Segi)

⑤ Intake of the Upper Ainokura Channel (Segi)

- ① There are several feeder channels (Segi) in the area from Kirigamine toward Yonezawa in Chino City.
- ② These are the Upper Ainokura Channel (Segi), the Lower Ainokura Channel (Segi), and the Ainokura Channel (Segi) (Nemurikubo Channel (Segi)).
- ③ These channels (Segi) were built to increase water in the Chino Yokokawa River and channel (Segi) it to Fumonji Temple and Kuwahara in Shika, Suwa City.

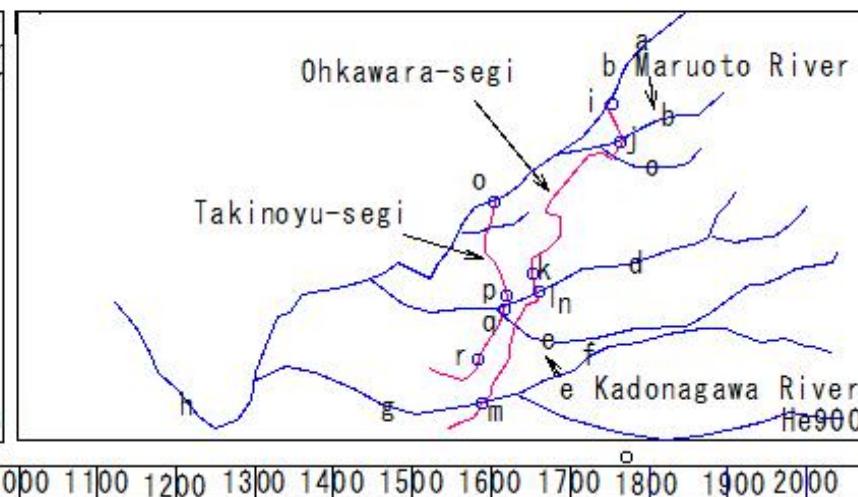
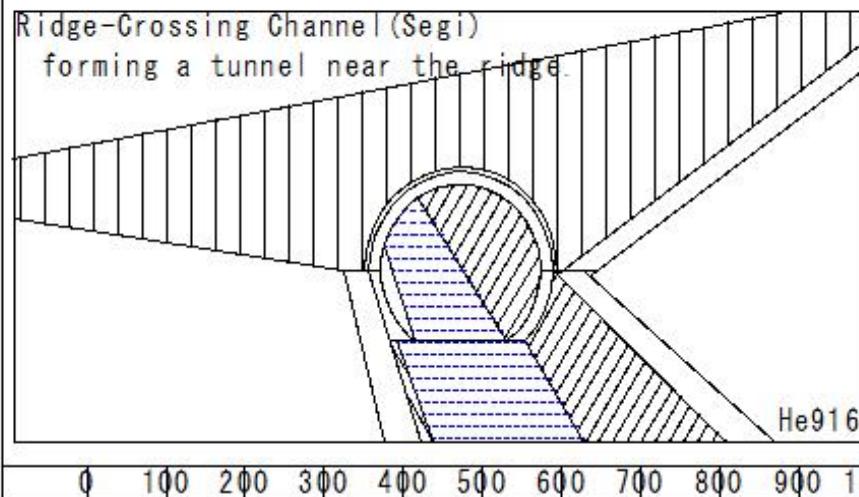


(He916) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He916) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Ridge-Crossing Channel (Segi)

- ⑥ Streamwater crossing the ridge through a tunnel
- ④ Until it crosses the ridge, the stream flows gently along the contour lines, then turns into a tunnel near the ridge.



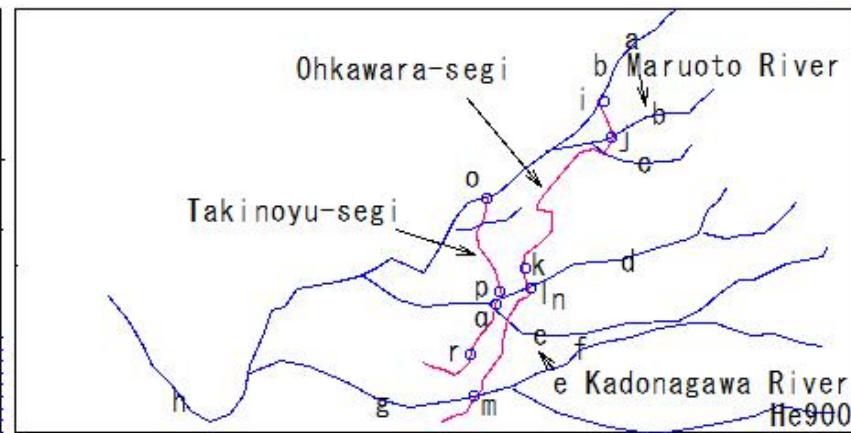
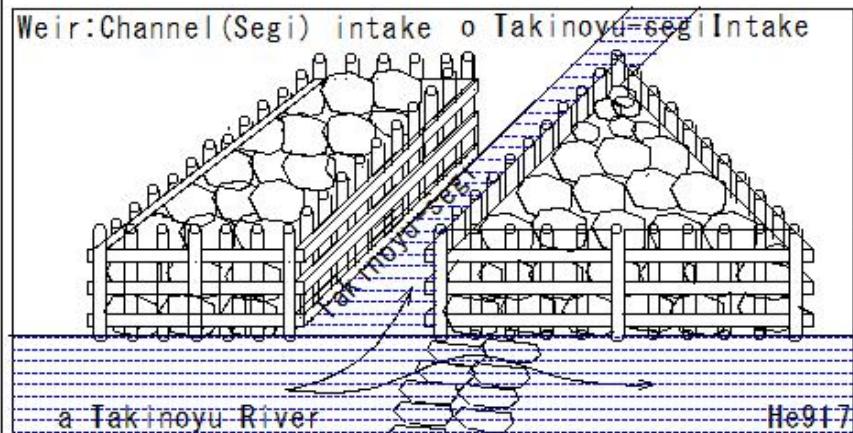
(He917) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He917) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Weir:Channel(Segi) intake
o Takinoyu-segi Intake
a Takinoyu River

a Takinoyu River	j Intersection with Maruoto River
b Maruoto River	k Stone-built Waterway
c Yudachi River	l Otome Falls
d Shibukawa River	m Otomitaki Falls
e Kadonagawa River	n Replenishment from Shibukawa
f Naruiwa River	o Takinoyu-segi Intake
g Yanagawa River	p Yugiri Falls
h Kamikawa River	q Waterway carved out of rock
i Ogawara-segi Intake	r Statue of Sakamoto Yosan

He900



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(He918) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

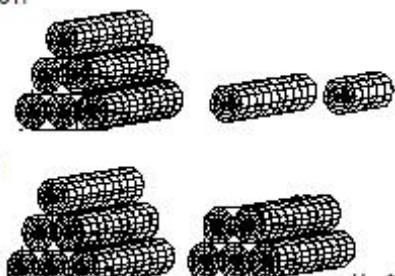
(He918) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Major Segi in the Suwa Region and Changes in Yield

① Serigasawa: Takinoyu Segi

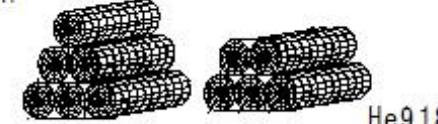
Before Segi Construction

150 koku



After Segi Construction

220 koku



Major Segi in the Suwa Region and Changes in Yield

② Nakamichi: Naruiwa Segi

Before Segi Construction

130 koku



After Segi Construction

210 koku

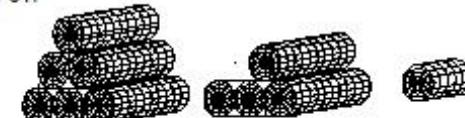


Major Segi in the Suwa Region and Changes in Yield

③ Anayama: Ohgawara Segi

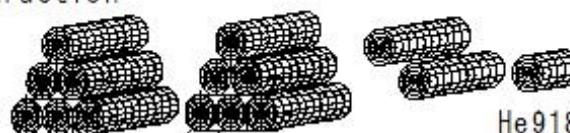
Before Segi Construction

210 koku



After Segi Construction

290 koku



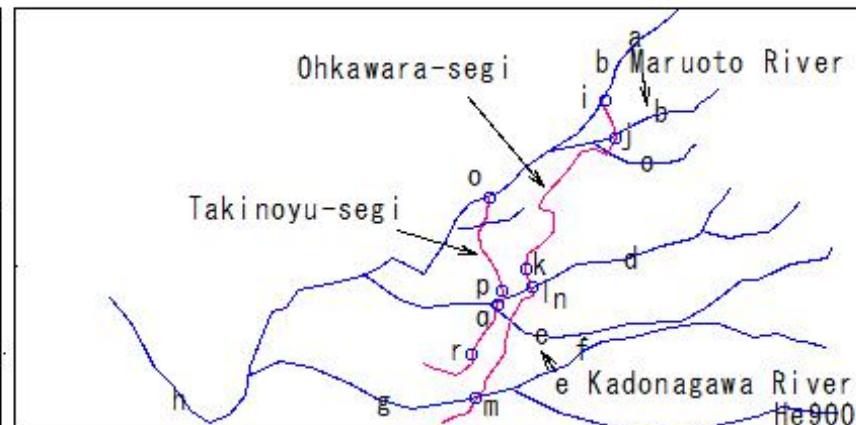
Major Segi in the Suwa Region and Changes in Yield

Ohkawara-segi

Maruoto River

Takinoyu-segi

Kadonagawa River



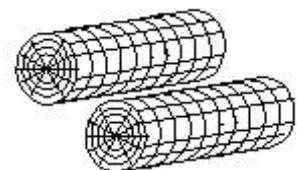
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(He919) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

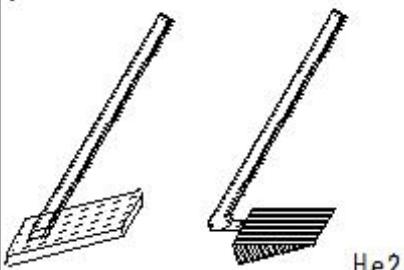
(He919) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

Making a segi

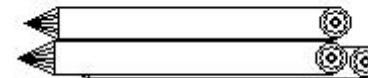
Rice straw



Hoe



Wooden stake

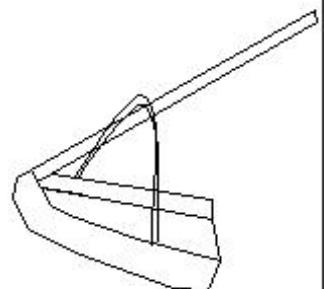


Satomi

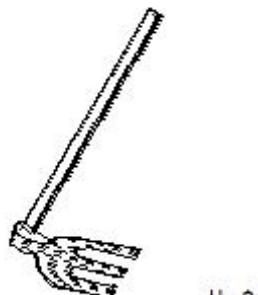


He373

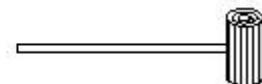
Joren



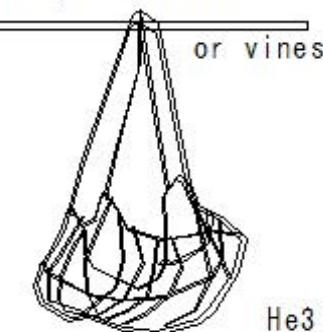
Hoe



Wood Hammer



Mokko
woven rope, bamboo,
or vines



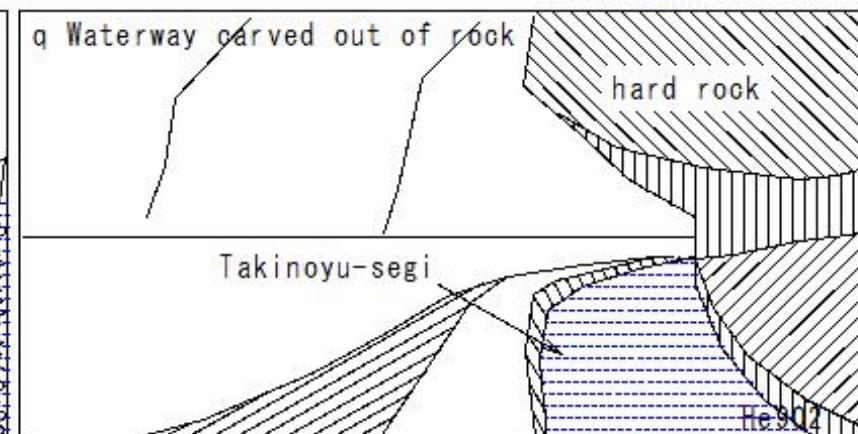
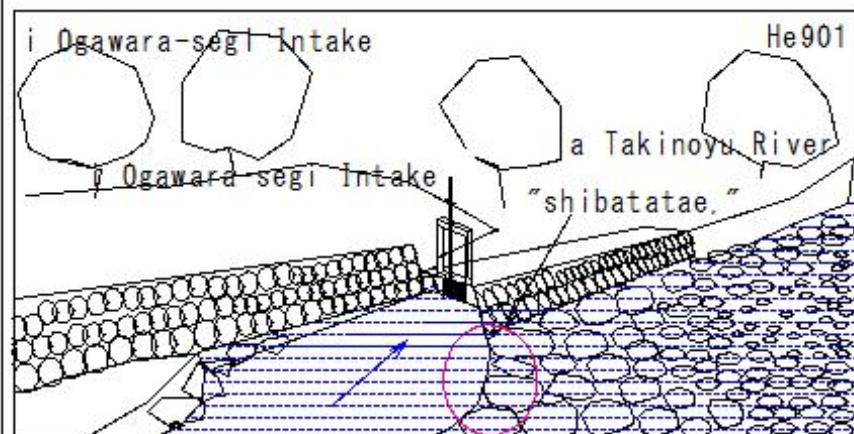
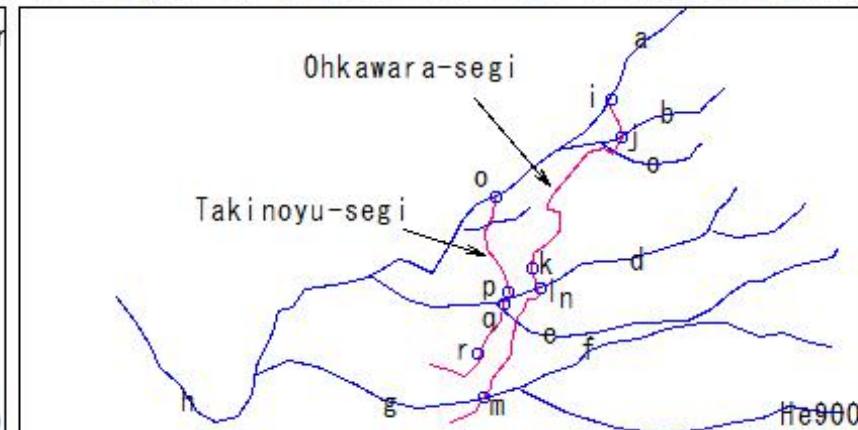
He3

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He920) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He920) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

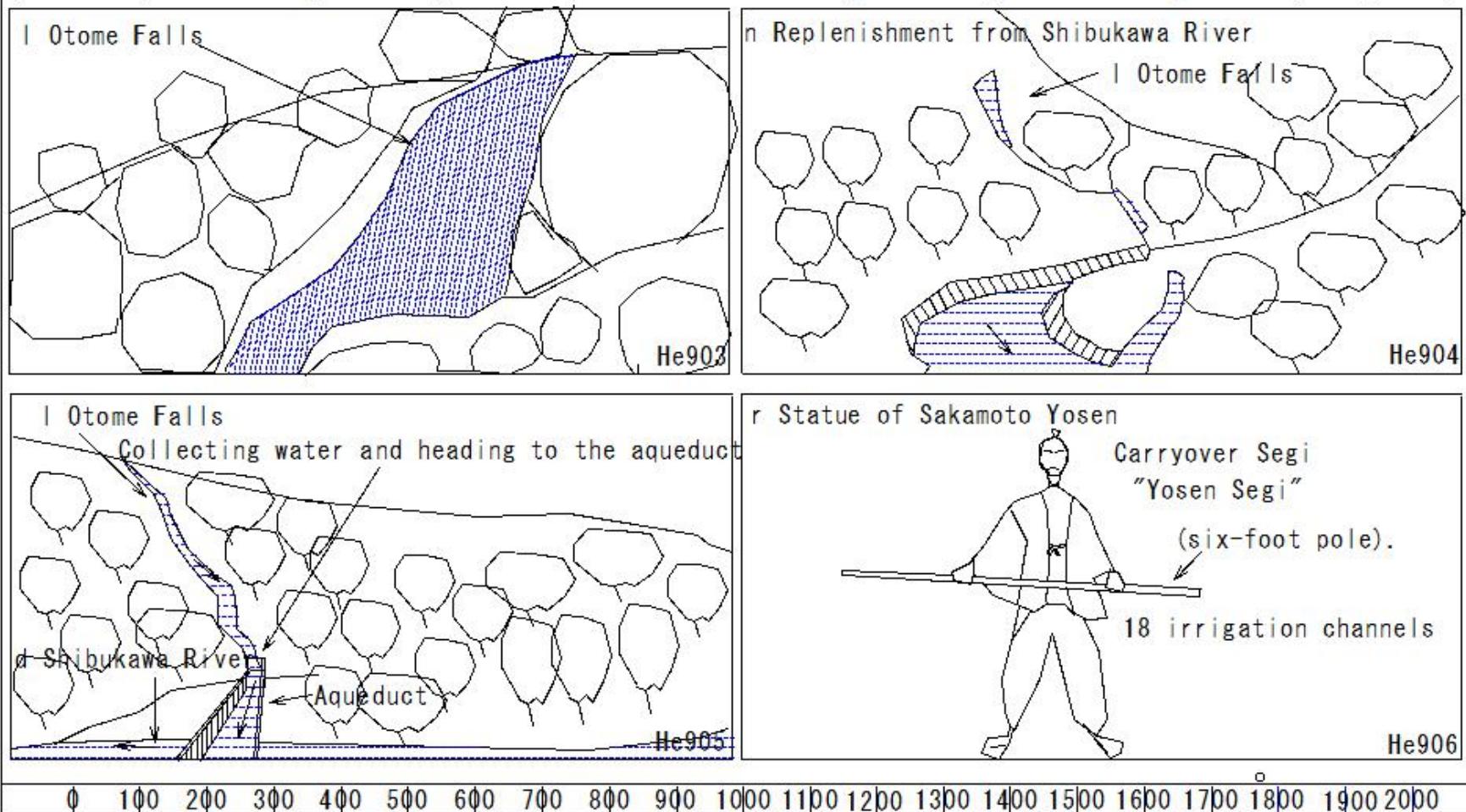
a Takinoyu River j Intersection with Maruoto River
 b Maruoto River k Stone-built Waterway
 c Yudachi River l Otome Falls
 d Shibukawa River m Otomitaki Falls River
 e Kadonagawa River n Replenishment from Shibukawa
 f Naruiwa River o Takinoyu-segi Intake
 g Yanagawa River p Yugiri Falls
 h Kamikawa River q Waterway carved out of rock
 i Ohkawara-segi r Statue of Sakamoto Yosen
 He900



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

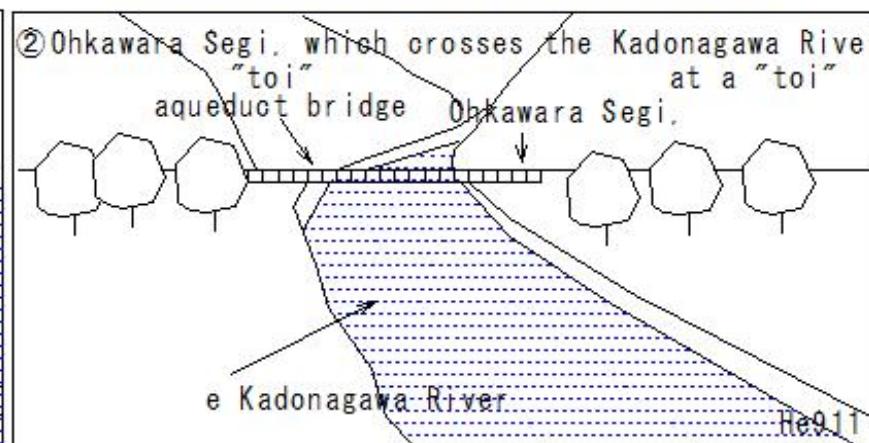
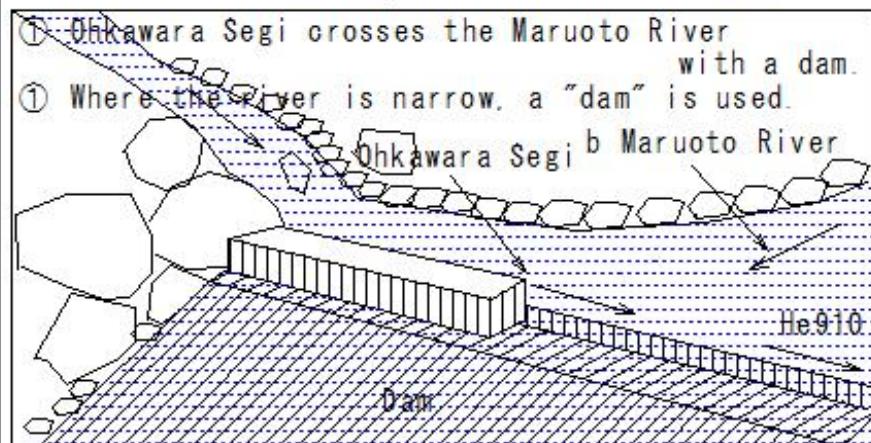
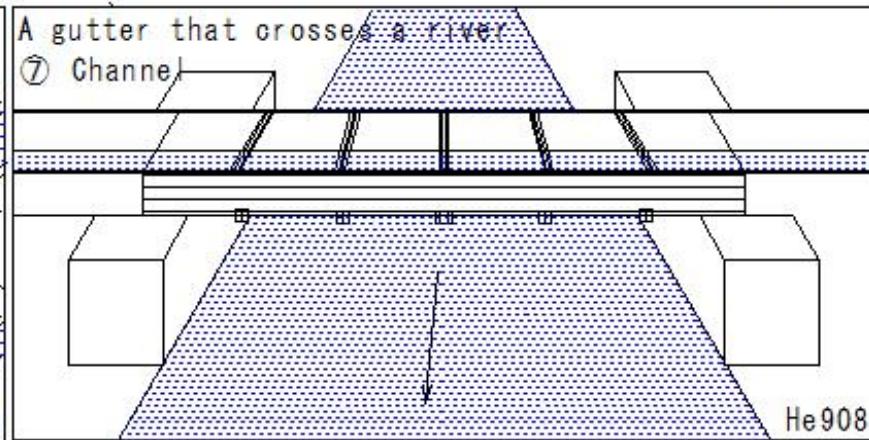
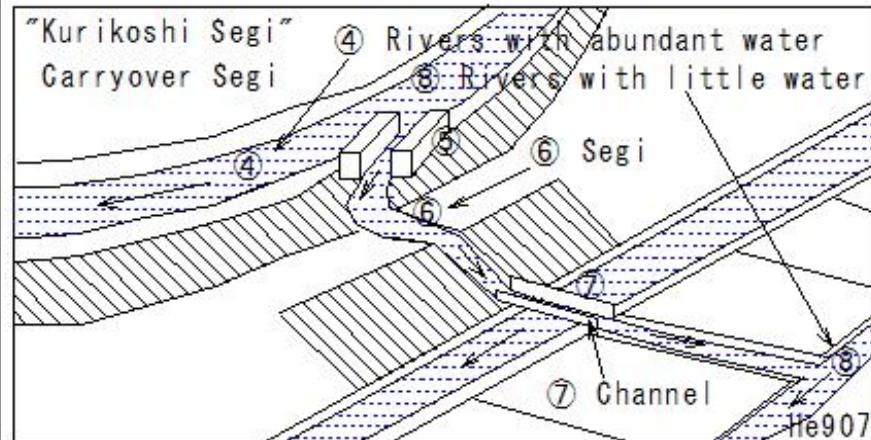
(He921) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He921) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)



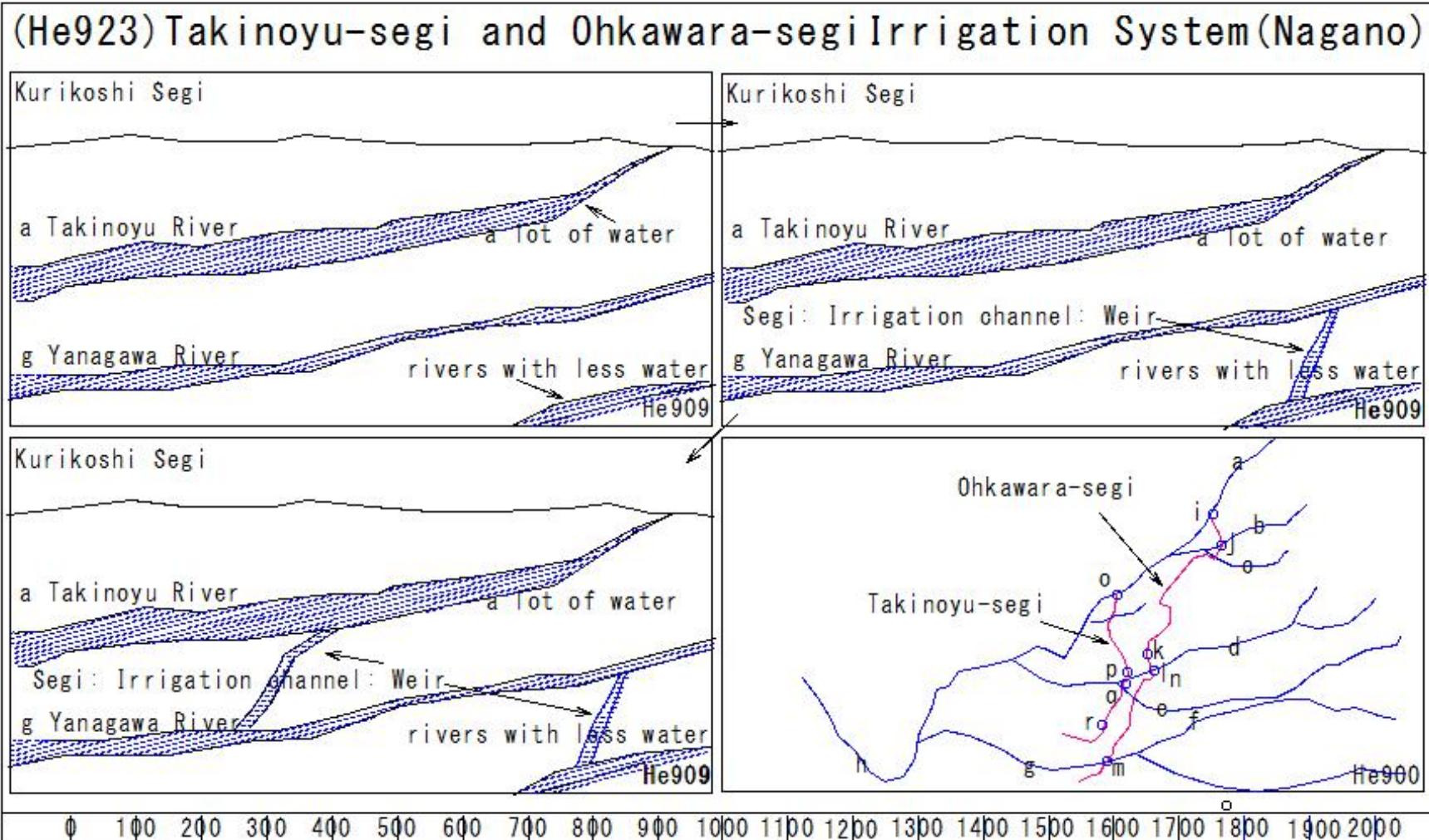
(He922) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He922) Takinoyu-segi and Ohkawara-segi Irrigation System (Nagano)



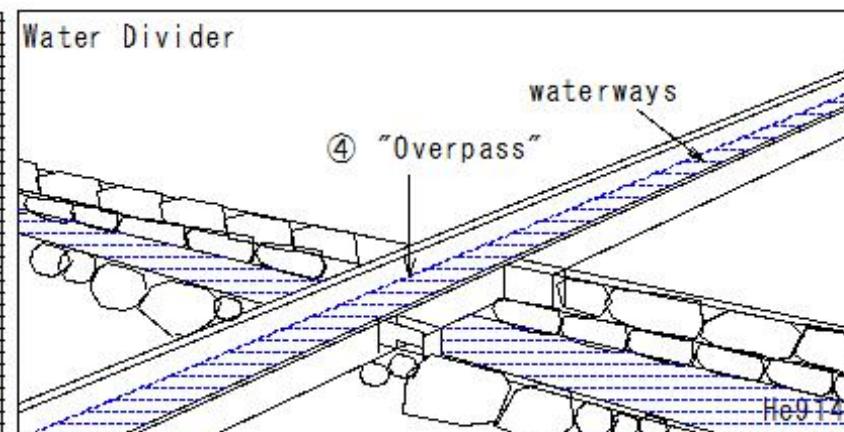
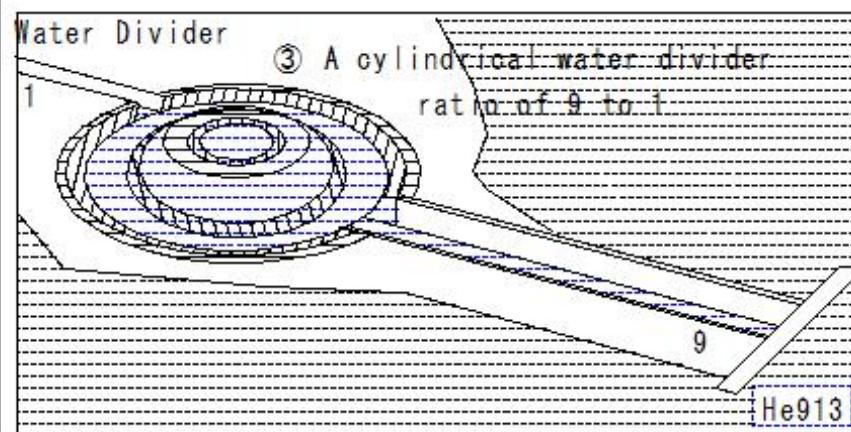
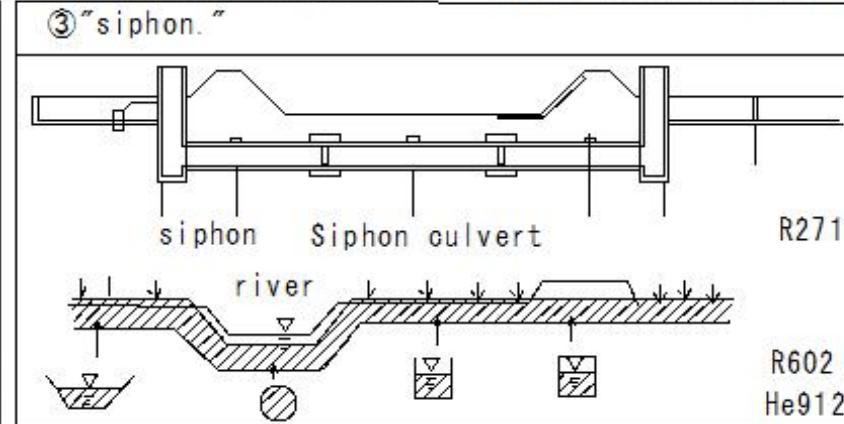
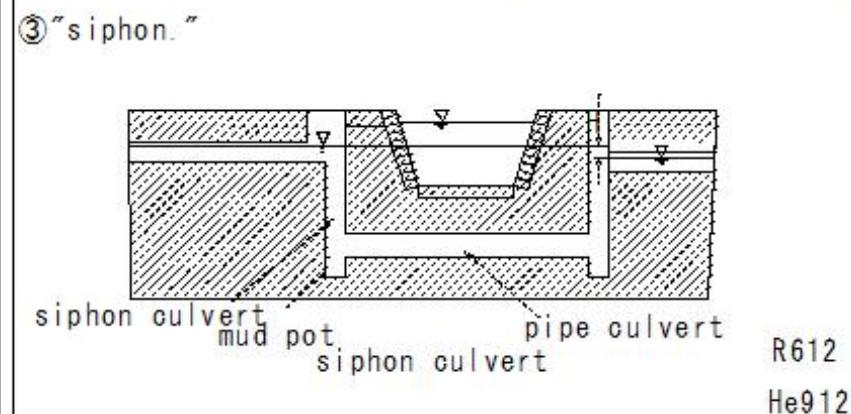
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(He923) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)



(He924) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

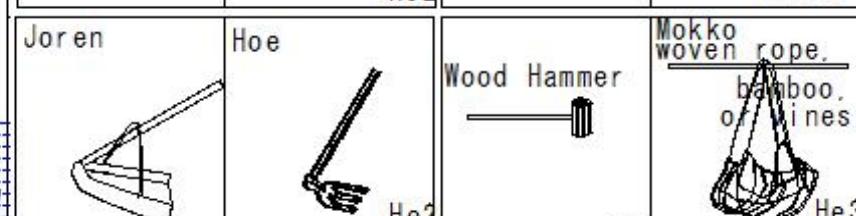
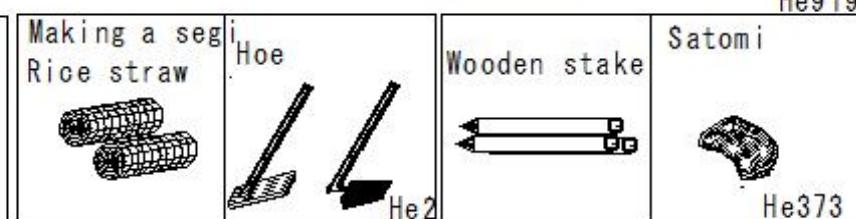
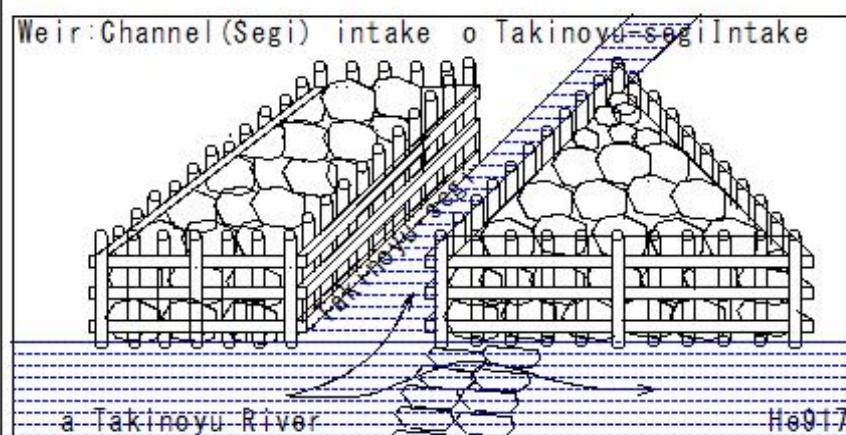
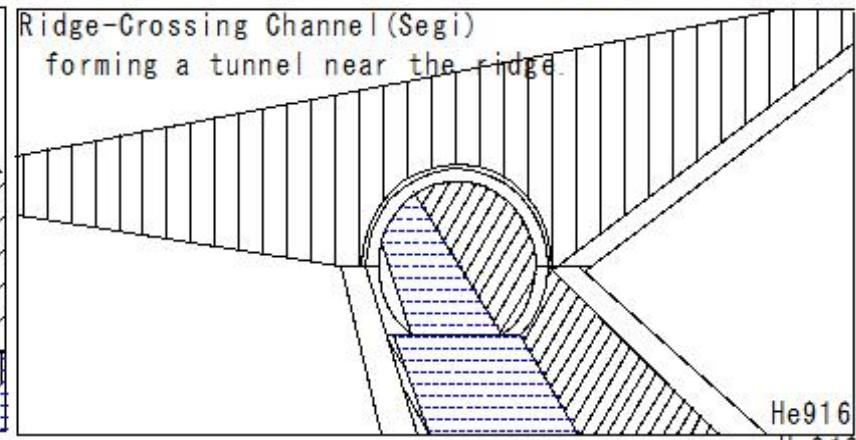
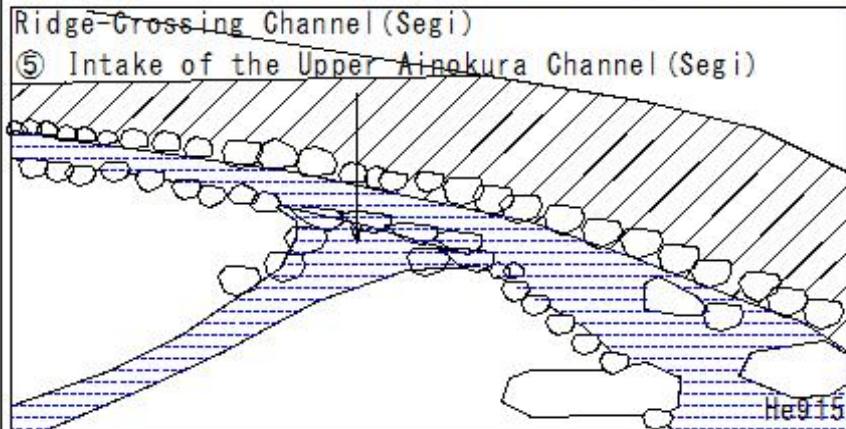
(He924) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)



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(He925) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

(He925) Takinoyu-segi and Ohkawara-segi Irrigation System(Nagano)

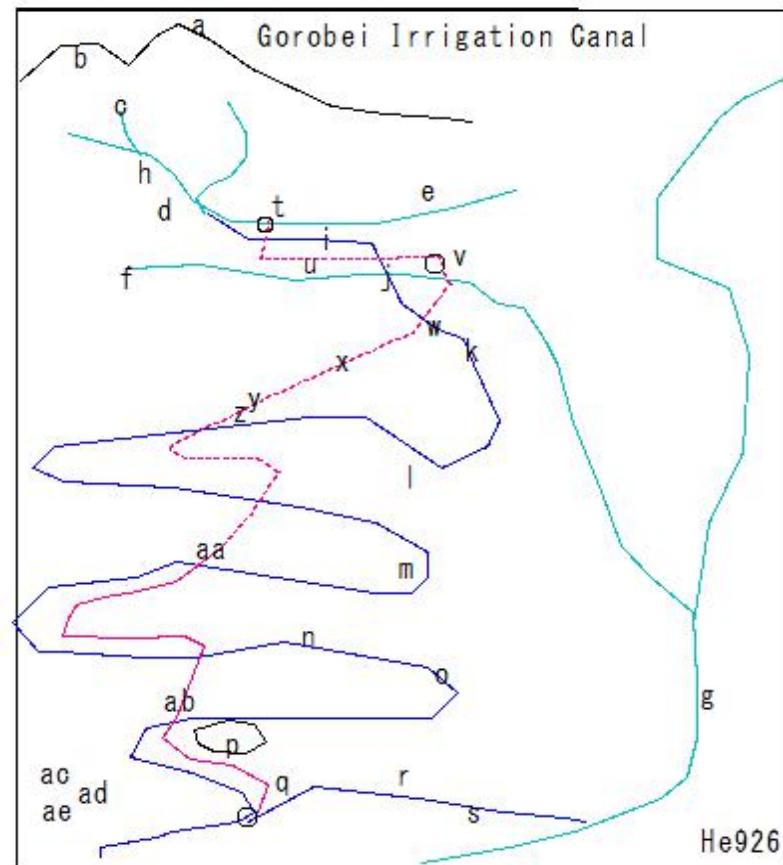


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(He926)Gorobe Irrigation Canal(Nagano)

(He926) Gorobe Irrigation Canal (Nagano)

Gorobei Irrigation Canal	r Tsukisegi
a Mt. Tateshina (2,530 m)	s Shimohara Plateau
b Mt. Futago	t Asakana Headworks (Rubber Weir)
c Spring	u Katakura Tunnel
d Former Water Intake	v Fuse Diversion
e Kakumagawa River	w Fuse Siphon
f Fuse River	x Kurinokizaka Tunnel
g Chikuma River	y Kurinokizaka Rapids
h Iwashita River (Hosokoji River)	z Gorobei Irrigation Canal Power Plant
i Katakura Canal	aa Yajima Tunnel
j Kaketoi (aqueduct)	ab Hosenji Tunnel
k Hyakuzawa Canal	ac Gorobei Memorial Hall
l Remains of Yawata Seireijo (Regulatory Office)	ad Cherry Blossoms of the Barrier
m Yajima Castle Ruins	ae Machiya Shrine
n Large Embankment	New Waterway
o Misaka Canal	Gorobei Irrigation Canal
p Large Pond	Old Waterway
q Kamihara Plateau	



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(He927)Gorobe Irrigation Canal(Nagano)

(He927) Gorobe Irrigation Canal (Nagano)

- ① The Gorobei Irrigation Canal is an irrigation canal that flows through Saku City, Nagano Prefecture (formerly the village of Gorobei Shinden).
- ② It was excavated and completed around 1631 (the 8th year of the Edo period) by Ichikawa Gorobei Masachika as part of the development of new rice fields.
- ③ Gorobei Shinden, located on a plateau 640 meters above sea level, was once a barren area with little water.
- ④ Ichikawa Gorobei dug a tunnel through Mt. Katakura, which crossed several mountains,
- ⑤ It draws approximately 20 kilometers of water from the Yuzawa River (now the Kamakuri River).
- ⑥ The canal was developed in the early Edo period, and then extensive renovations were carried out during the Showa period, bringing prosperity to the area.

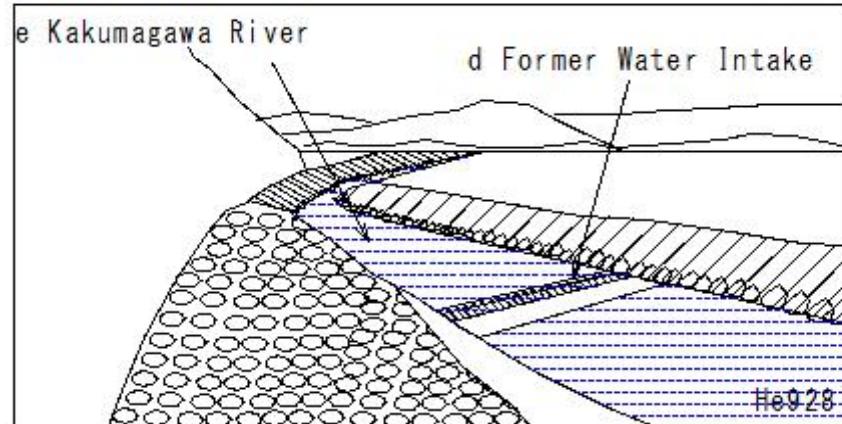
(He928)Gorobe Irrigation Canal(Nagano)

(He928) Gorobe Irrigation Canal (Nagano)

Former Gorobei Irrigation Canal Intake Dam

- ① Intake of Gorobei Irrigation Canal
 - ② Kakumagawa River, Kyowa, Saku City, Nagano Prefecture
 - ③ Upstream of the current intake dam
 - ④ The old intake dam, a masonry dam, was located here.
- d Former Water Intake
e Kakumagawa River

He928



Gorobei Irrigation Canal

e Kakumagawa River

d Former Water Intake

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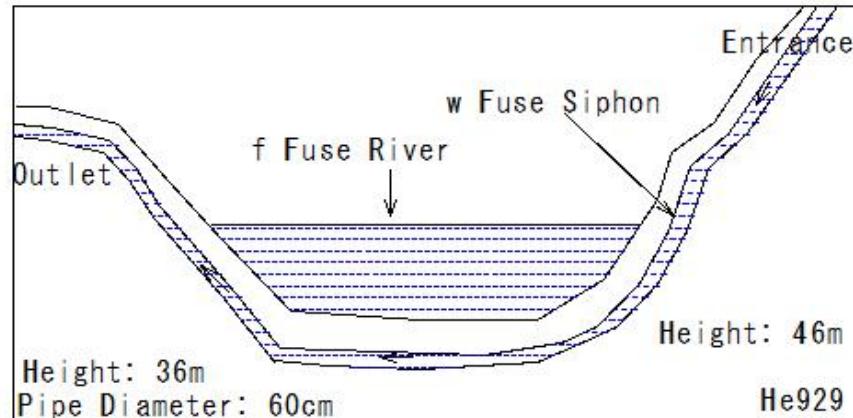
(He929) Gorobe Irrigation Canal(Nagano)

(He929) Gorobe Irrigation Canal (Nagano)

w Fuse Siphon

① The current Gorobei Irrigation Canal flows under the Fuse River via a siphon.

He929



Gorobei Irrigation Canal

w Fuse Siphon

f Fuse River

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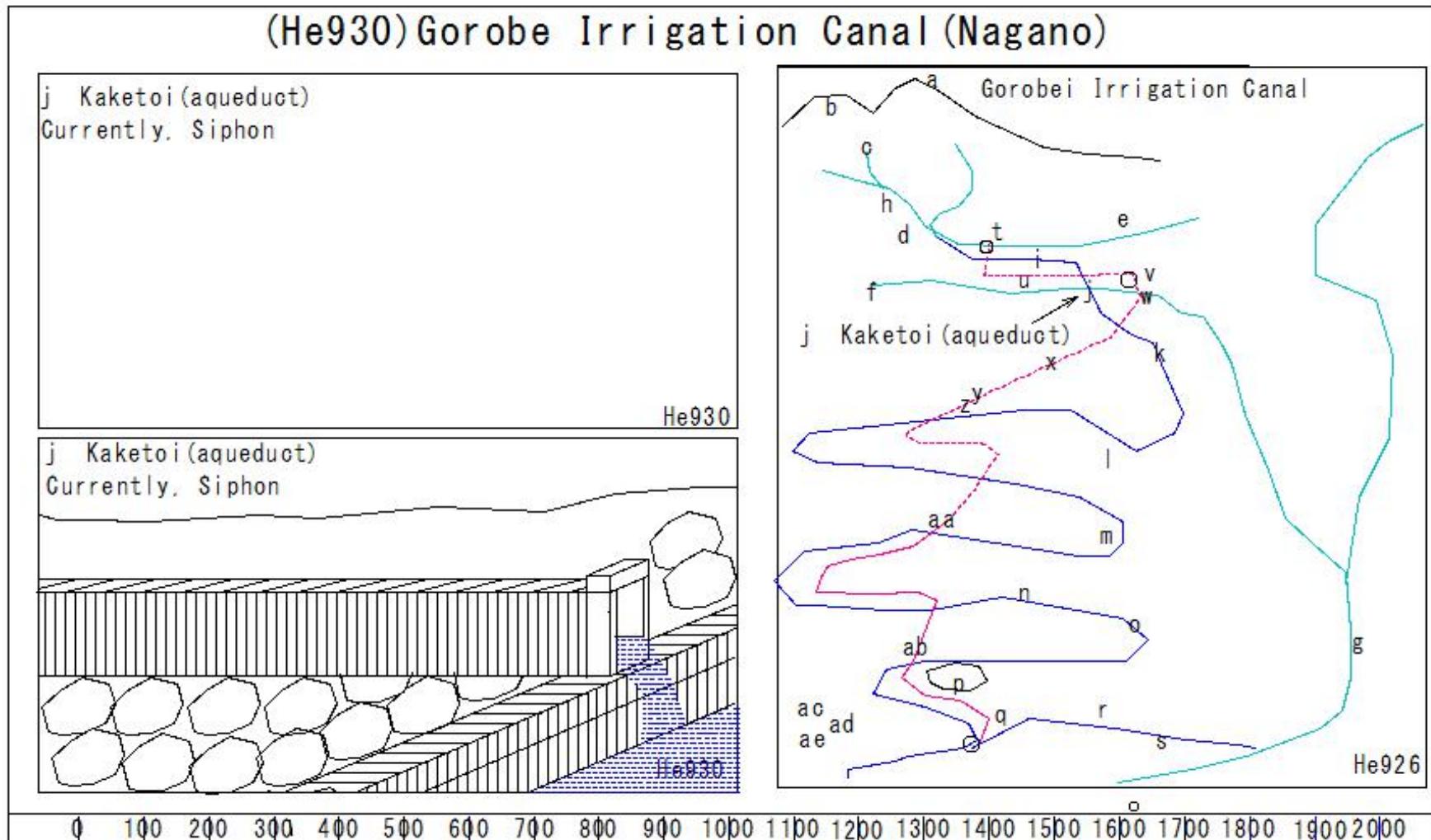
mm

nn

He926

Ø 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He930)Gorobe Irrigation Canal(Nagano)



(He931)Gorobe Irrigation Canal(Nagano)

(He931) Gorobe Irrigation Canal (Nagano)

p Large Pond

- ① In Yajima, Saku City, Nagano Prefecture,
- ② there is a large pond filled with water from the Gorobei Irrigation Canal.
- ③ From the large pond, you can see Mount Asama.

He931

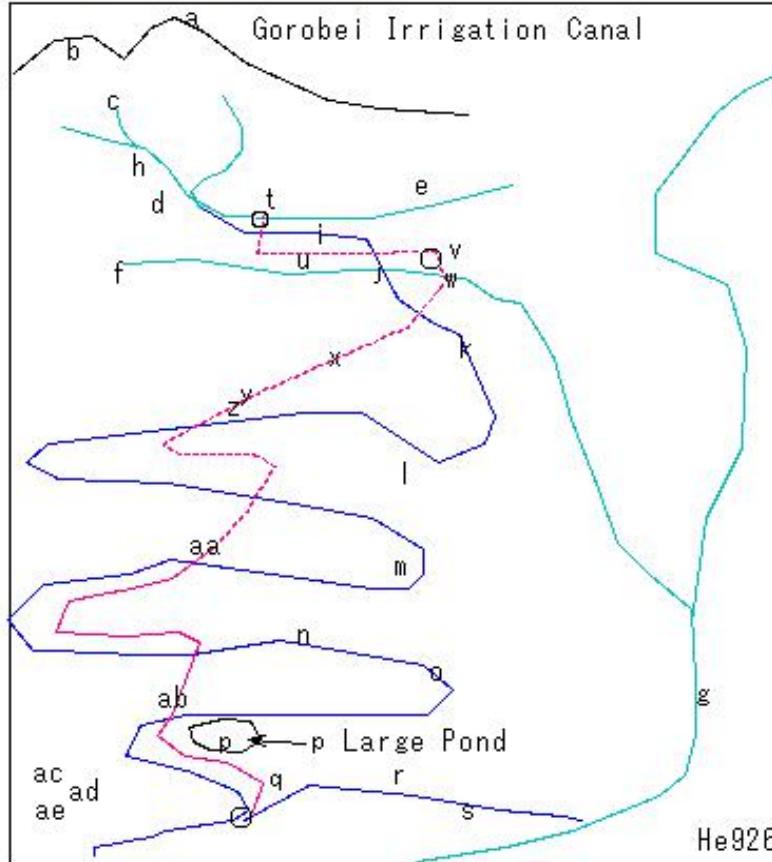
p Large Pond

Mount Asama

p Large Pond

He931

Gorobei Irrigation Canal



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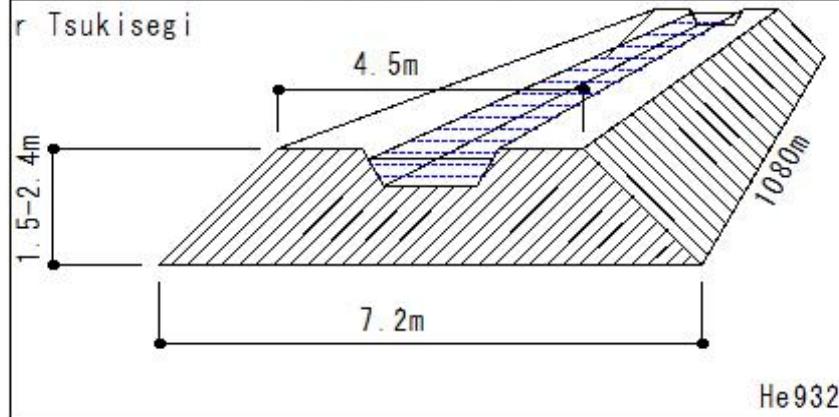
(He932)Gorobe Irrigation Canal(Nagano)

(He932) Gorobe Irrigation Canal (Nagano)

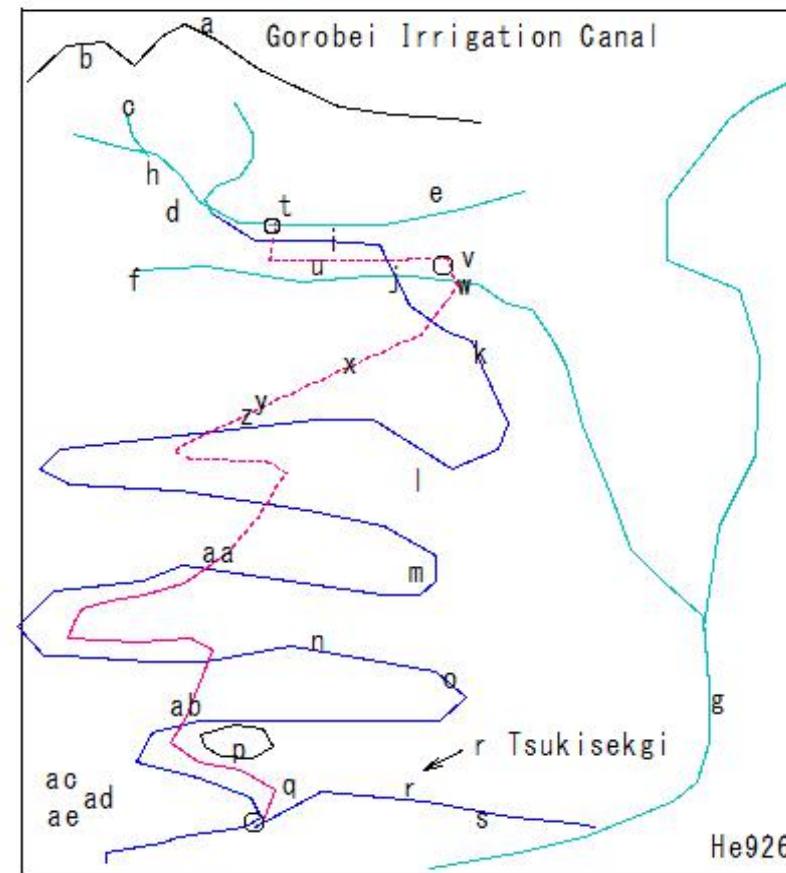
r Tsukisegi

- ① A waterway was created by piling up soil in a depression.
- ② The piling up was created by mixing clay with cotton wool.
- ③ Measures have been taken to prevent water leakage.
 - Width at base: Approximately 7.2m
 - Height: 1.5-2.4m
 - Length: Approximately 1,080m

r Tsukisegi



Gorobei Irrigation Canal



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

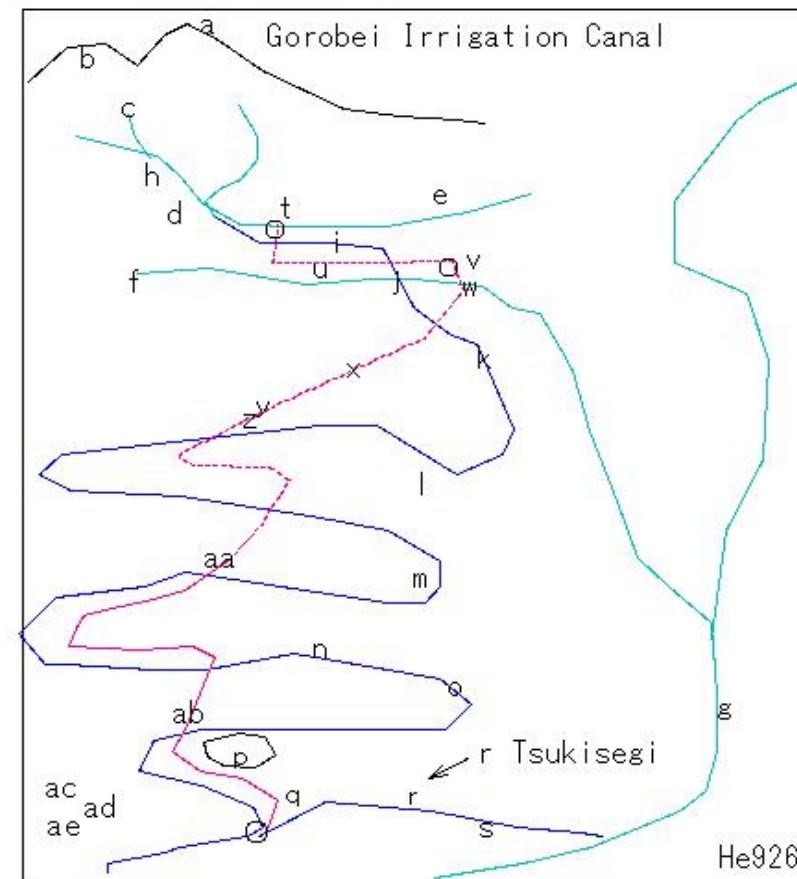
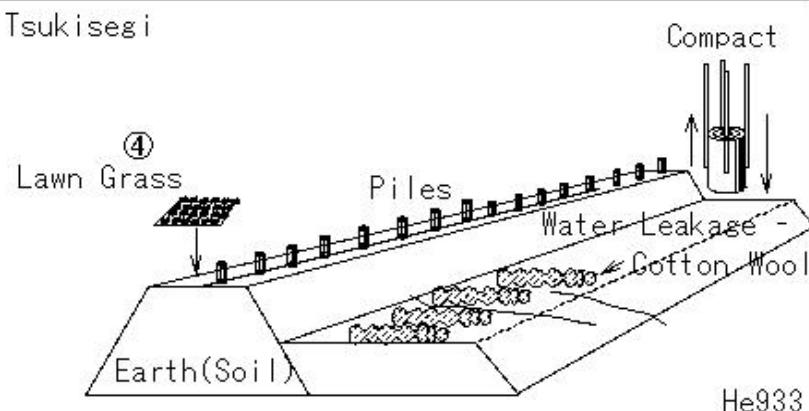
(He933) Gorobe Irrigation Canal(Nagano)

(He933) Gorobe Irrigation Canal (Nagano)

r Tsukisegi

- ① They also devised ways to direct irrigation water to the highest point in Yajimahara.
- ② This is called a "tsukisegi" or "earthen channel," which is a raised main waterway made by building embankments.
- ③ They reinforce the "tsukisegi" banks, which are simply made of hardened earth.
- ④ They also use square pieces of grass cut into "dengakuzashi" and pasted on the ground.

r Tsukisegi



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He934)Gorobe Irrigation Canal(Nagano)

(He934) Gorobe Irrigation Canal (Nagano)

r Tsukisegi

- ① A waterway was created by piling up soil in a depression.
- ② This is called a "tsukisegi" or "earthen channel," which is a raised main waterway made by building embankments.

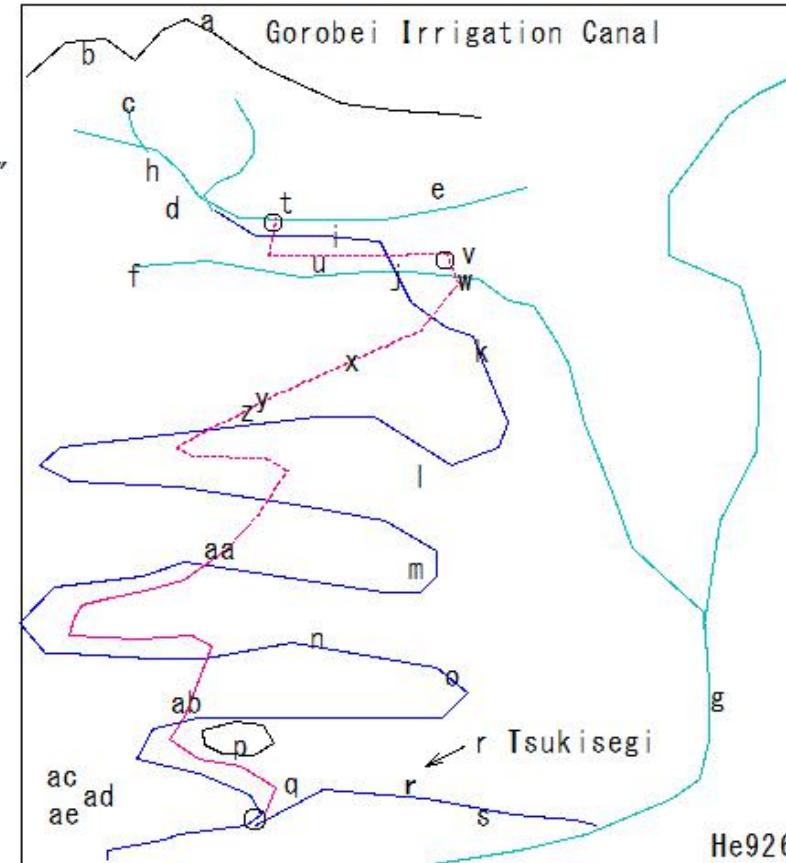
He934

r Tsukisegi

Low-lying land waterway

embankment

He934



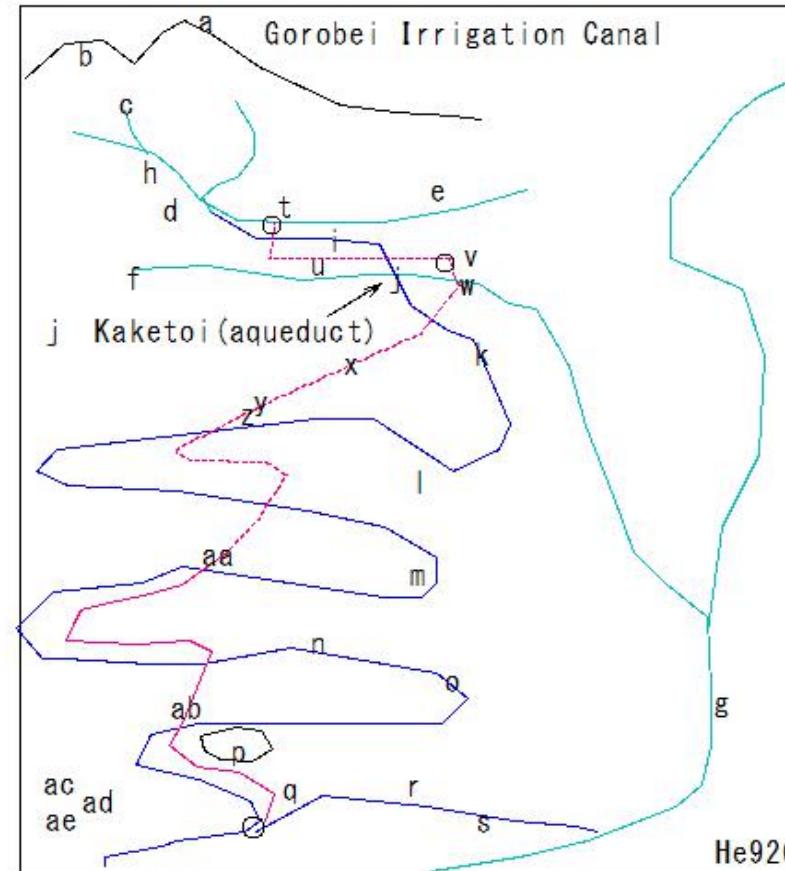
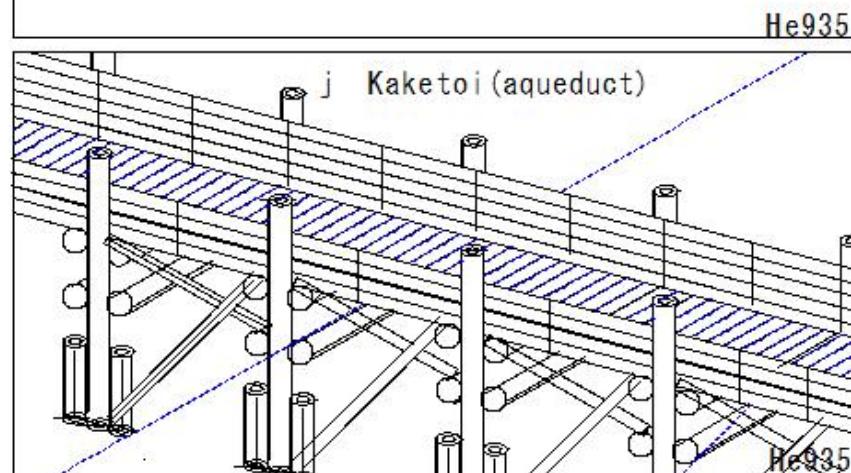
He926

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(He935)Gorobe Irrigation Canal(Nagano)

(He935) Gorobe Irrigation Canal (Nagano)

j Kaketoi (aqueduct)
Currently, Siphon



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(He936)Gorobe Irrigation Canal(Nagano)

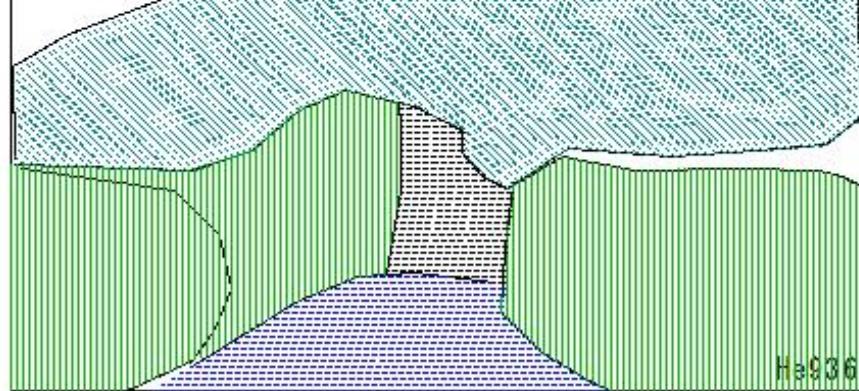
(He936) Gorobe Irrigation Canal (Nagano)

Old Hori-nuki (Tunnel)

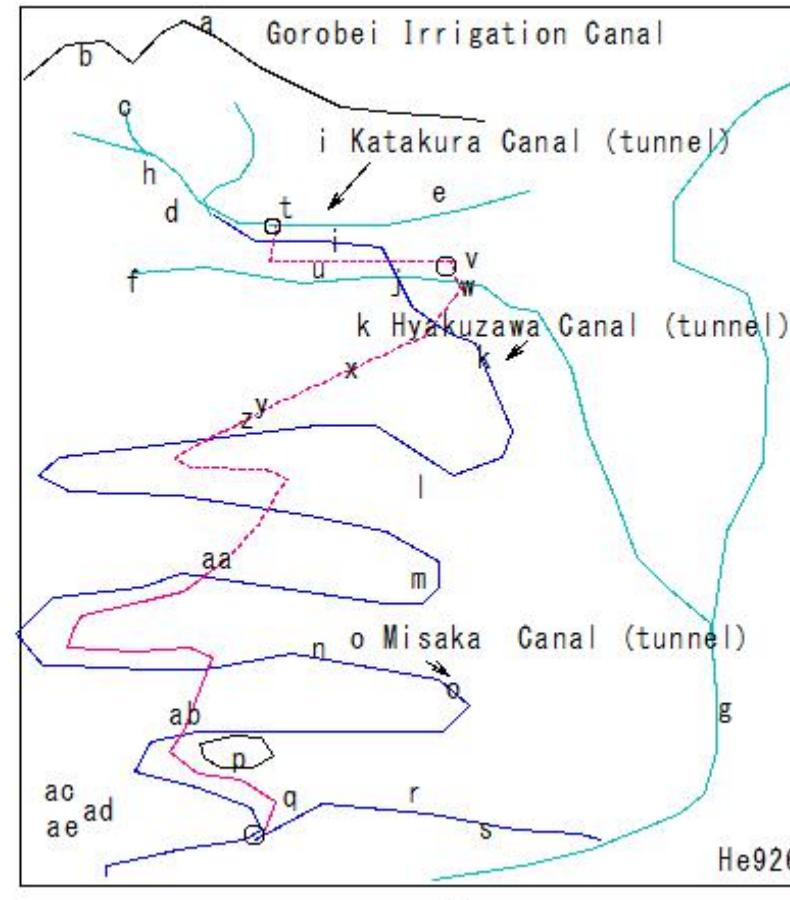
- ① People called "gold miners" and "stone cutters" who worked on gold mine development and grinding stone mining.
 - ② Specialized engineers called "gold miners" and "stone cutters" dug the tunnels.
- i Katakura Canal (tunnel)
k Hyakuzawa Canal (tunnel)
o Misaka Canal (tunnel)

He936

Old Hori-nuki (Tunnel)



He936



He926

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He937) Gorobe Irrigation Canal(Nagano)

(He937) Gorobe Irrigation Canal (Nagano)

Old Hori-nuki (Tunnel)

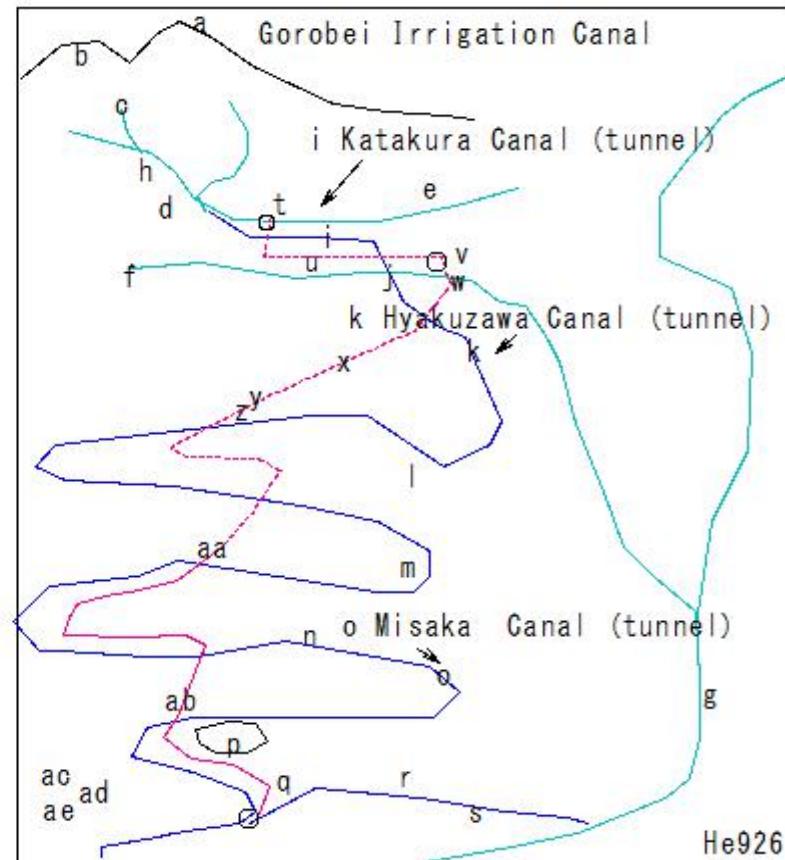
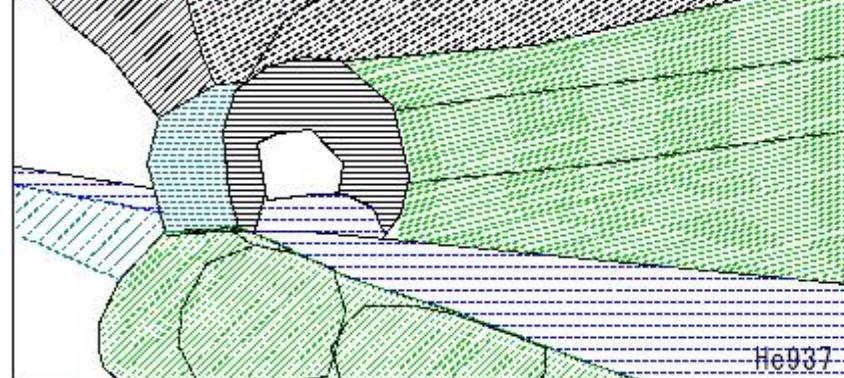
Former Hori-nuki (Tunnel for Irrigation)

- ① Engineers who were responsible for the construction of tunnels through the mountains
- ② Remaining retainers of the Takeda clan
- ③ They scattered throughout the country, developing irrigation waterways

i Katakura Canal (tunnel) o Misaka Canal (tunnel)
k Hyakuzawa Canal (tunnel)

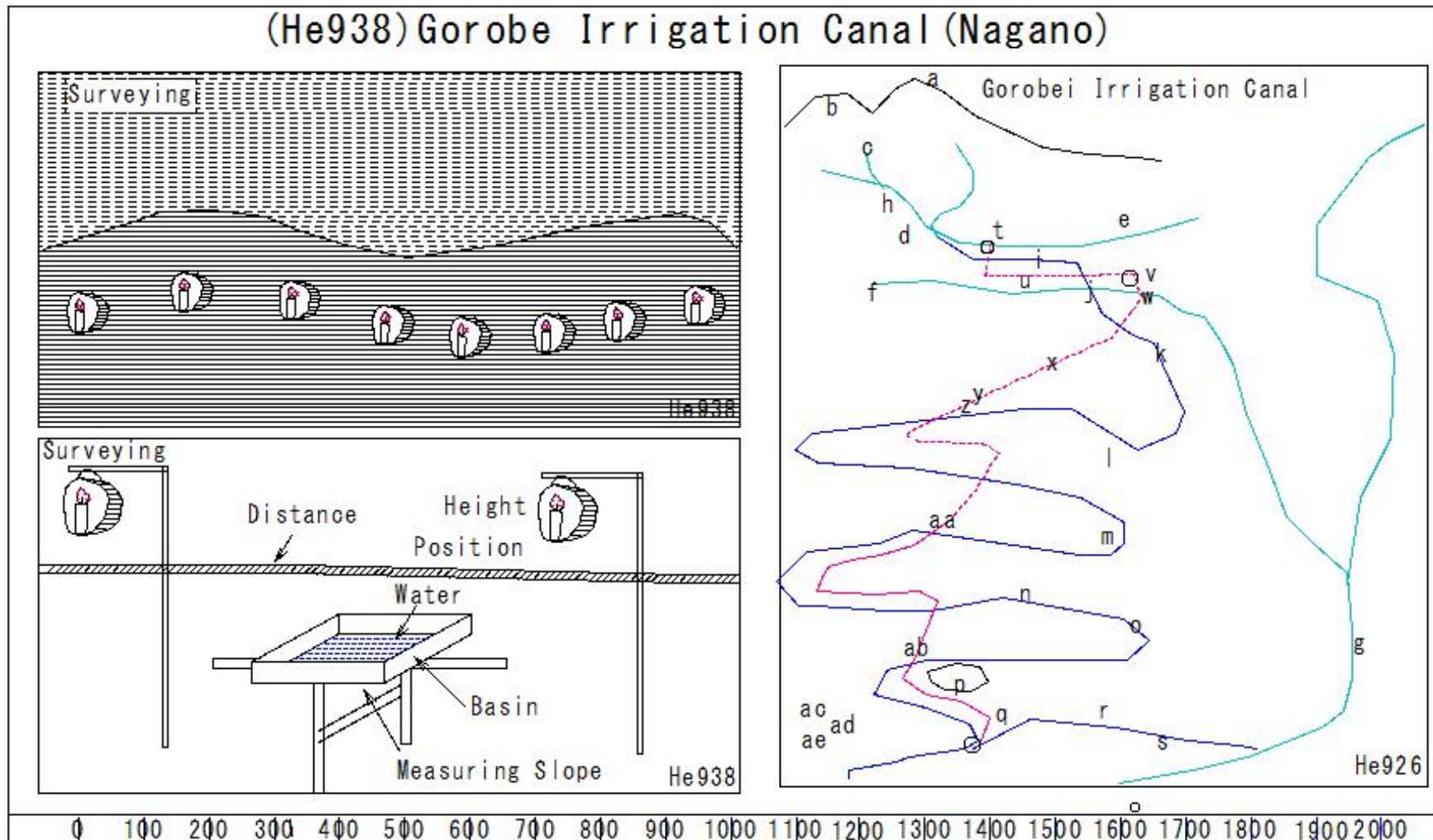
He937

Old Hori-nuki (Tunnel)



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He938) Gorobe Irrigation Canal(Nagano)

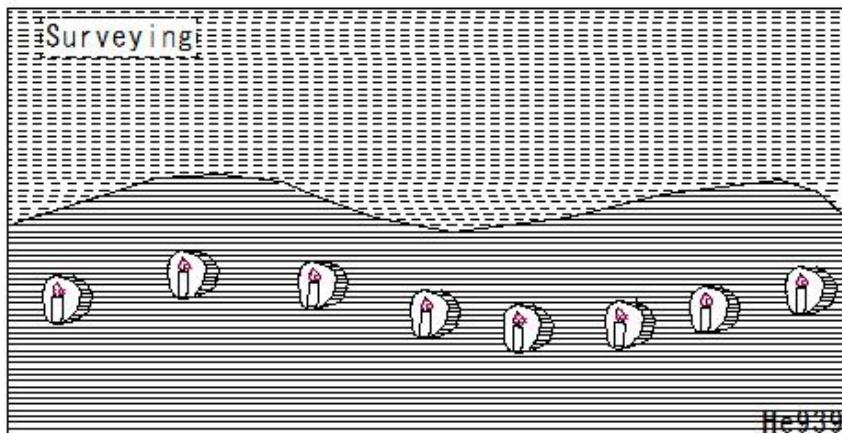


(He939)Gorobe Irrigation Canal(Nagano)

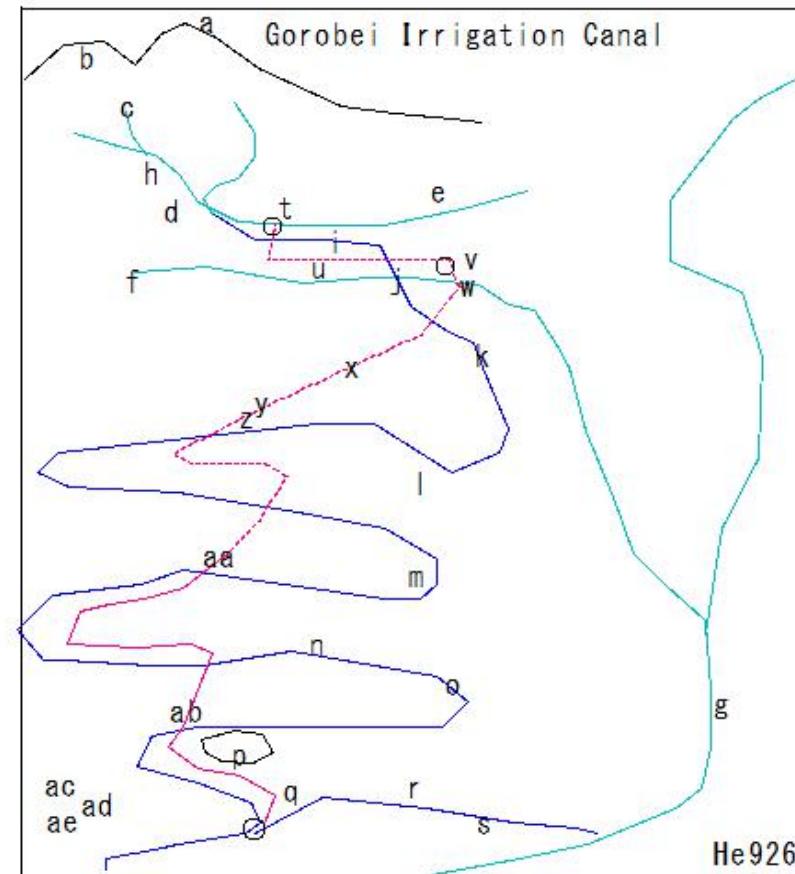
(He939) Gorobe Irrigation Canal (Nagano)

- Iwama Segi
- ① Its length is 3,300 meters.
 - ② It is said that the Iwama Segi was surveyed at night using lights.
 - ③ Lights were lit on the mountain streams and cliffs facing the Shikamagari River.
 - ④ From a high mountain, the scattered lights were aligned to form a straight line
 - ⑤ The level (gradient) of the planned dam was determined.

He939



He939



He926

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He940)Gorobe Irrigation Canal(Nagano)

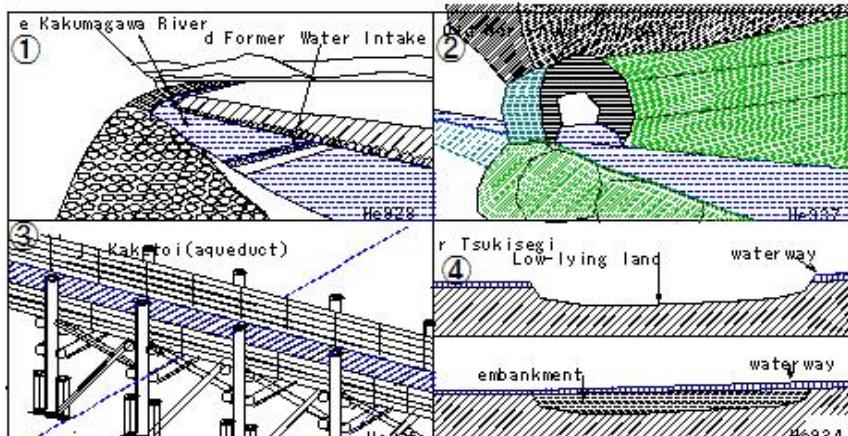
(He940) Gorobe Irrigation Canal (Nagano)

Approximately 18 kilometers from the intake in Kasuga Village to Yajimahara

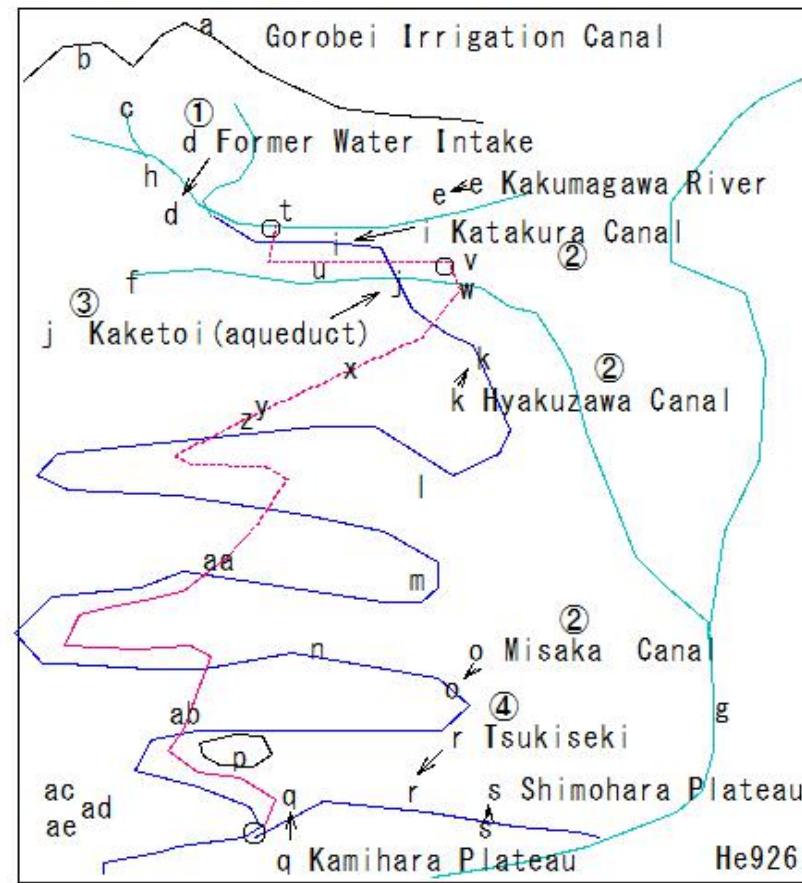
- ① Damming the Kakumagawa River and funneling it into an irrigation channel
- ② Excavating four tunnels, including Katakura
- ③ The Fuse River with a Kaketoi
- ④ Building a dam by piling up soil in the lowlands from Uehara to Shimohara

He939

He939

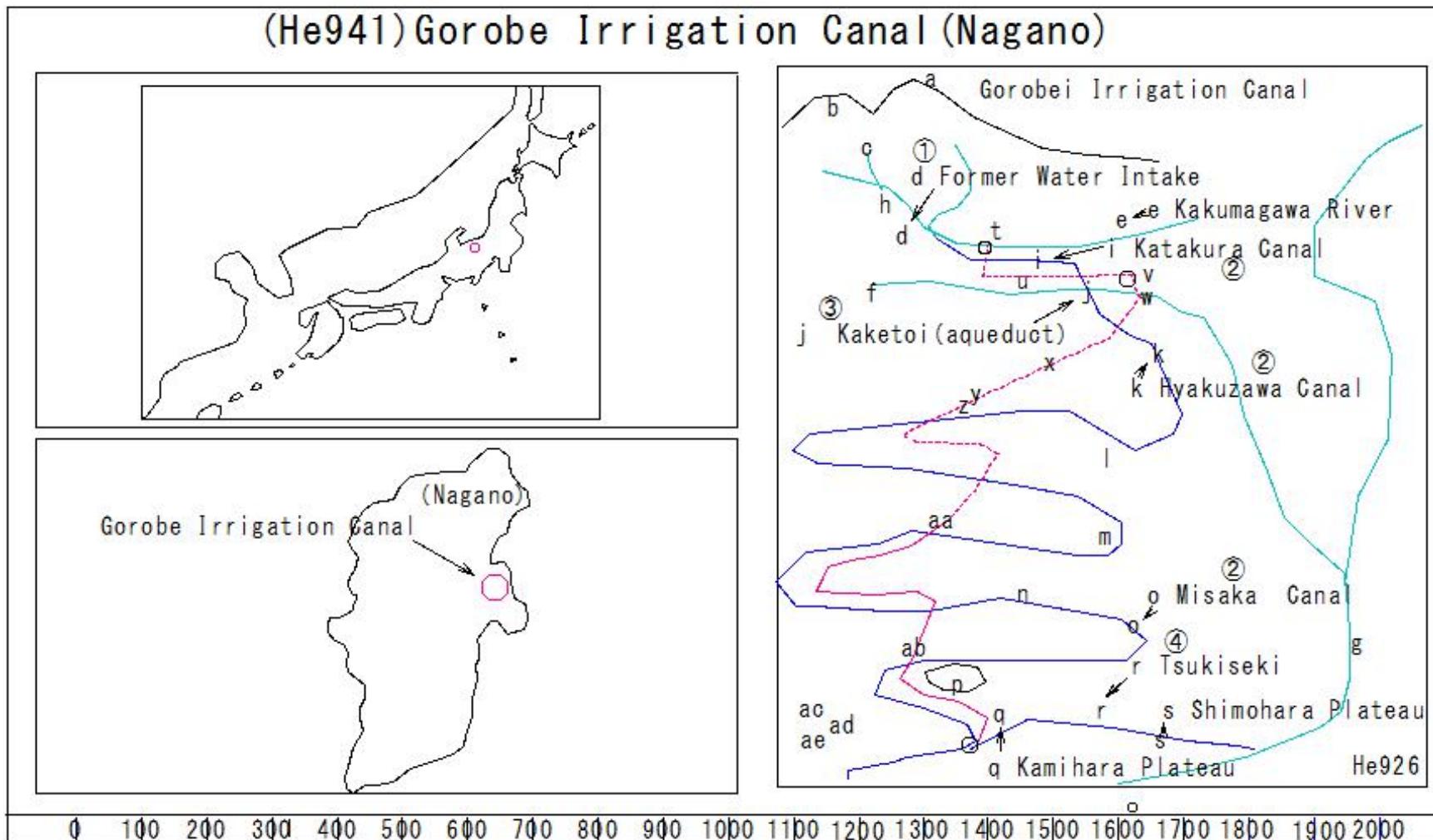


Φ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

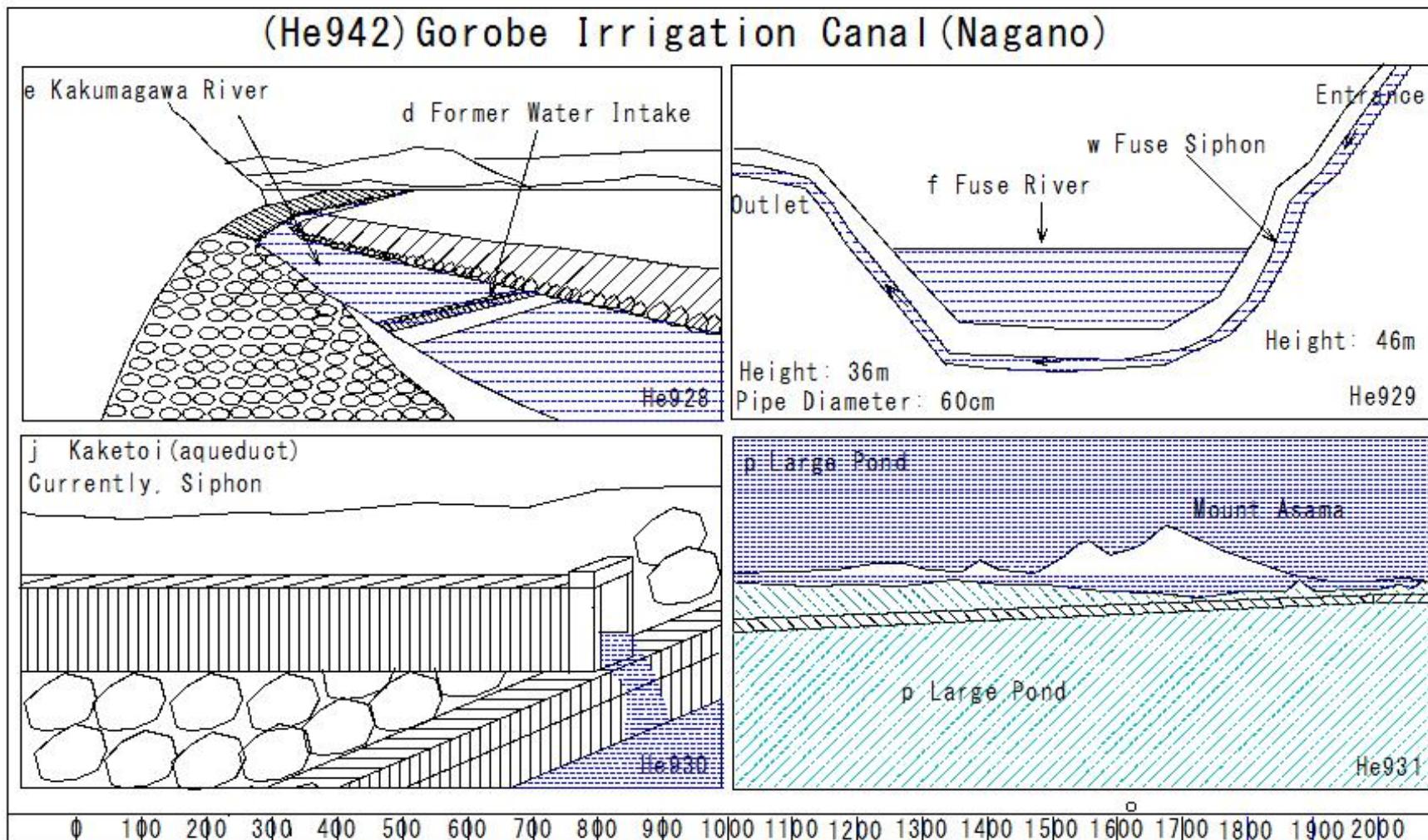


(He941)Gorobe Irrigation Canal(Nagano)

(He941) Gorobe Irrigation Canal (Nagano)

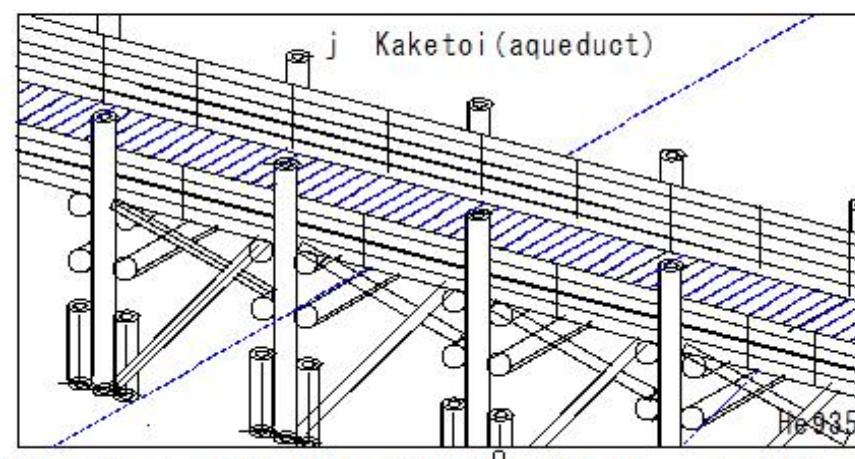
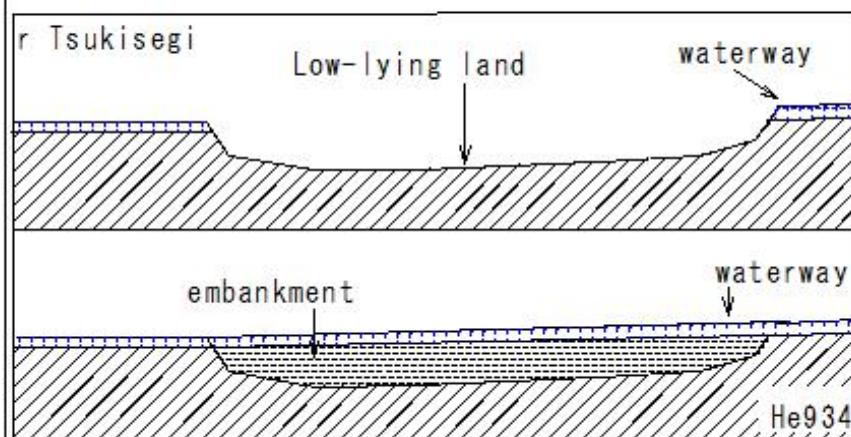
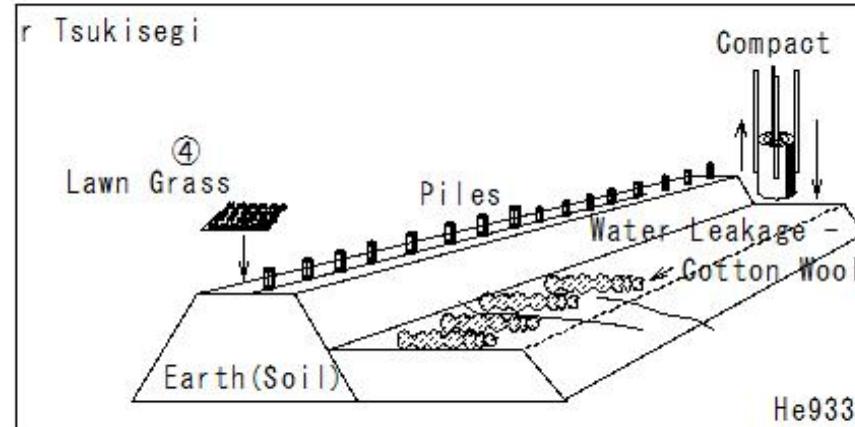
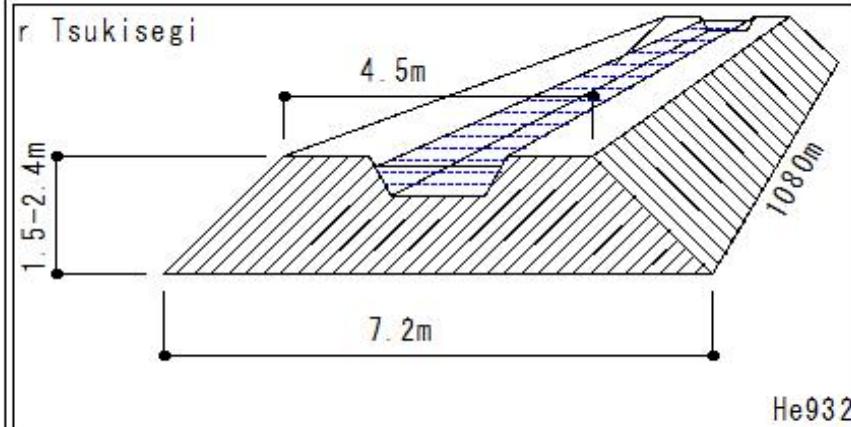


(He942) Gorobe Irrigation Canal(Nagano)



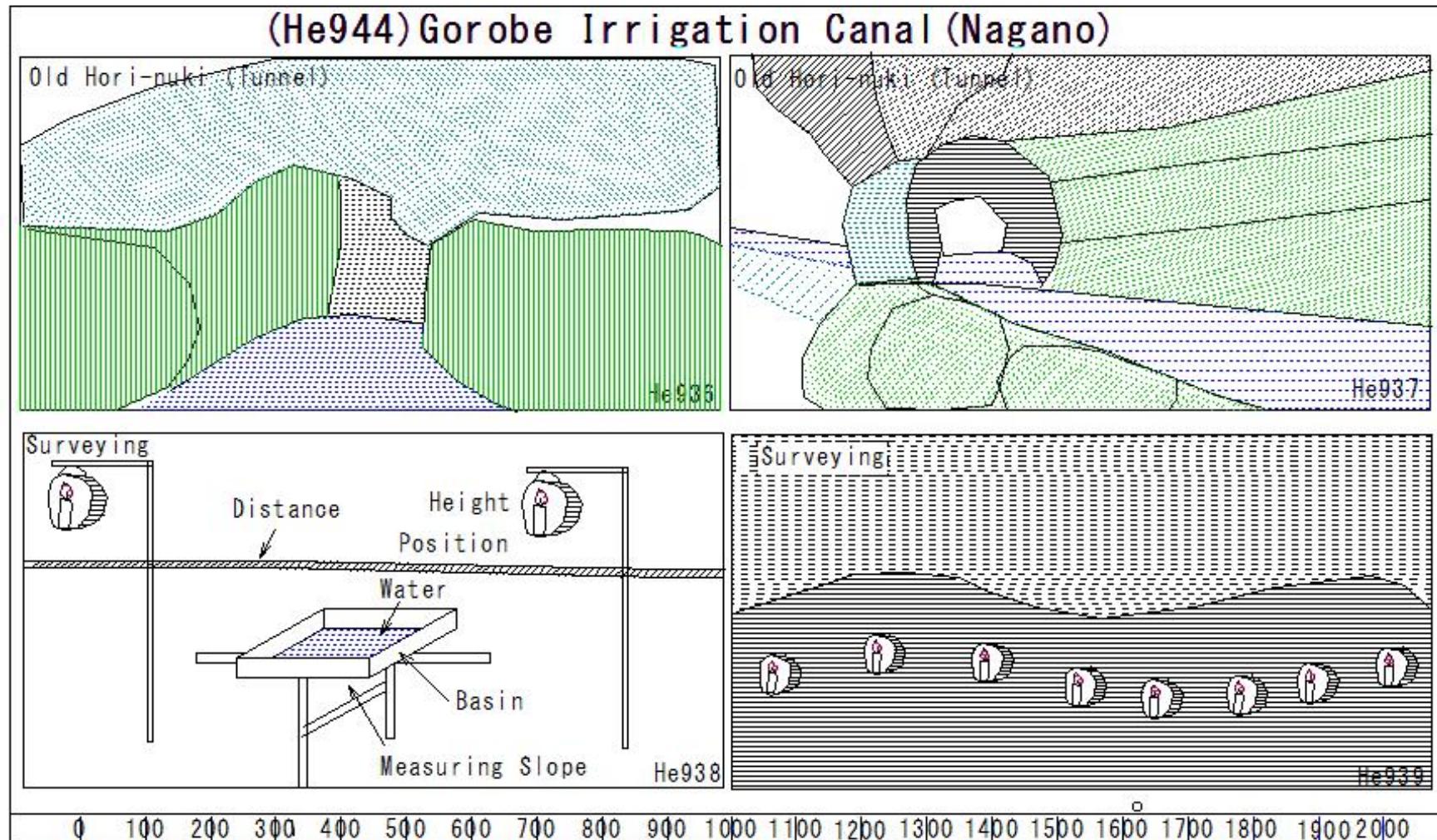
(He943)Gorobe Irrigation Canal(Nagano)

(He943) Gorobe Irrigation Canal (Nagano)

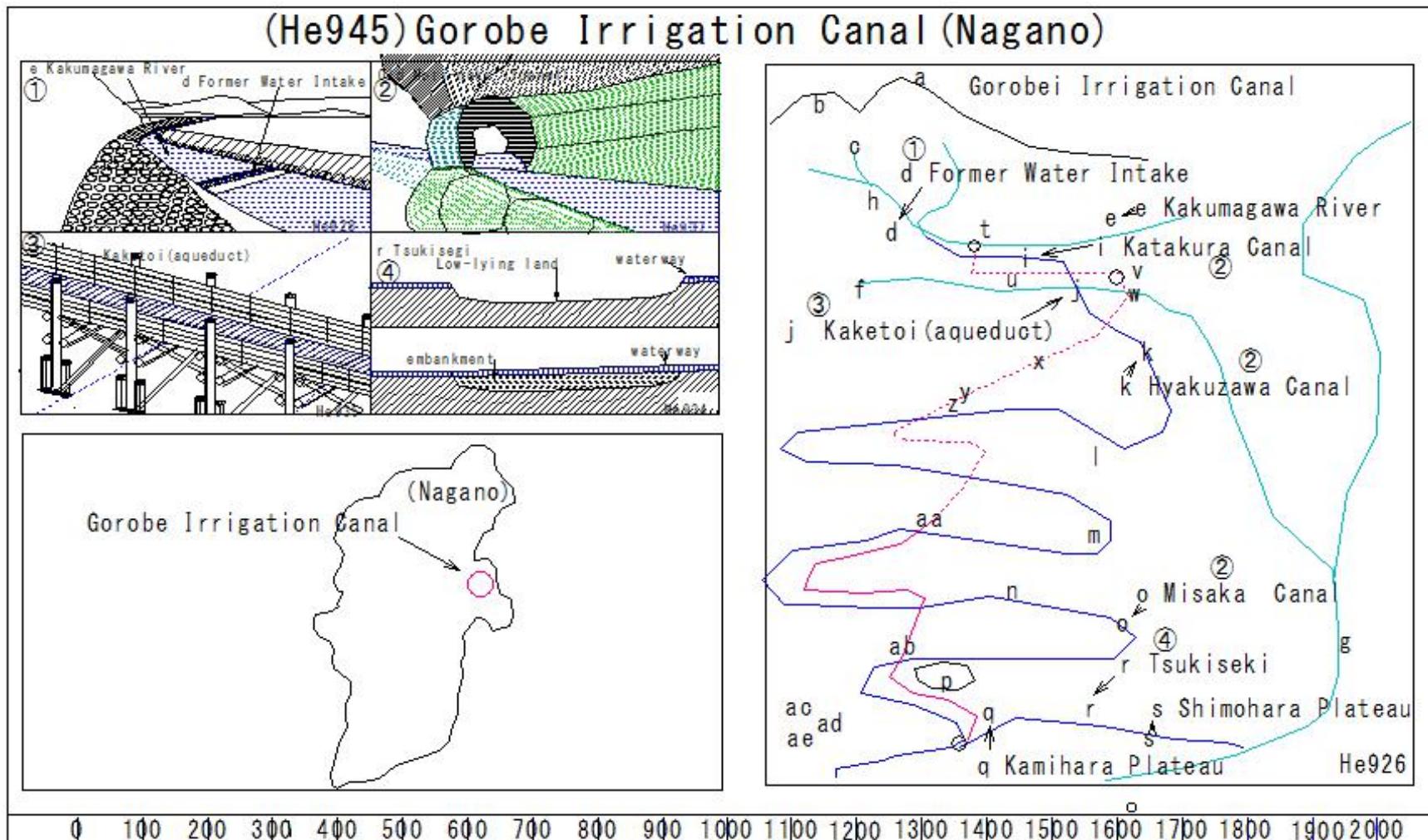


∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He944) Gorobe Irrigation Canal(Nagano)



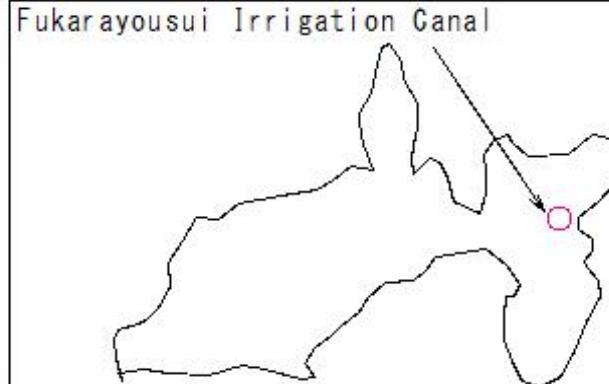
(He945)Gorobe Irrigation Canal(Nagano)



(He946) Fukarayousui Irrigation Canal (Shizuoka)

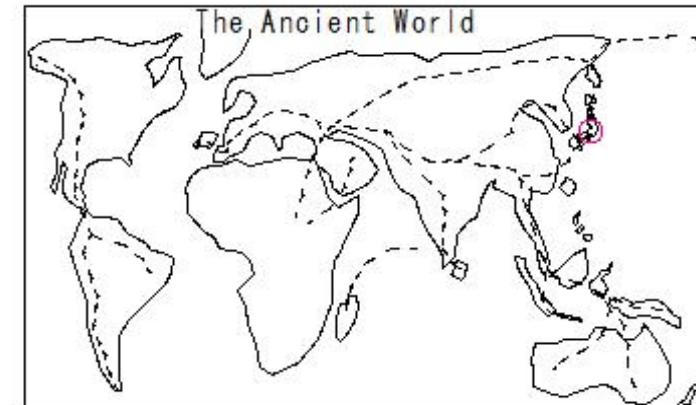
(He946) Fukarayousui Irrigation Canal (Shizuoka)

Fukarayousui Irrigation Canal
[Shizuoka Prefecture, Susono City, etc.]
The irrigation canal that draws water from Lake
Ashi was built in 1666.
The error at the excavation confluence point
is just 1 meter.



He946

He946



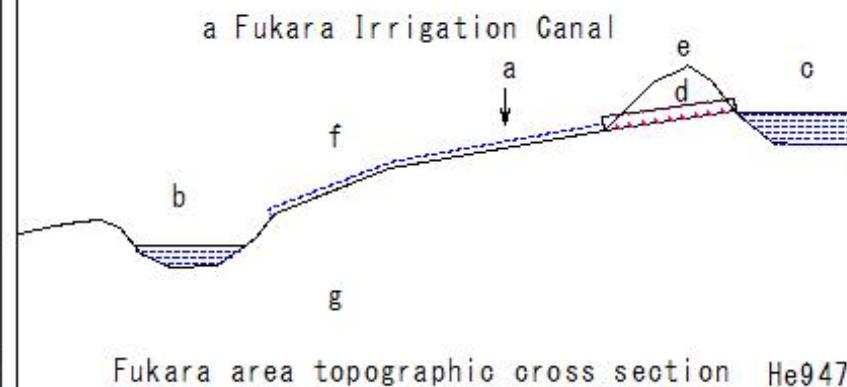
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He947) Fukarayousui Irrigation Canal (Shizuoka)

(He947) Fukarayousui Irrigation Canal (Shizuoka)

- ① Before the construction of the Fukara Irrigation Canal, villagers struggled to find water due to the soil damaged by the eruption of Mount Fuji, and lived a poor life relying on miscellaneous grains.
- ② When the irrigation canal drawing water from Lake Ashi was built in 1666, no machinery was used; it was dug from upstream and downstream using only chisels.
- ③ It was extremely precise, with an error of just 1 meter at the confluence point, setting a model for subsequent aqueduct tunnel projects in Japan.
- ④ Water users still express their gratitude to Hakone Shrine, which manages the lake.

a Fukara Irrigation Canal
b Kise River
c Hakone Lake Ashi
d Irrigation Canal Tunnel
e Kojiri Pass
f Farmland
g Susono City

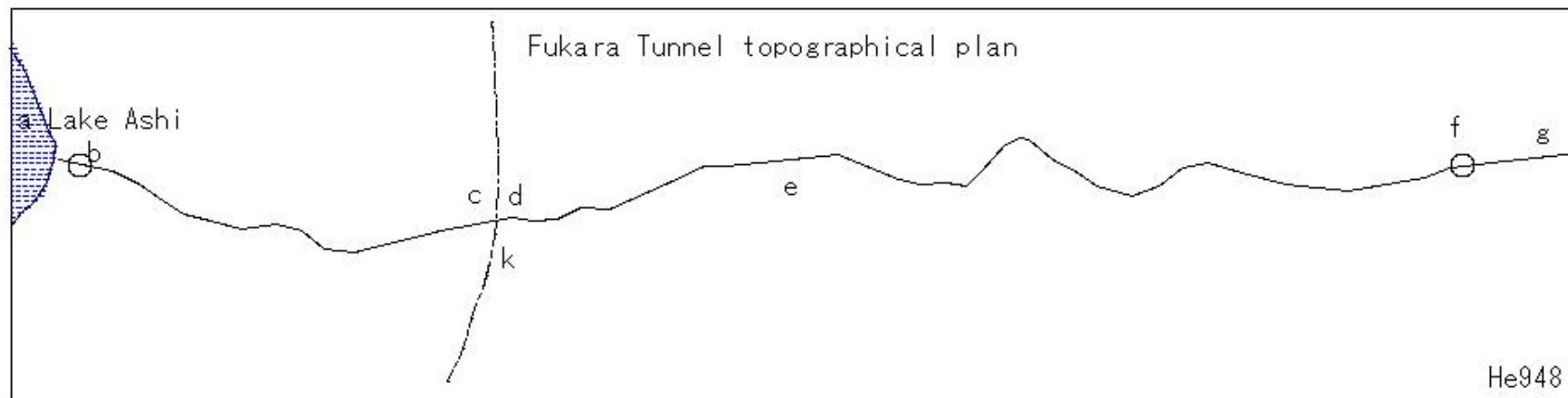


He947

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He948) Fukarayousui Irrigation Canal (Shizuoka)

(He948) Fukarayousui Irrigation Canal (Shizuoka)



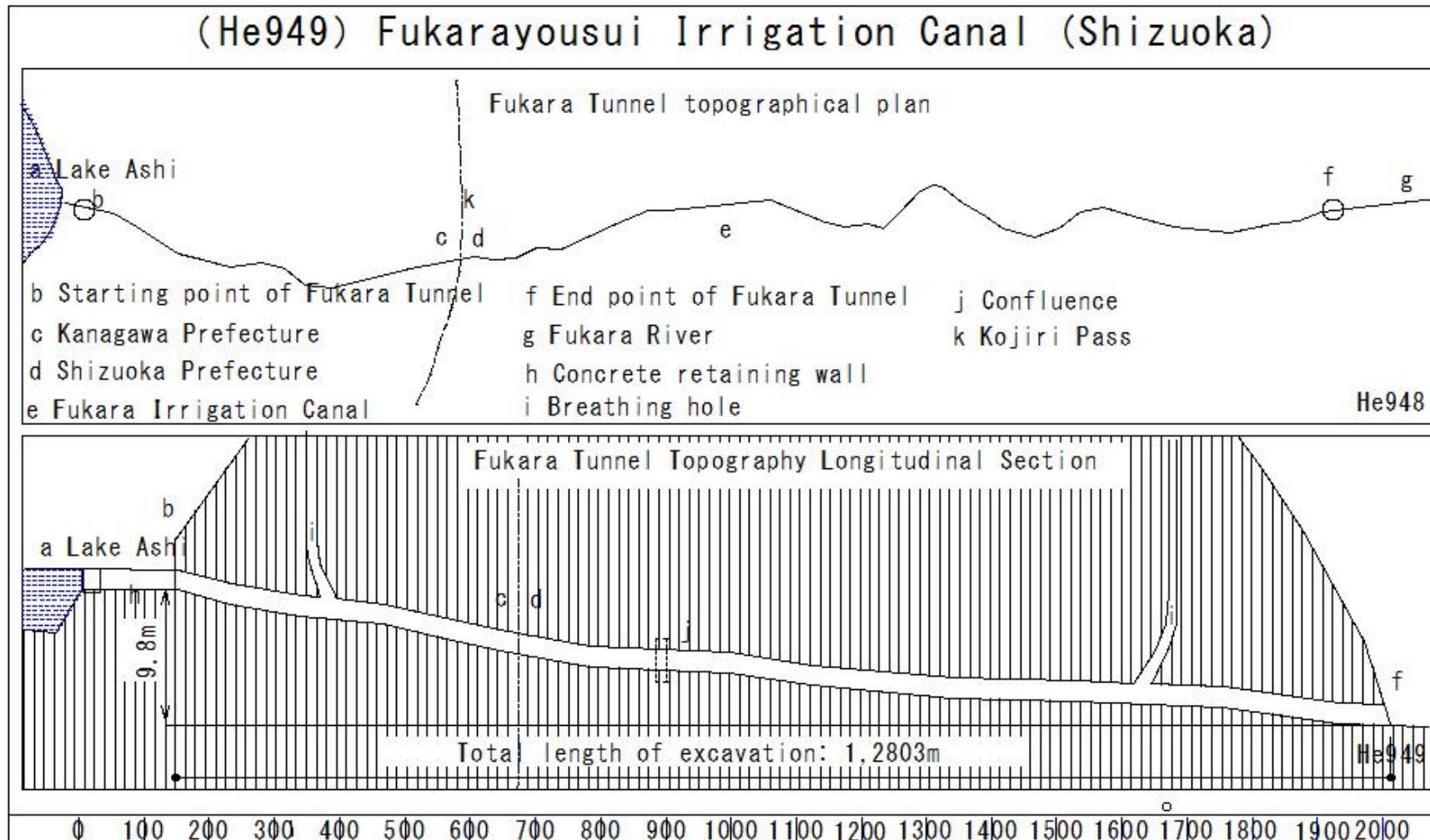
He948

- b Starting point of Fukara Tunnel j Confluence
- c Kanagawa Prefecture k Kojiri Pass
- d Shizuoka Prefecture
- e Fukara Irrigation Canal
- f End point of Fukara Tunnel
- g Fukara River
- h Concrete retaining wall
- i Breathing hole

He948

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

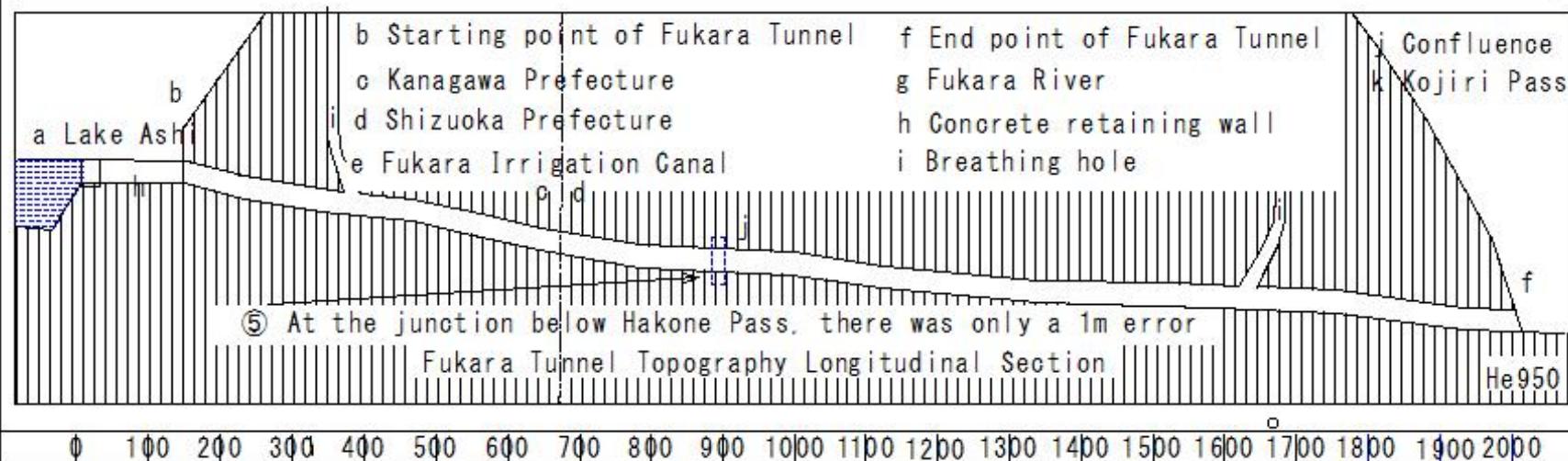
(He949) Fukarayousui Irrigation Canal (Shizuoka)



(He950) Fukarayousui Irrigation Canal (Shizuoka)

(He950) Fukarayousui Irrigation Canal (Shizuoka)

- ① In August 1666, under the leadership of Tomono Yoemon and others, construction of a 1.28km tunnel digging through Mount Hakone began at two locations: the Lake Ashi Intake and Fukara Village.
- ② After four years of construction, it was successfully completed in February 1670.
- ③ Further waterways and weirs were constructed to irrigate the fields, and the entire Fukara Irrigation Canal was completed in 1671.
- ④ Thanks to the Fukara Irrigation Canal, large-scale new rice fields covering approximately 500 chobu (500 hectares) were developed in 28 villages, including Fukara Village.
- ⑤ At the junction below Hakone Pass, there was only a 1m error, demonstrating the high level of civil engineering at the time.



(He951) Fukarayousui Irrigation Canal (Shizuoka)

(He951) Fukarayousui Irrigation Canal (Shizuoka)

Overview of the Fukara Irrigation Canal "Irrigation Tunnel"

Name: Fukara Irrigation Canal "Irrigation Tunnel"

Year Completed: 1670 (Kanbun 10)

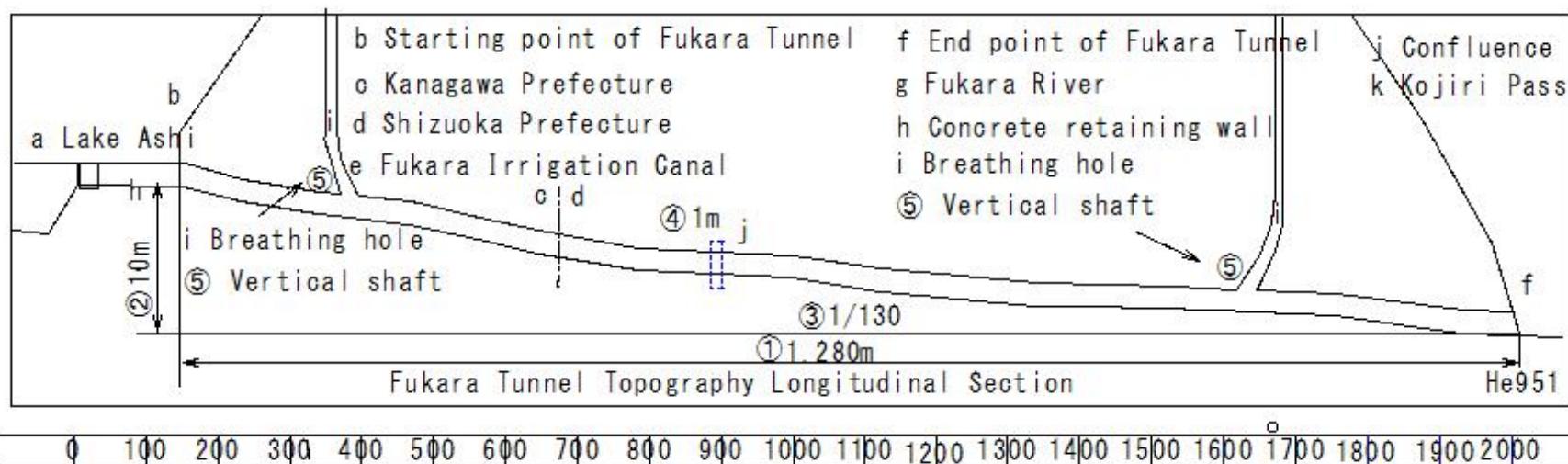
① Type: Hand-dug mountain tunnel, total length approximately 1,280m

② Elevation difference approximately 10m

③ Average gradient of the tunnel is 1/130

④ Elevation difference at the confluence is only about 1m

⑤ Vertical shaft, believed to be for ventilation, located approximately 150m from both tunnel entrances i Breathing hole



(He952) Fukarayousui Irrigation Canal (Shizuoka)

(He952) Fukarayousui Irrigation Canal (Shizuoka)

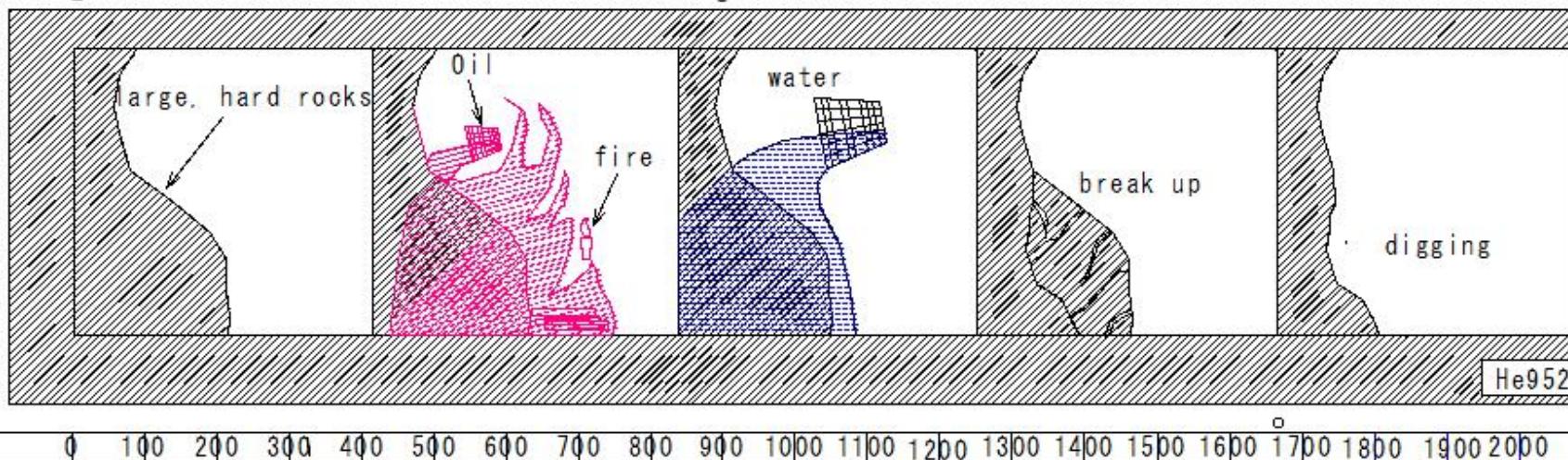
Fire and water to break the rocks, Lantern to dig straight!

- ① Oil was poured over the large, hard rocks, and a fire was lit to heat them, then water was poured over them to make them easier to break up, allowing the digging to proceed.
- ② The tunnel was dug from both sides. The skill to dig straight was necessary to prevent two diggers from passing each other.
- ③ One theory is that lanterns were hung every 1 to 2 meters, and the diggers made sure they were in a straight line as they dug.

Fire and water to break the rocks

①

"Irrigation Tunnel"

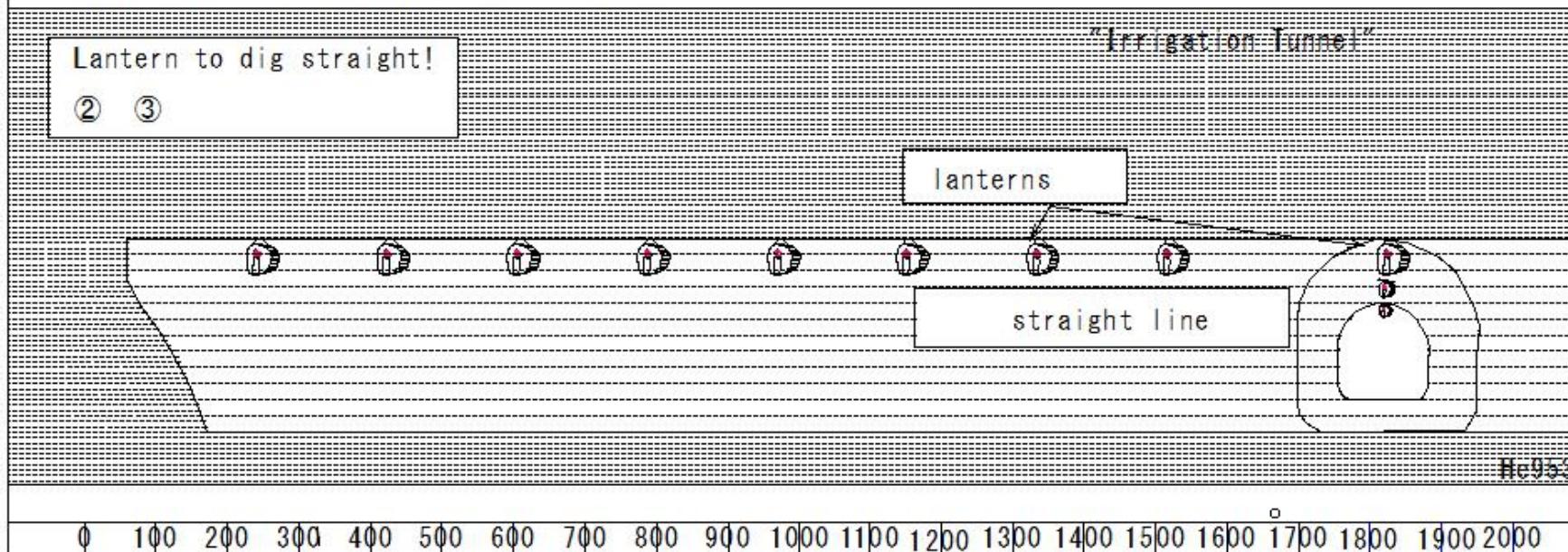


(He953) Fukarayousui Irrigation Canal (Shizuoka)

(He953) Fukarayousui Irrigation Canal (Shizuoka)

Fire and water to break the rocks, Lantern to dig straight!

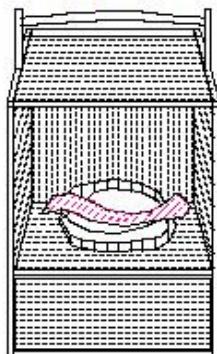
- ① Oil was poured over the large, hard rocks, and a fire was lit to heat them, then water was poured over them to make them easier to break up, allowing the digging to proceed.
- ② The tunnel was dug from both sides. The skill to dig straight was necessary to prevent two diggers from passing each other.
- ③ One theory is that lanterns were hung every 1 to 2 meters, and the diggers made sure they were in a straight line as they dug.



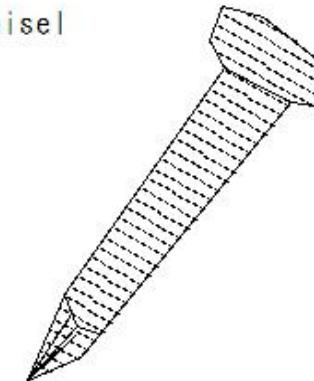
(He954) Fukarayousui Irrigation Canal (Shizuoka)

(He954) Fukarayousui Irrigation Canal (Shizuoka)

Lantern used in excavation



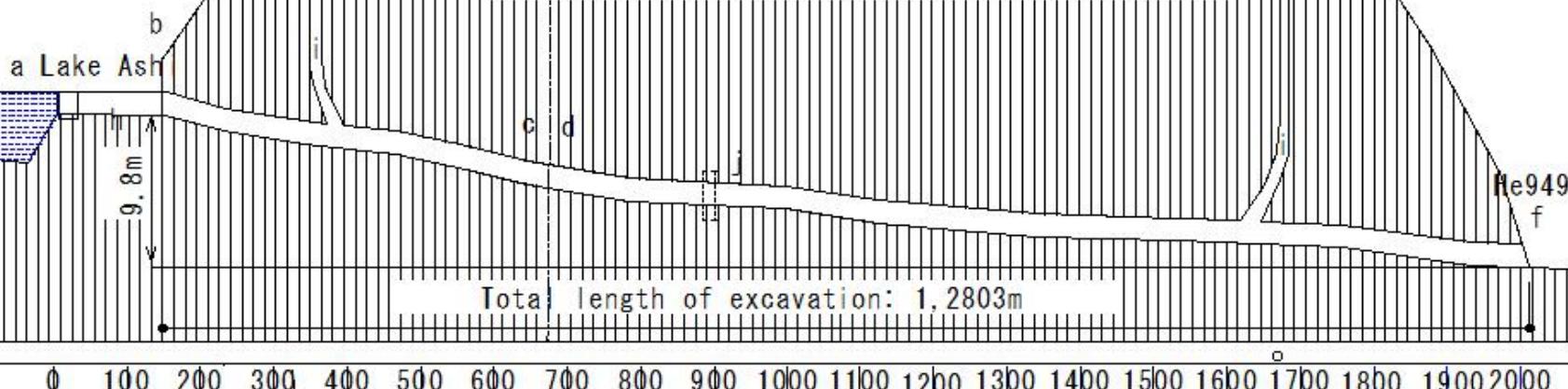
Hand-digging chisel



He954

He954

Fukara Tunnel Topography Longitudinal Section



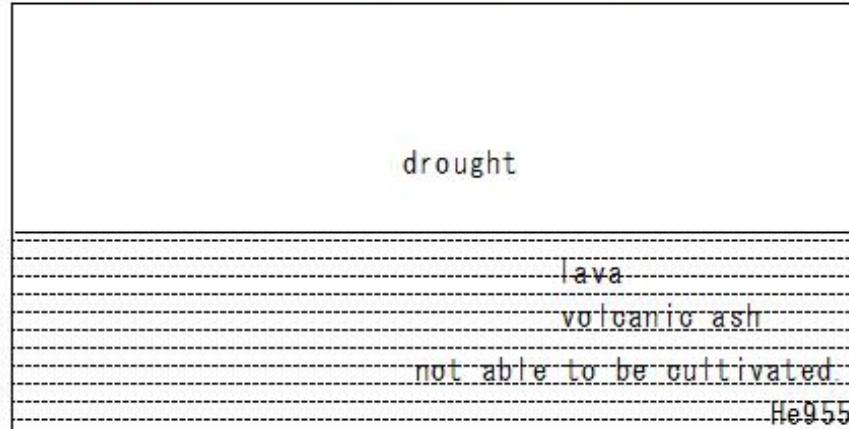
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He955) Fukarayousui Irrigation Canal (Shizuoka)

(He955) Fukarayousui Irrigation Canal (Shizuoka)

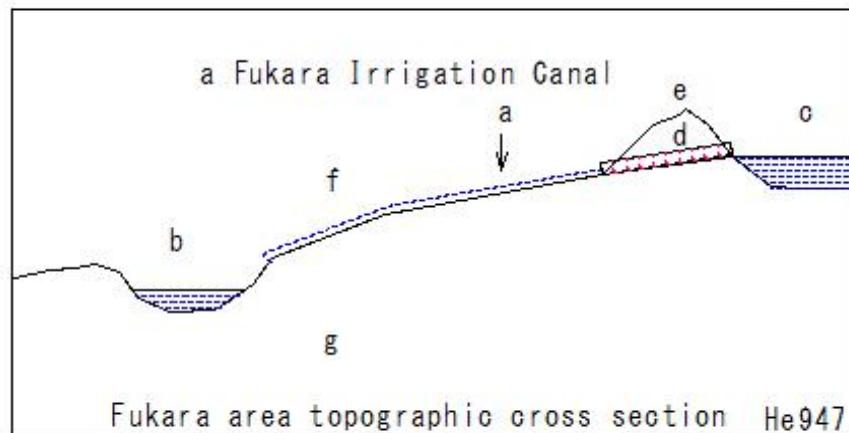
- ① This land is covered with lava flows and volcanic ash from Mount Fuji, which means water easily seeps into the ground, making it impossible to harvest a satisfactory amount of rice.
② Due to the drought, rice fields were not able to be cultivated.

He955



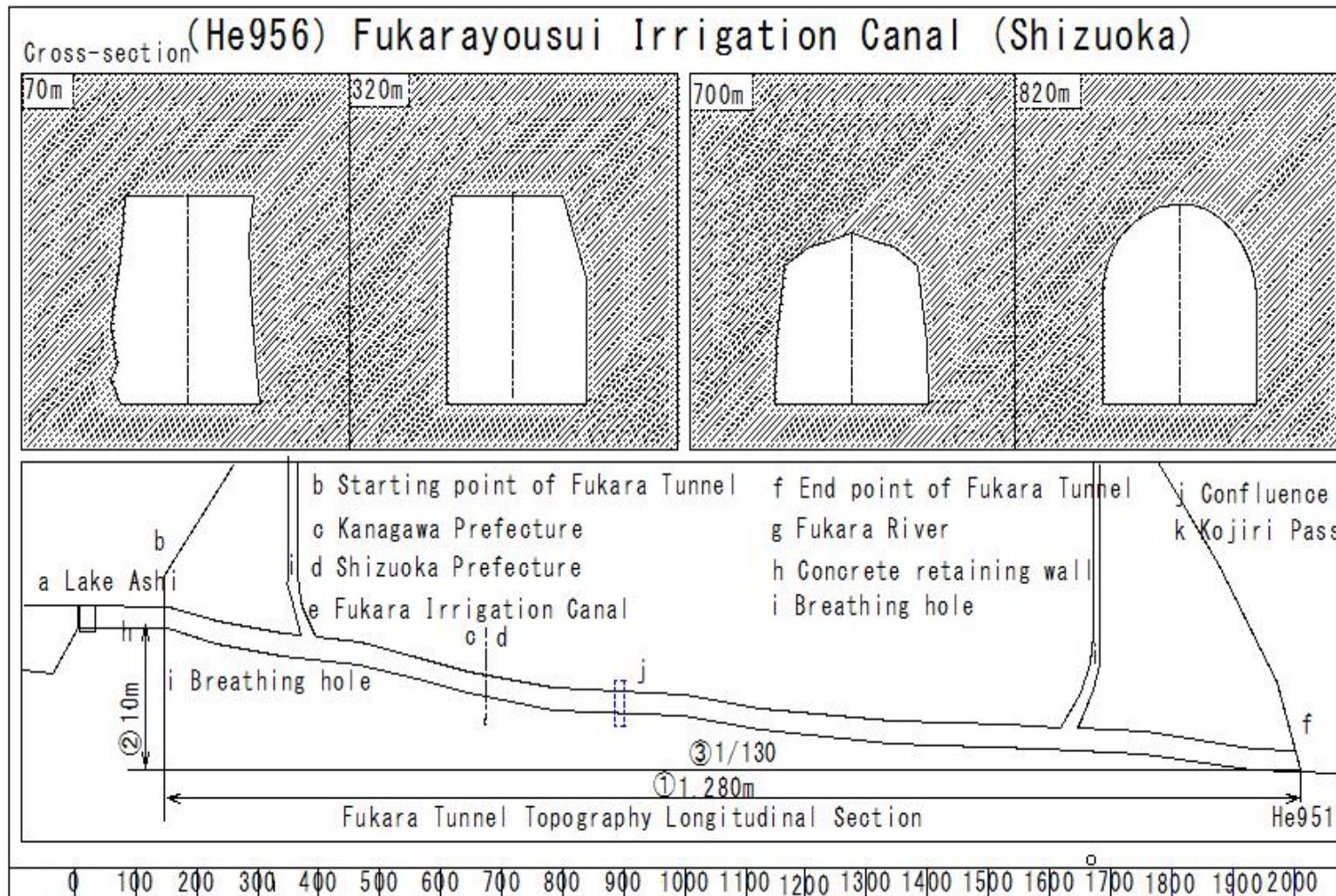
- a Fukara Irrigation Canal
b Kise River
c Hakone Lake Ashi
d Irrigation Canal Tunnel
e Kojiri Pass
f Farmland
g Susono City

He947

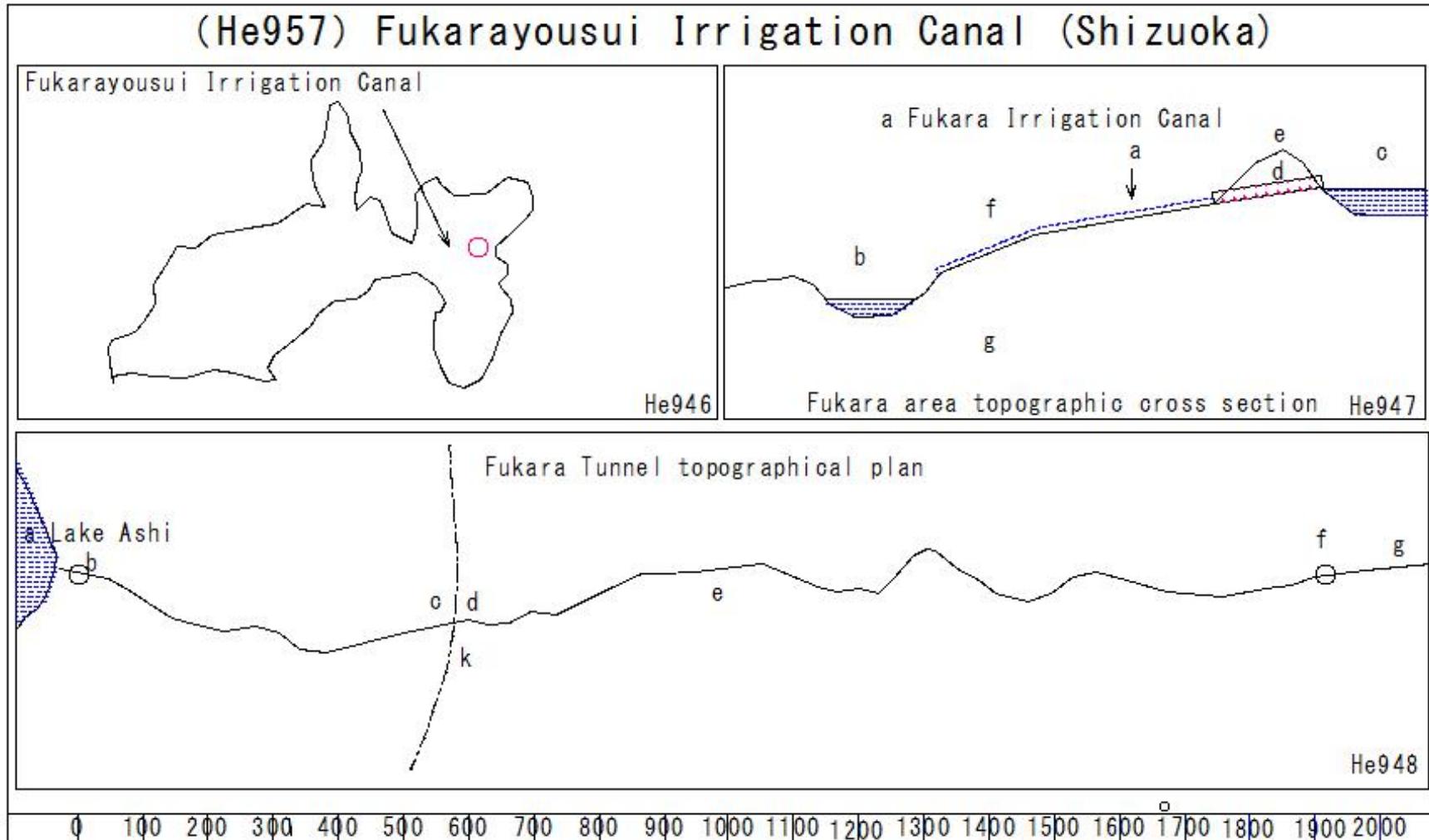


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

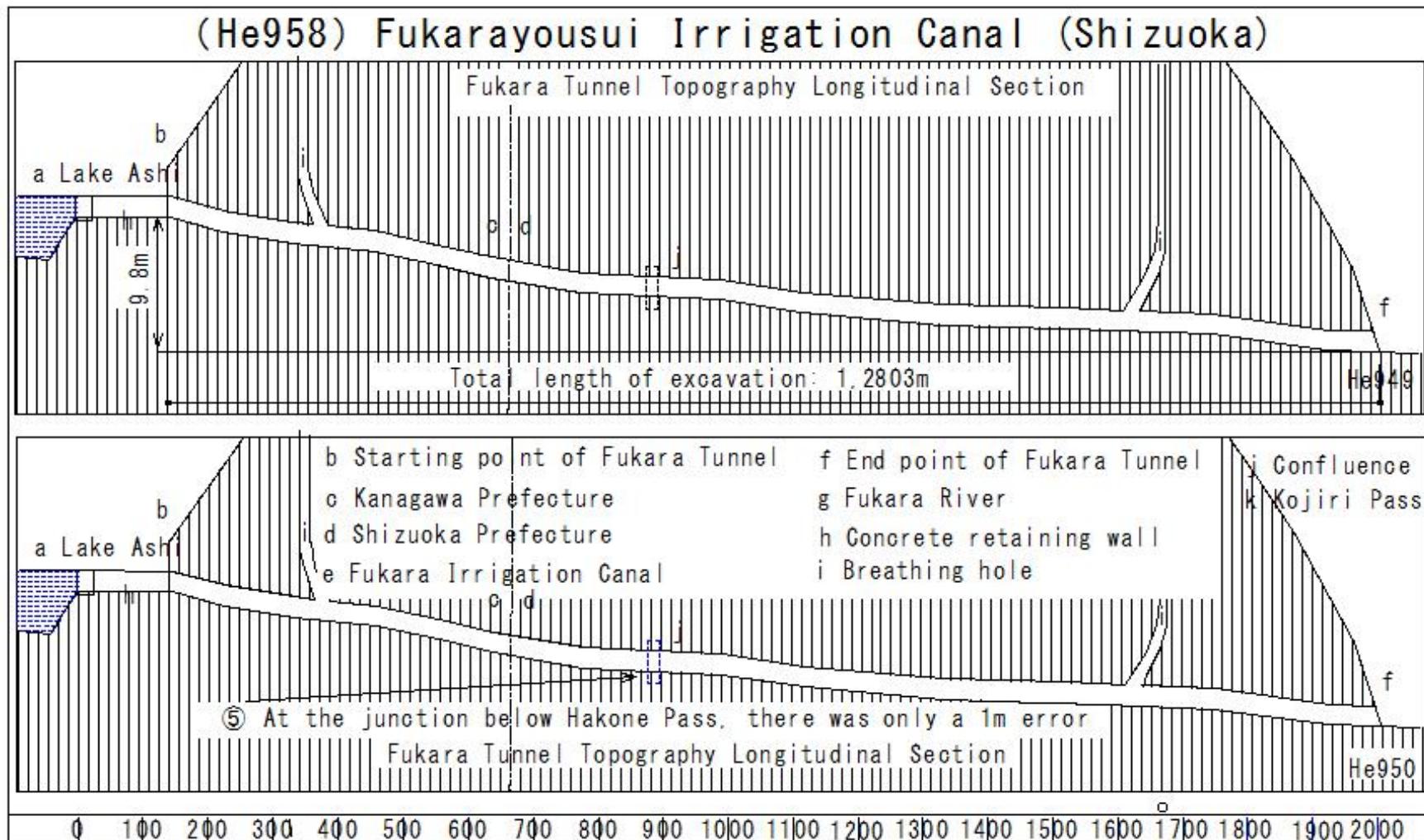
(He956) Fukarayousui Irrigation Canal (Shizuoka)



(He957) Fukarayousui Irrigation Canal (Shizuoka)

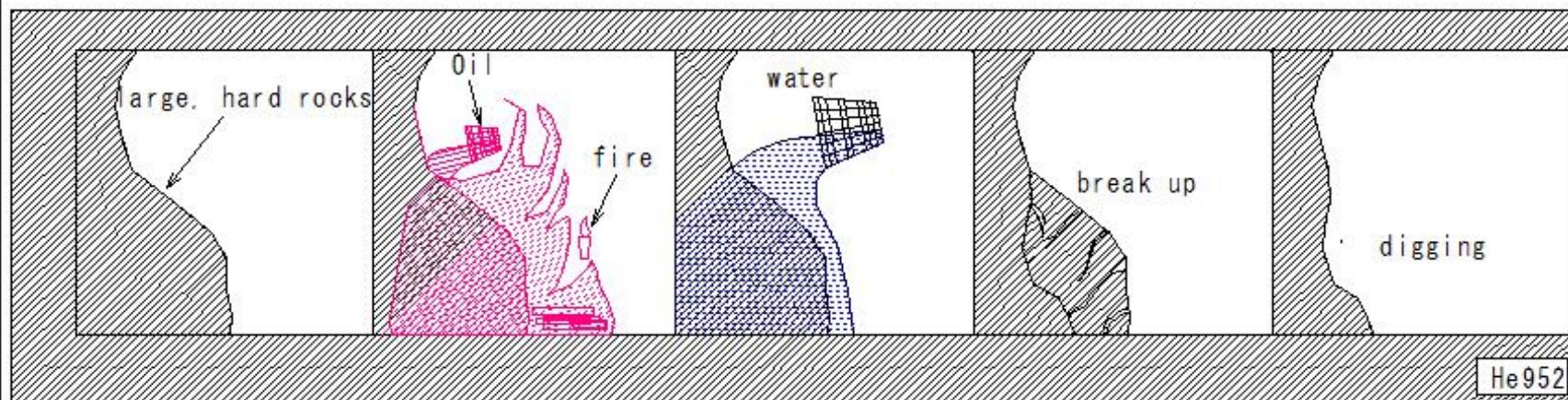
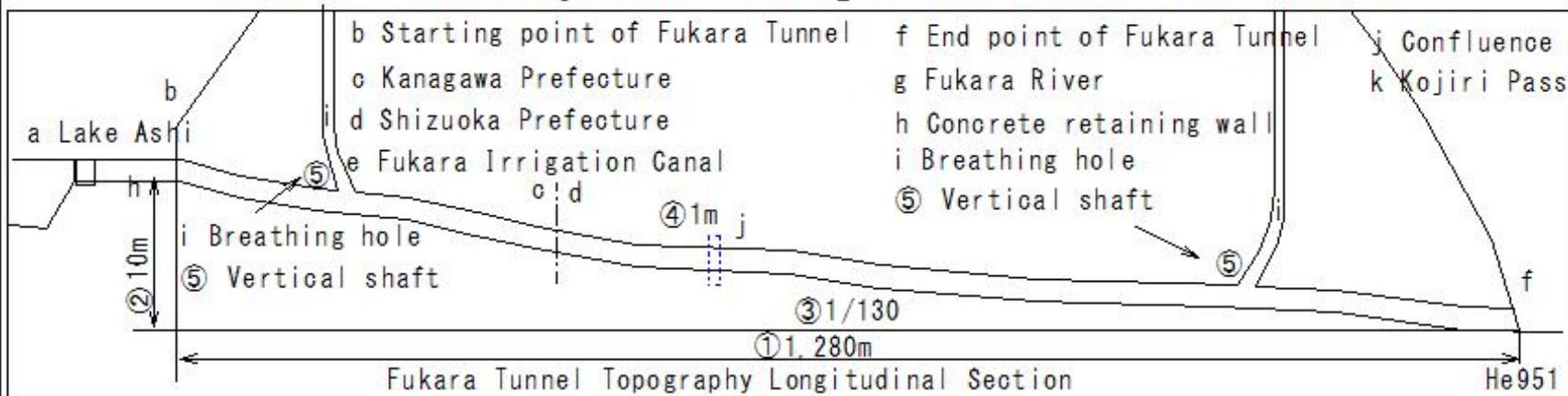


(He958) Fukarayousui Irrigation Canal (Shizuoka)



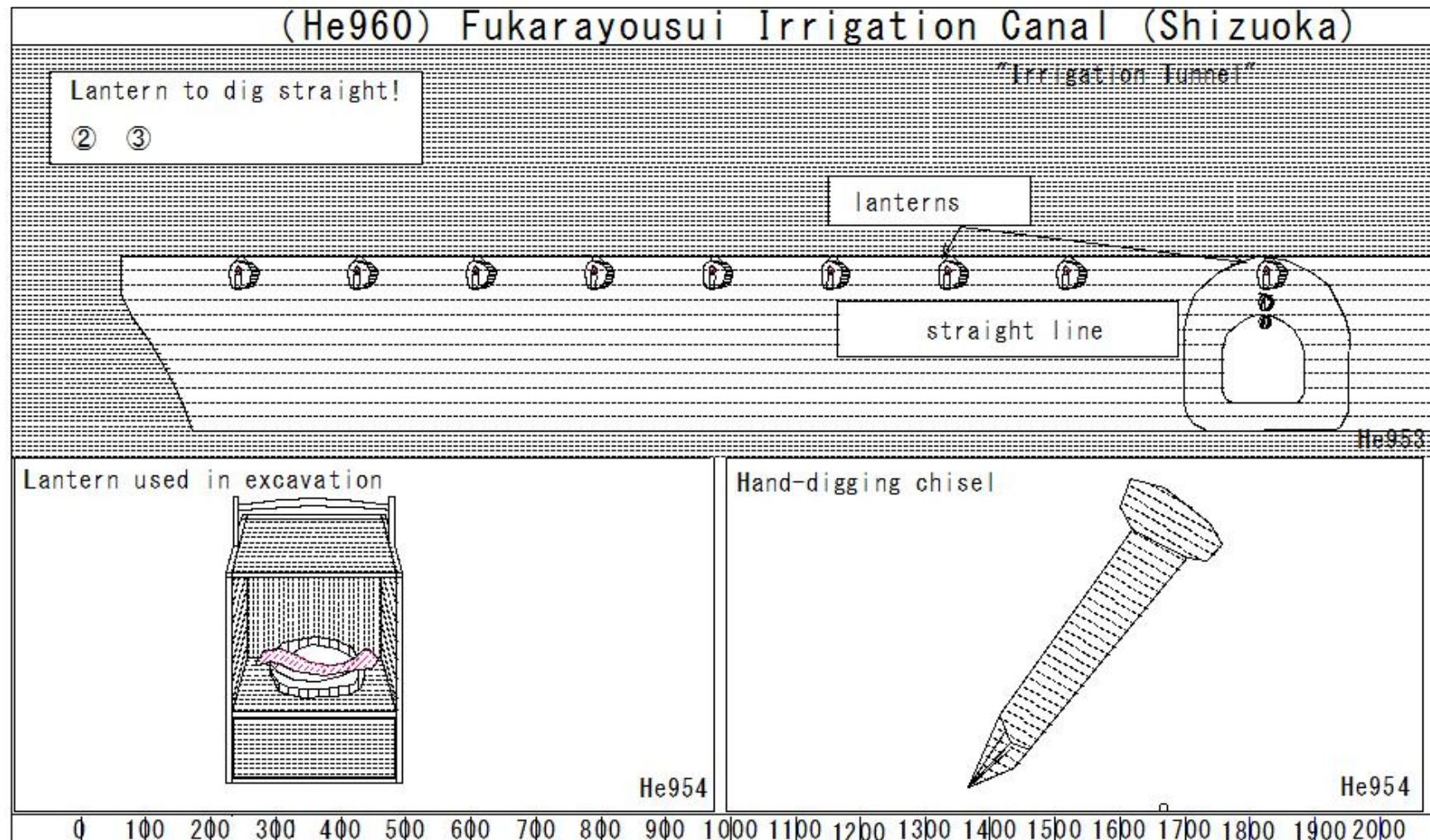
(He959) Fukarayousui Irrigation Canal (Shizuoka)

(He959) Fukarayousui Irrigation Canal (Shizuoka)

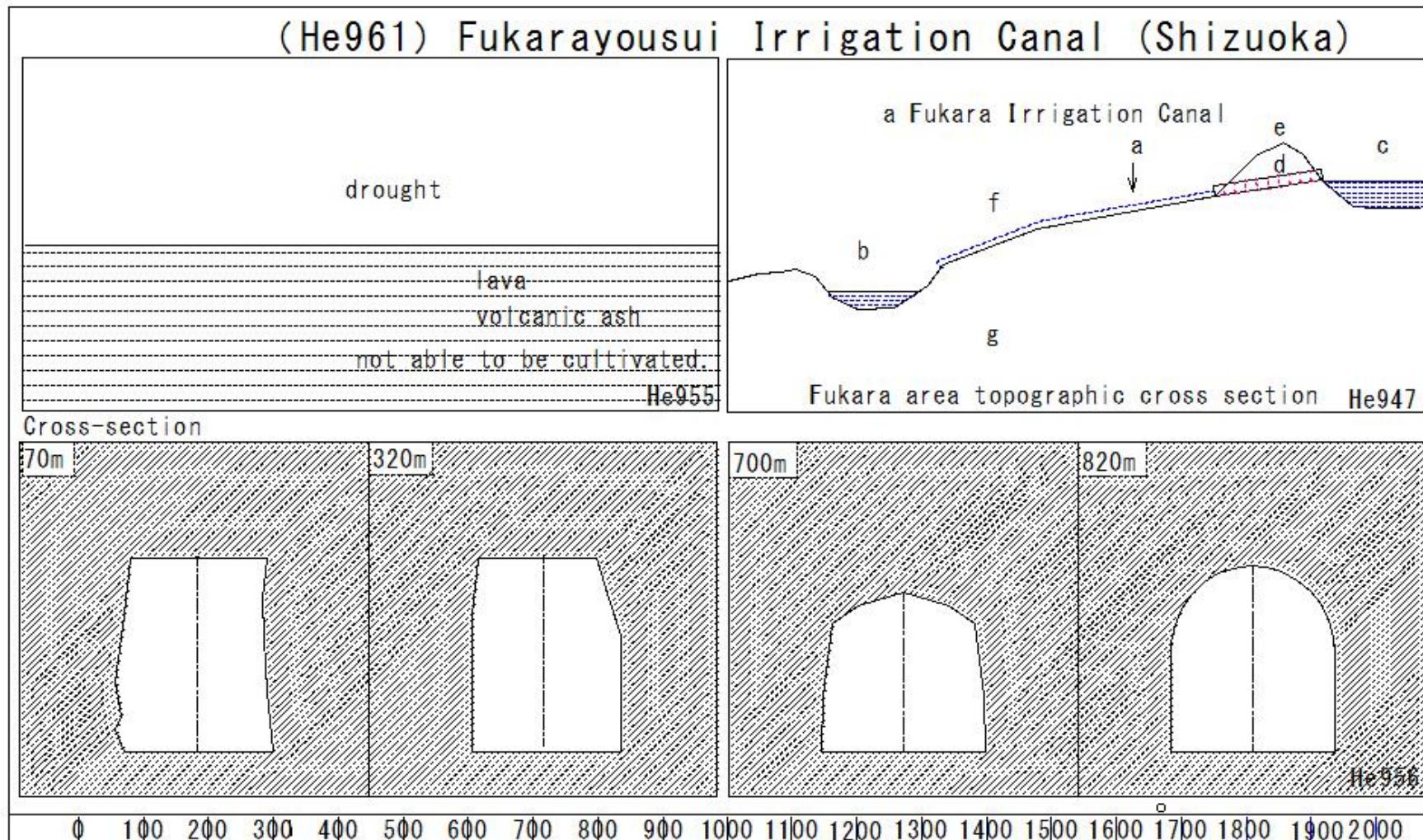


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He960) Fukarayousui Irrigation Canal (Shizuoka)



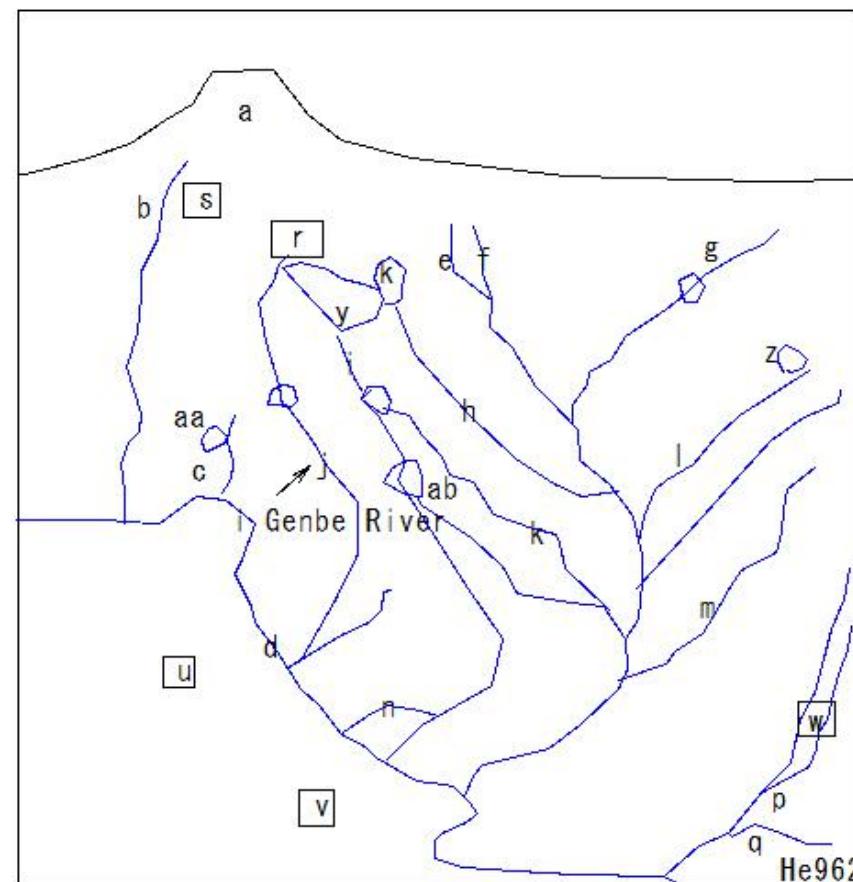
(He961) Fukarayousui Irrigation Canal (Shizuoka)



(He962)Genbegawa Irrigation Canal(Shizuoka)

(He962) Genbegawa Irrigation Canal (Shizuoka)

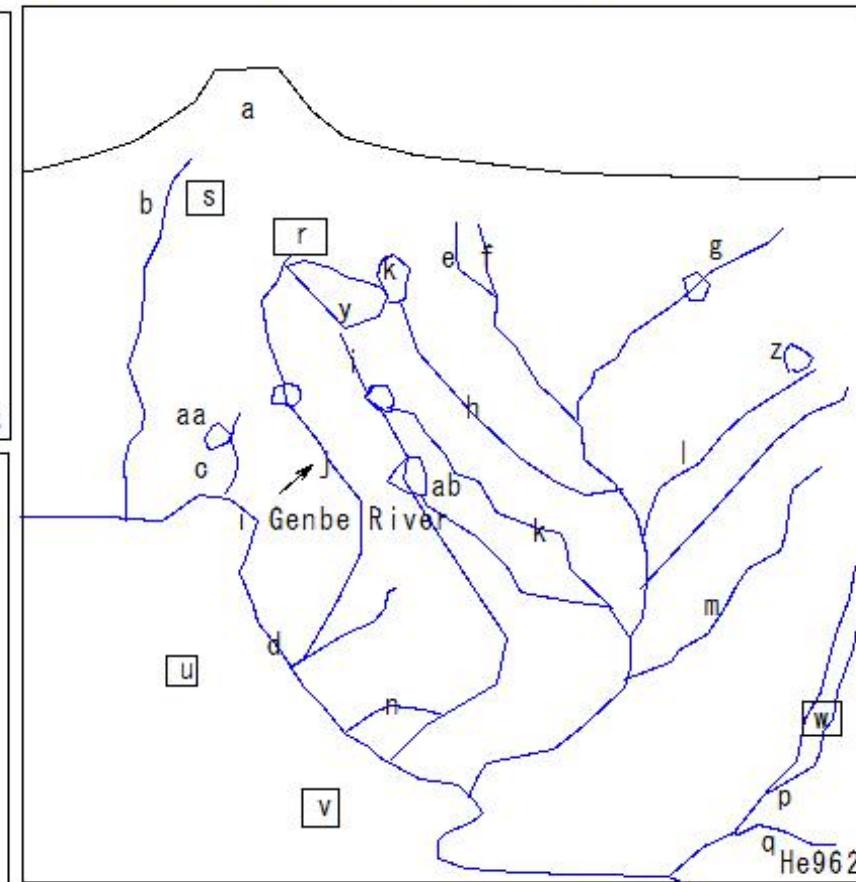
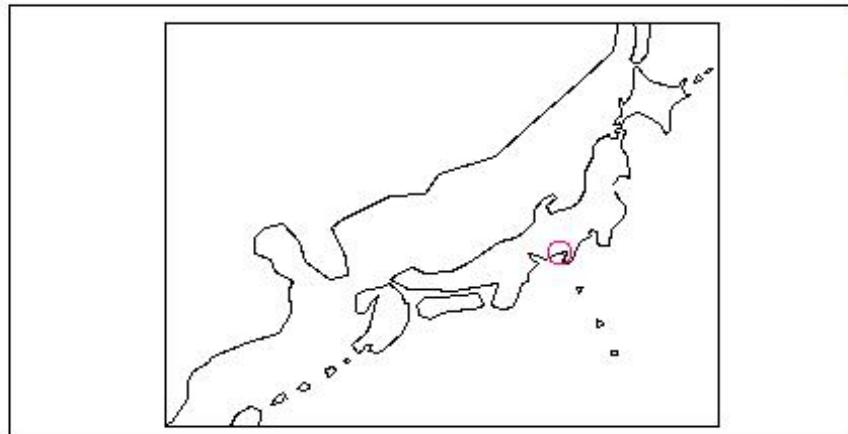
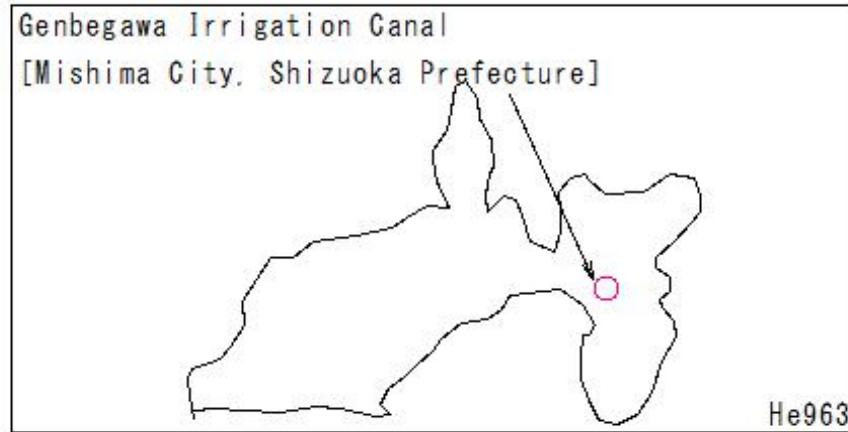
a Mount Fuji	v Numazu City
b Kise River	w Kannami Town
c Kakida River	x Komoike Park and Kagami Pond
d Kano River	y Obama Pond
e Oba River	z Takekura Spring
f Sawaji River	aa Kakida
g Yamada River	River Spring
h Sakura River	ab Nakago Hot
i Genbe River	Spring Pond
j Sakai River	
k Goten River	
l Natsuumeki River	
m Miyagawa River	
n Matsuge River	
o Raiko River	
p Raiko River	
q Kakizawa River	
r Mishima	
s Nagaizumi Town	
u Shimizu Town	



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He963)Genbegawa Irrigation Canal(Shizuoka)

(He963) Genbegawa Irrigation Canal (Shizuoka)



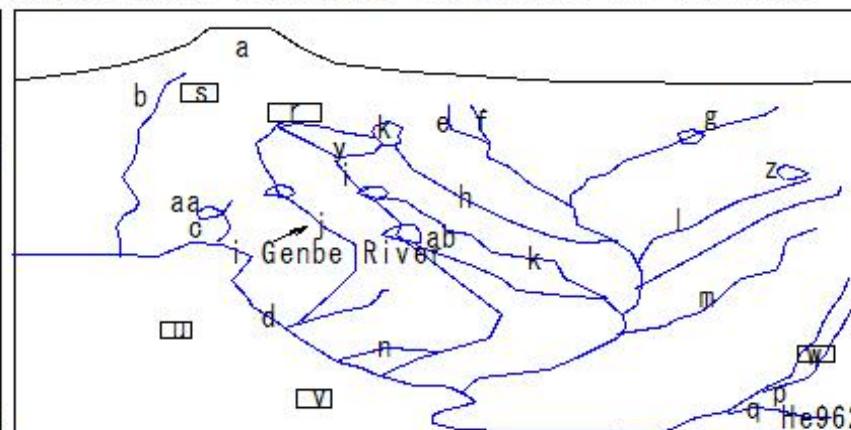
Φ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He964)Genbegawa Irrigation Canal(Shizuoka)

(He964) Genbegawa Irrigation Canal (Shizuoka)

- ① The Genbe River was constructed in the 16th century by local influential figure Genbe Terao, transforming the Nakago area into a fertile rice paddy region. It continues to serve as an irrigation facility supporting local agriculture today.
- ② The banks are made of masonry utilizing lava from Mt. Fuji. To raise the temperature of the cold spring water from Mt. Fuji to a suitable temperature for agricultural use, the river channel in the upper reaches was constructed with a wide width and shallow depth.
- ③ Since the 1960s, urbanization and river basin development have caused a period of deterioration in water quality and the environment, but Since the 1990s, environmental conservation efforts by a diverse range of entities, including citizens, NPOs, businesses, and government, have restored the stream's purity, and It has become a symbolic facility of "Mishima, the City of Water" a place of relaxation for citizens.

a Mount Fuji	k Goten River	v Numazu City
b Kise River	l Natsuumeiki River	w Kannami Town
c Kakida River	m Miyagawa River	x Komoike Park
d Kano River	n Matsuge River	and Kagami Pond
e Oba River	o Raiko River	y Obama Pond
f Sawaji River	p Raiko River	z Takekura Spring
g Yamada River	q Kakizawa River	aa Kakida
h Sakura River	r Mishima	River Spring
i Genbe River	s Nagaizumi Town	ab Nakago Hot
j Sakai River	u Shimizu Town	Spring Pond He962



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He965)Genbegawa Irrigation Canal(Shizuoka)

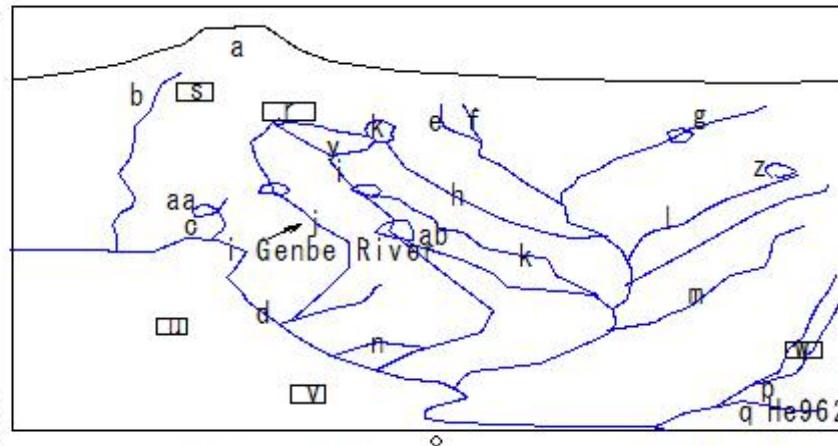
(He965) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

① The Genbe River was constructed in the 16th century by local influential figure Genbe Terao, transforming the Nakago area into a fertile rice paddy region. It continues to serve as an irrigation facility supporting local agriculture today.

①
Genbe Terao
16th century
irrigation facility

He965



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

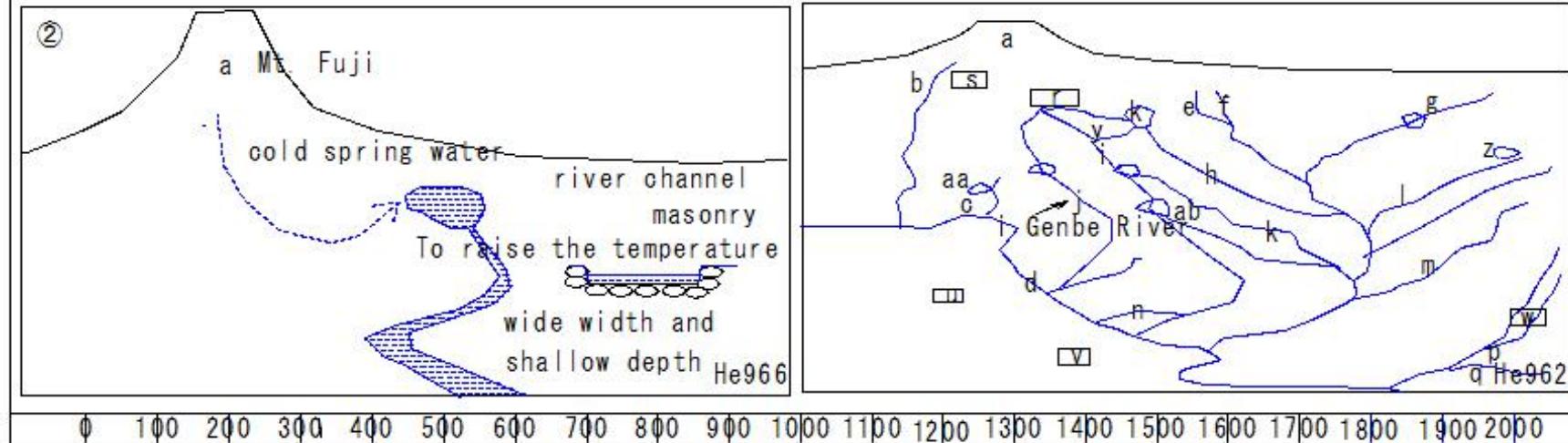
He962

(He966)Genbegawa Irrigation Canal(Shizuoka)

(He966) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

- ② The banks are made of masonry utilizing lava from Mt. Fuji. To raise the temperature of the cold spring water from Mt. Fuji to a suitable temperature for agricultural use, the river channel in the upper reaches was constructed with a wide width and shallow depth.



(He967)Genbegawa Irrigation Canal(Shizuoka)

(He967) Genbegawa Irrigation Canal(Shizuoka)

[Mishima City, Shizuoka Prefecture]

③

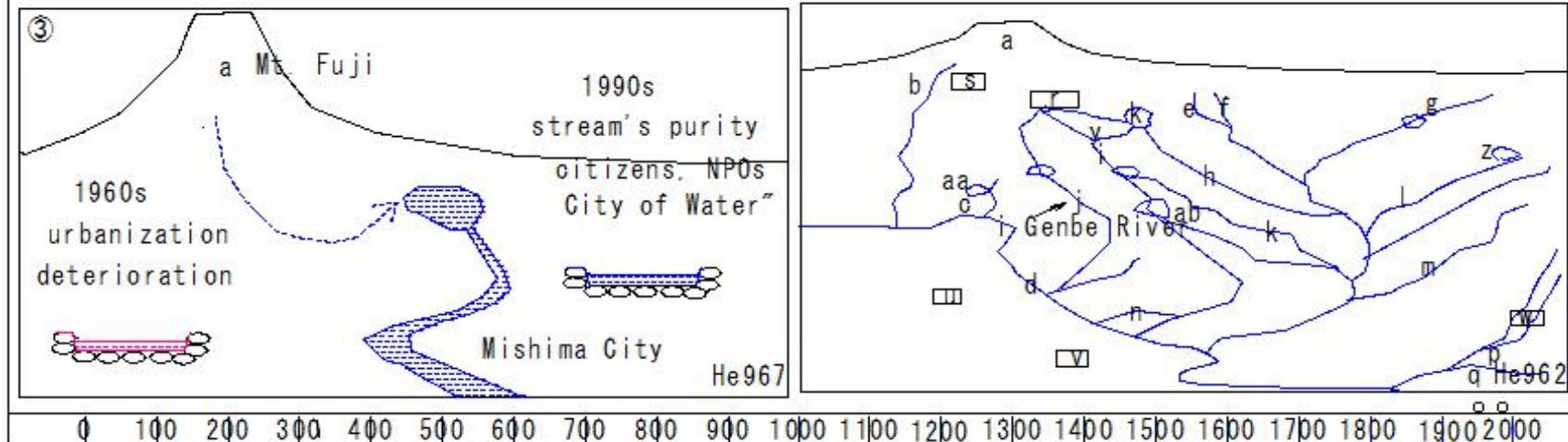
Since the 1960s, urbanization and river basin development have caused a period of deterioration in water quality and the environment, but

Since the 1990s, environmental conservation efforts by a diverse range of entities,

including citizens, NPOs, businesses, and government, have restored the stream's purity, and

It has become a symbolic facility of "Mishima, the City of Water"

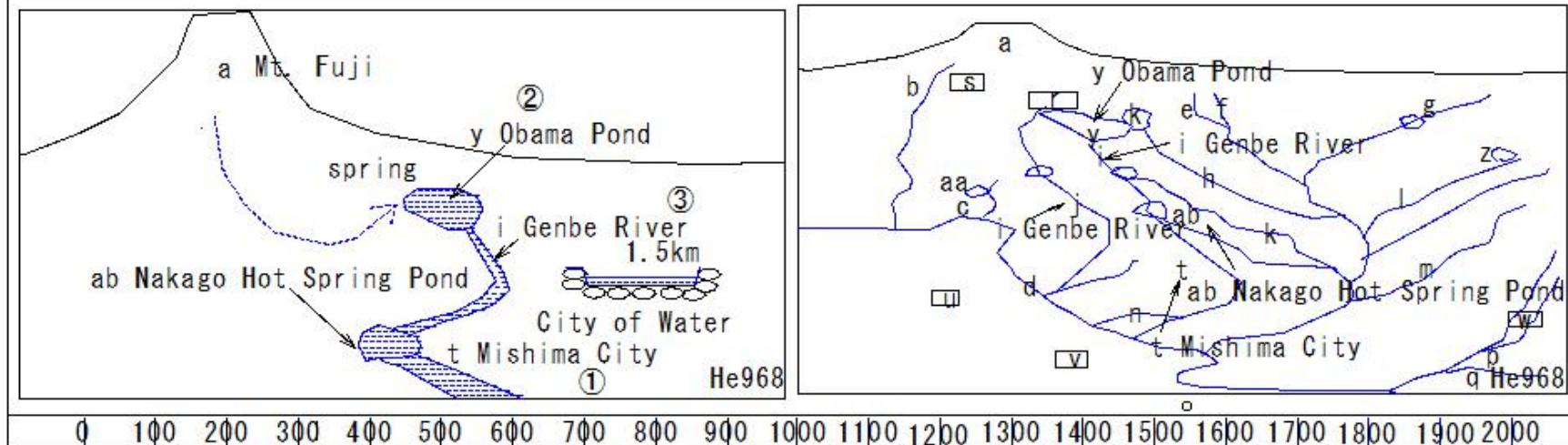
and a place of relaxation for citizens.



(He968)Genbegawa Irrigation Canal(Shizuoka)

(He968) Genbegawa Irrigation Canal (Shizuoka)

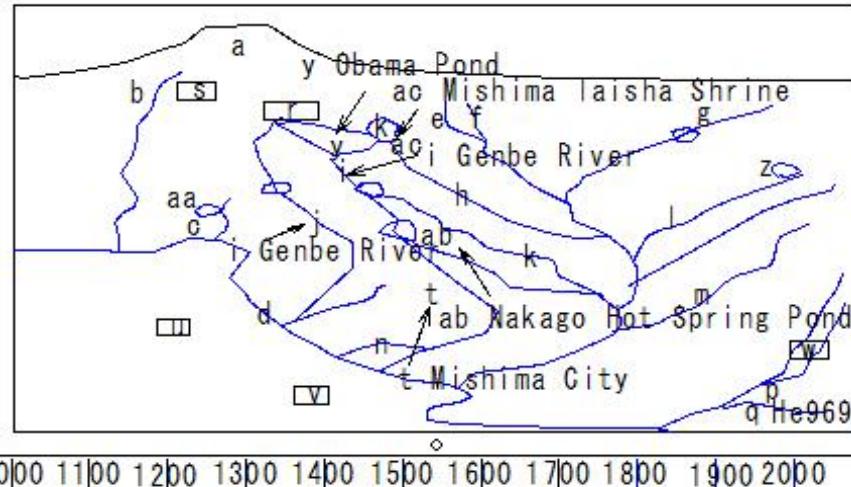
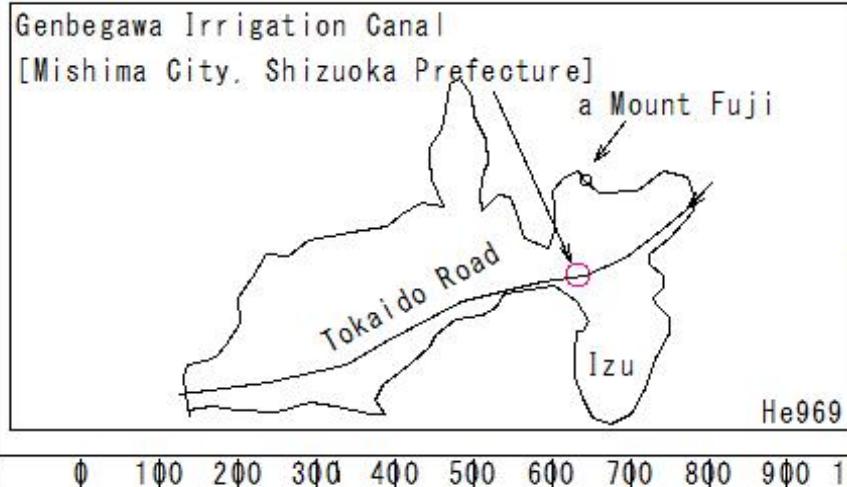
- ① The Genbe River is a clear stream that can be said to be a symbol of Mishima, the City of Water.
- ② It originates from the Obama Pond spring at Rakujuen Garden, a national natural monument and scenic spot located in front of Mishima Station.
- ③ It is an approximately 1.5km irrigation canal that flows into the Nakago Hot Water Pond, an agricultural reservoir.



(He969)Genbegawa Irrigation Canal(Shizuoka)

(He969) Genbegawa Irrigation Canal (Shizuoka)

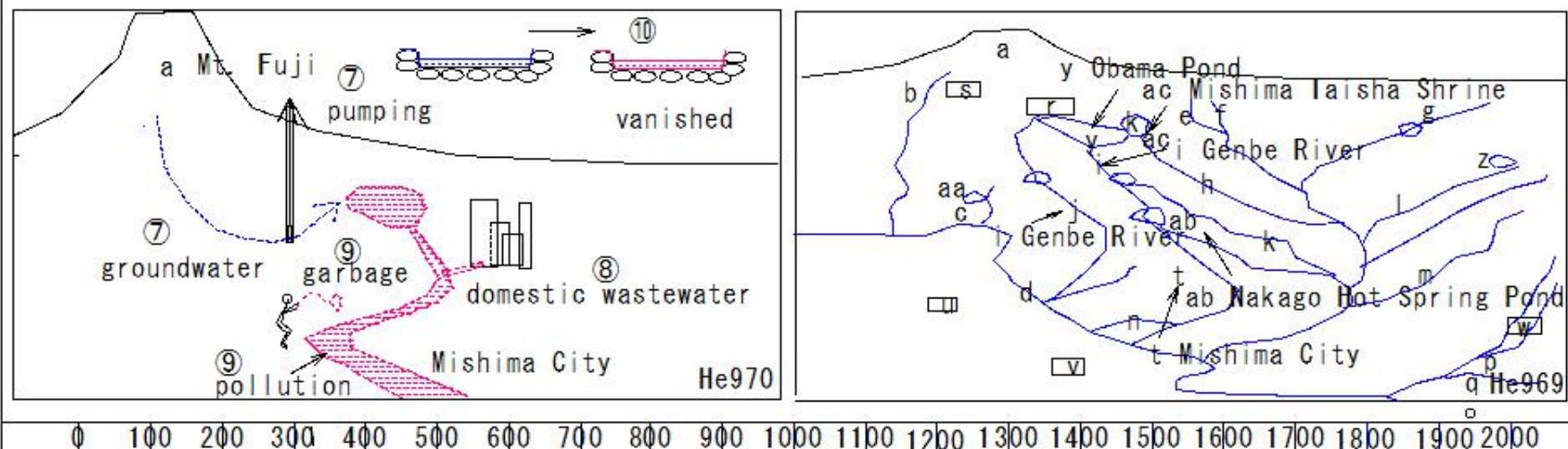
- ④ The name of this river is said to come from Terao Genbe, who constructed the canal.
- ⑤ The abundant water of this river has long been used for domestic water in Mishima and agricultural water in the Nakago area.
- ⑥ which was a bustling temple town for Mishima Taisha Shrine, a post town on the Tokaido Road, and the gateway to Izu.



(He970)Genbegawa Irrigation Canal(Shizuoka)

(He970) Genbegawa Irrigation Canal(Shizuoka)

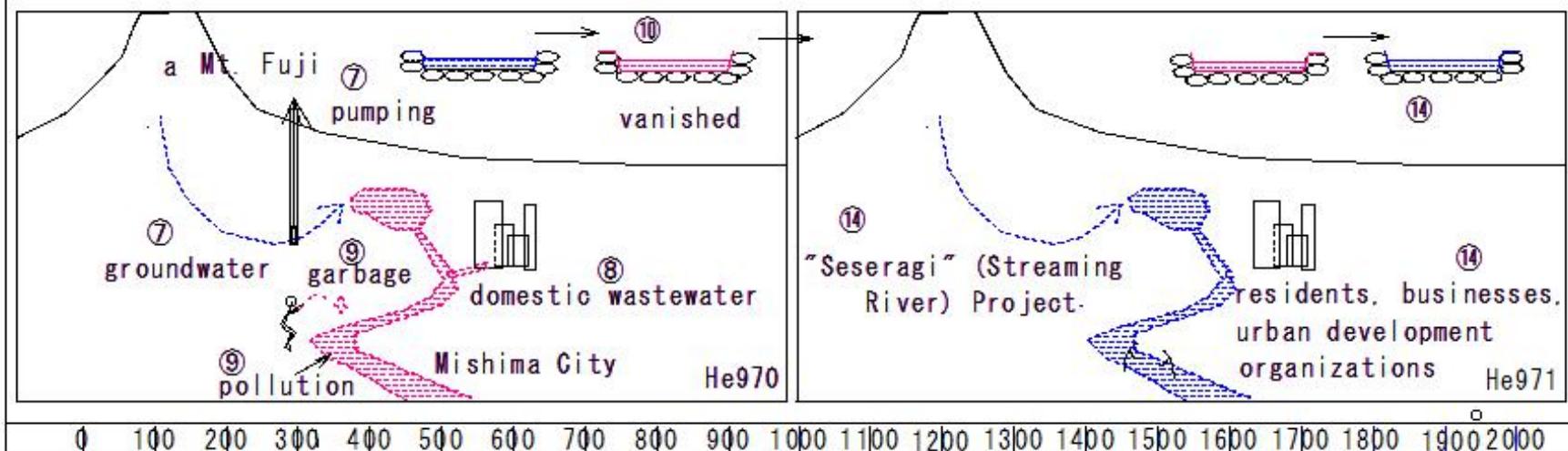
- ⑦ Since the mid-1950s, the river has suffered from a decline in spring water due to groundwater pumping by factories,
- ⑧ the inflow of domestic wastewater due to urban modernization,
- ⑨ pollution from illegally dumped garbage, and other issues.
- ⑩ A trace of its former self has vanished.



(He971)Genbegawa Irrigation Canal(Shizuoka)

(He971) Genbegawa Irrigation Canal (Shizuoka)

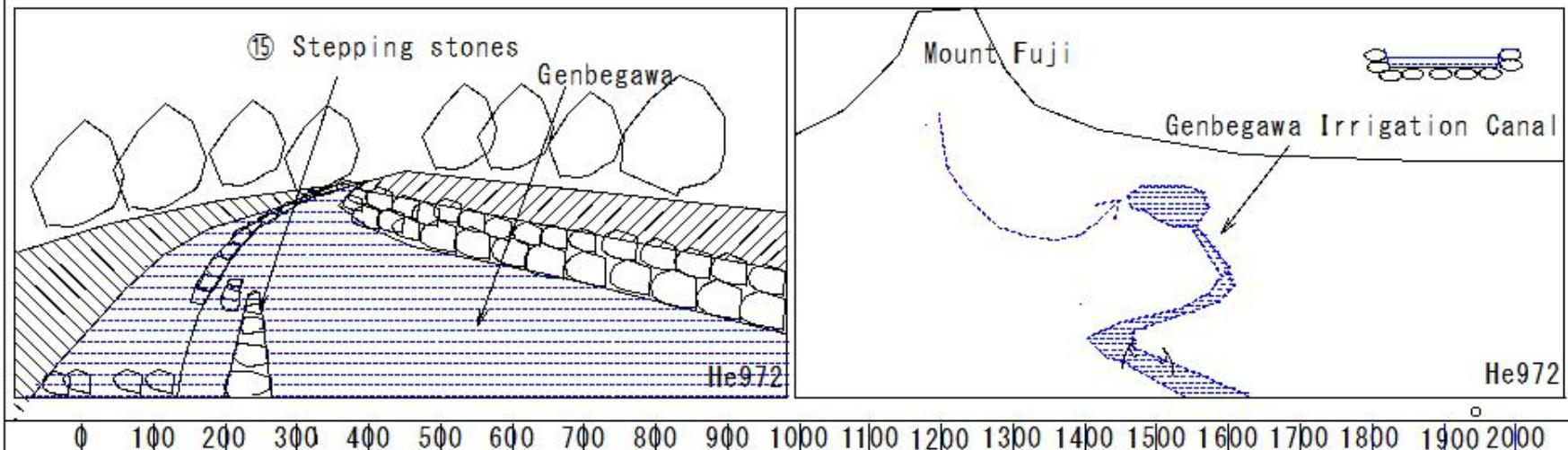
- ⑪ To create a place for residents and tourists to relax, protect nature, and pass it on to future generations.
- ⑫ The Prefectural Agricultural Irrigation Facility Advanced Utilization Project began in 1990.
- ⑬ The Prefectural Water Environment Improvement Project began in 1993.
- ⑭ The "Seseragi" (Streaming River) Project, a groundwork approach in which residents, businesses, urban development organizations, and the government collaborated to share responsibilities, resulted in



(He972)Genbegawa Irrigation Canal(Shizuoka)

(He972) Genbegawa Irrigation Canal (Shizuoka)

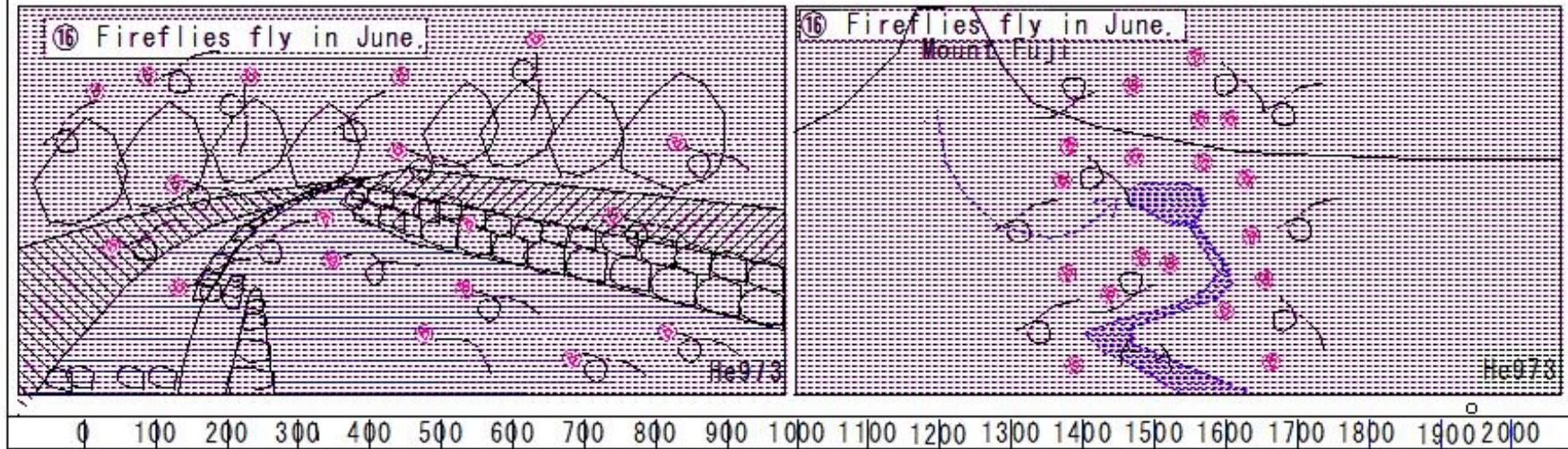
- ⑯ Stepping stones for strolling through the river,
- ⑯ Fireflies fly in June,
- ⑯ Children play in the water in the summer,
- ⑯ Many residents, tourists, and visitors visit the area,
- ⑯ The area has been recognized as one of Japan's 100 Water Villages, 100 Canals, and 100 Famous Waters of the Heisei Era,
- ⑯ It has become a waterfront landscape representative of "Mishima, the City of Water."



(He973)Genbegawa Irrigation Canal(Shizuoka)

(He973) Genbegawa Irrigation Canal (Shizuoka)

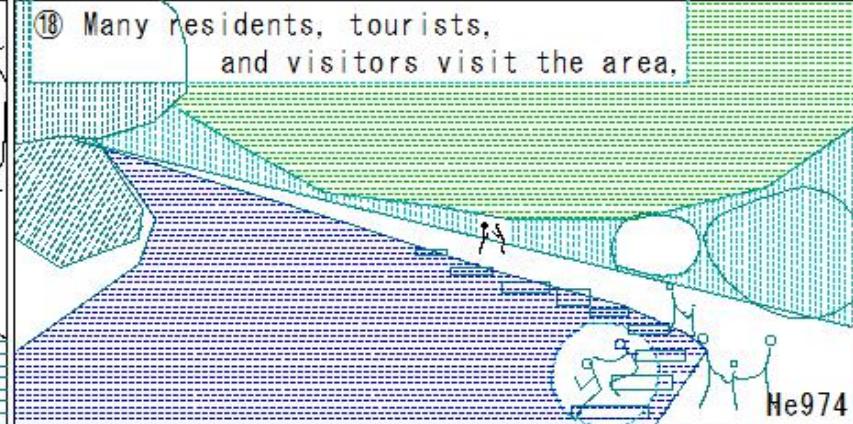
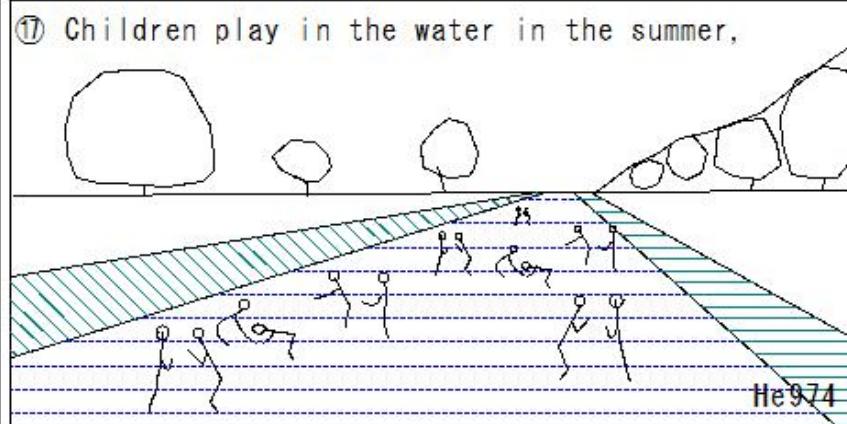
- ⑯ Stepping stones for strolling through the river.
- ⑯ Fireflies fly in June.
- ⑯ Children play in the water in the summer.
- ⑯ Many residents, tourists, and visitors visit the area.
- ⑯ The area has been recognized as one of Japan's 100 Water Villages, 100 Canals, and 100 Famous Waters of the Heisei Era.
- ⑯ It has become a waterfront landscape representative of "Mishima, the City of Water."



(He974)Genbegawa Irrigation Canal(Shizuoka)

(He974) Genbegawa Irrigation Canal (Shizuoka)

- ⑯ Stepping stones for strolling through the river,
- ⑯ Fireflies fly in June,
- ⑯ Children play in the water in the summer,
- ⑯ Many residents, tourists, and visitors visit the area,
- ⑯ The area has been recognized as one of Japan's 100 Water Villages, 100 Canals, and 100 Famous Waters of the Heisei Era,
- ⑯ It has become a waterfront landscape representative of "Mishima, the City of Water."



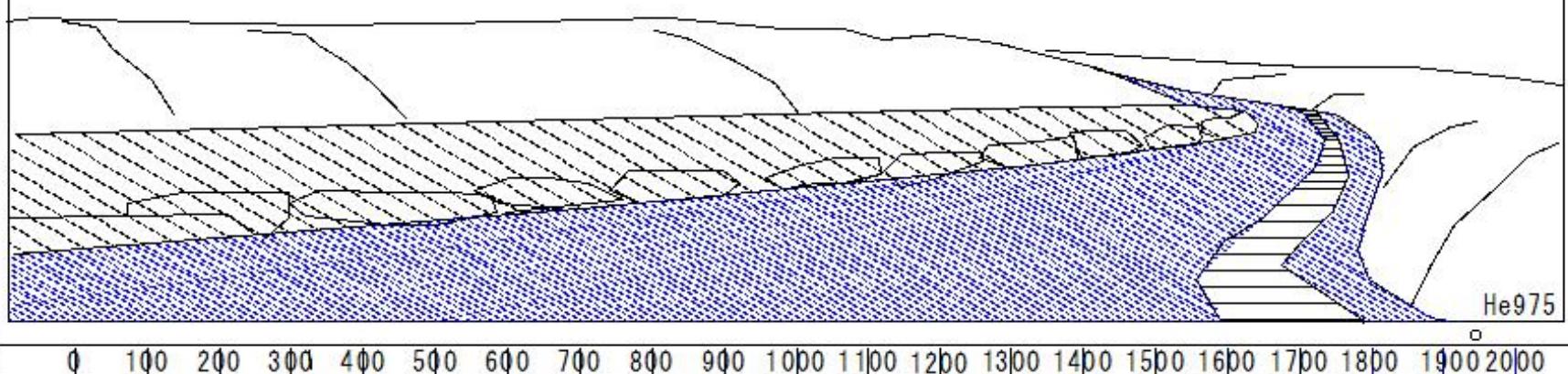
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He975)Genbegawa Irrigation Canal(Shizuoka)

(He975) Genbegawa Irrigation Canal (Shizuoka)

- ⑯ Stepping stones for strolling through the river.
- ⑯ Fireflies fly in June.
- ⑯ Children play in the water in the summer.
- ⑯ Many residents, tourists, and visitors visit the area.
- ⑯ The area has been recognized as one of Japan's 100 Water Villages, 100 Canals, and 100 Famous Waters of the Heisei Era.
- ⑯ It has become a waterfront landscape representative of "Mishima, the City of Water."

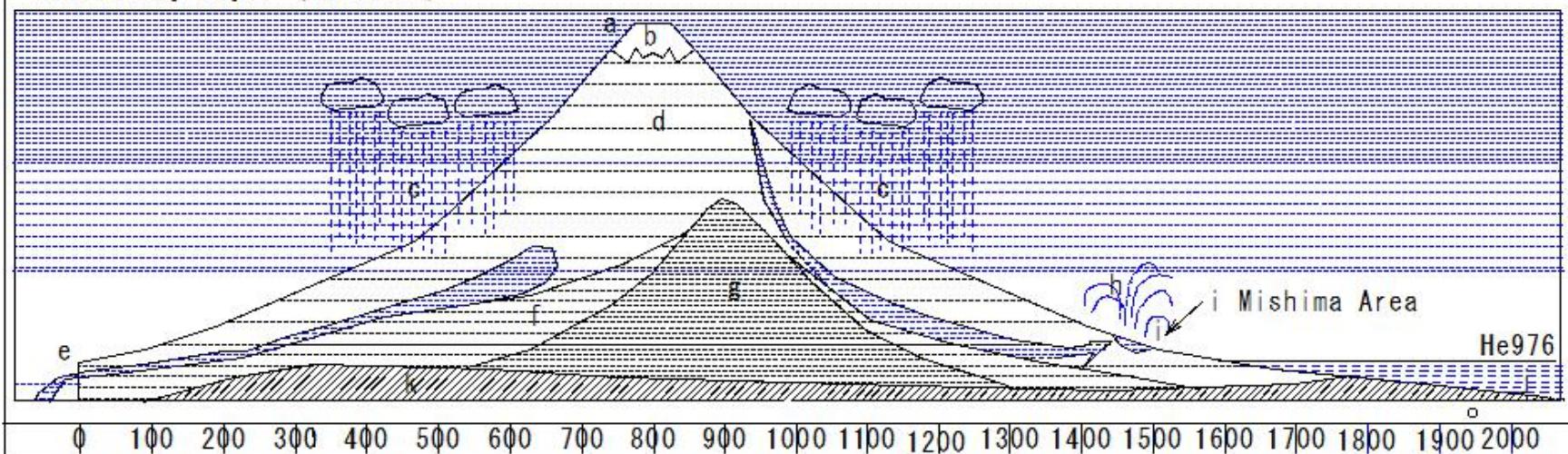
⑯ "Mishima, the City of Water."



(He976)Genbegawa Irrigation Canal(Shizuoka)

(He976) Genbegawa Irrigation Canal (Shizuoka)

- a Mount Fuji
- b Snow
- c Rain
- d New Mount Fuji
- e Shiraito Falls
- f old Fuji volcano
- g Komitake Volcano
- h Springs District
- i Mishima Area
- j Suruga Bay
- k Tertiary Layer (Basement)

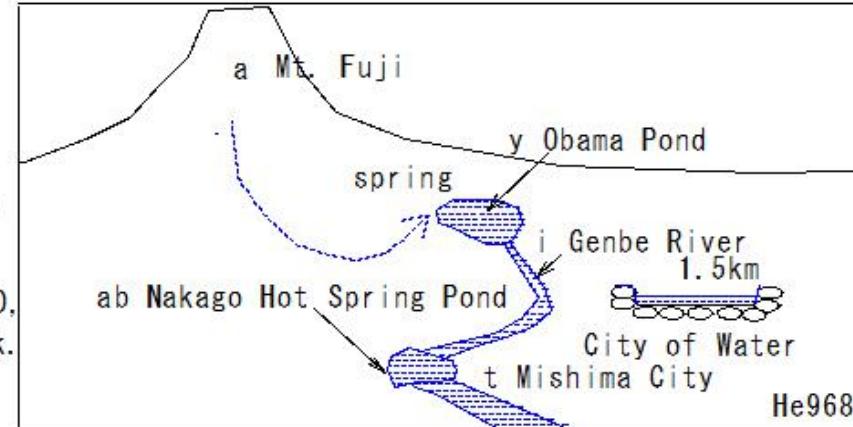


(He977)Genbegawa Irrigation Canal(Shizuoka)

(He977) Genbegawa Irrigation Canal (Shizuoka)

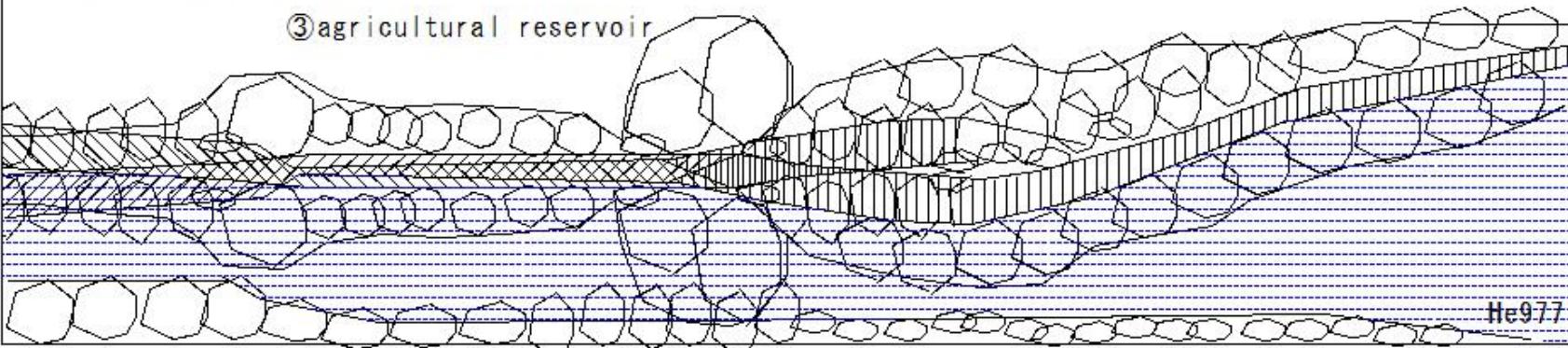
ab Nakago Hot Spring Pond

- ① A hot water pond where the Genbe River flows into.
- ② It stores agricultural water for 13 downstream communities.
- ③ It is an agricultural reservoir built to warm cold spring water.
- ④ A waterfront development project began in 1990, creating a green belt beneath the concrete bank.
- ⑤ As a result, the pond is now home to a total of 100 species of plants and animals.



ab Nakago Hot Spring Pond

③agricultural reservoir



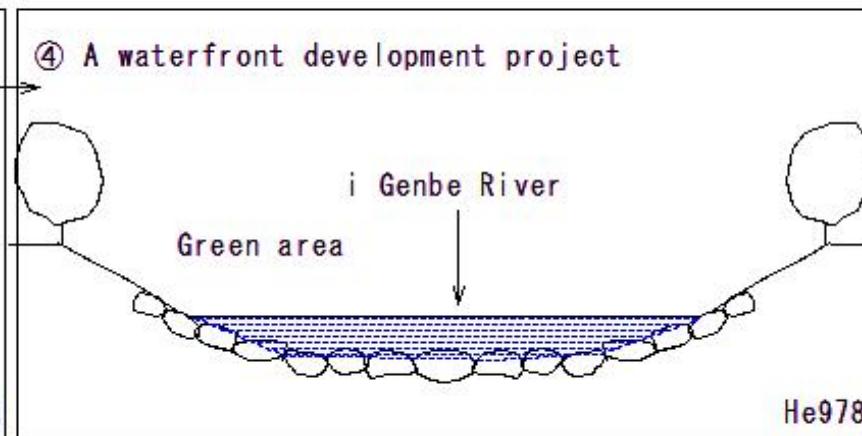
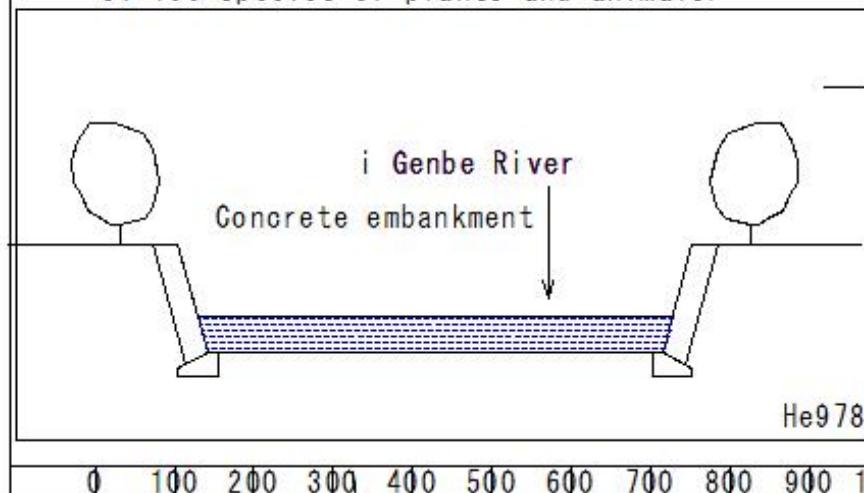
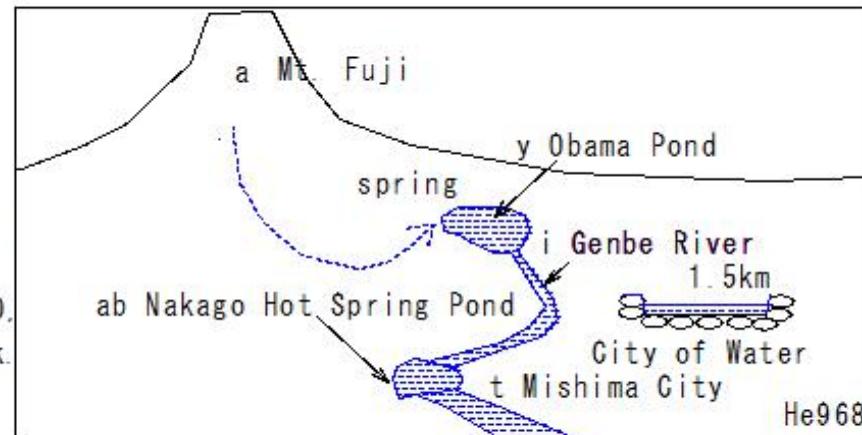
Ø 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He978)Genbegawa Irrigation Canal(Shizuoka)

(He978) Genbegawa Irrigation Canal (Shizuoka)

ab Nakago Hot Spring Pond

- ① A hot water pond where the Genbe River flows into.
- ② It stores agricultural water for 13 downstream communities.
- ③ It is an agricultural reservoir built to warm cold spring water.
- ④ A waterfront development project began in 1990, creating a green belt beneath the concrete bank.
- ⑤ As a result, the pond is now home to a total of 100 species of plants and animals.



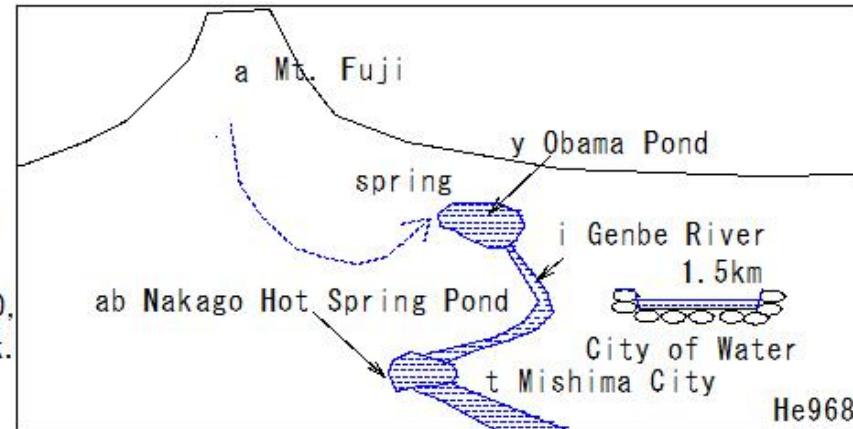
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(He979)Genbegawa Irrigation Canal(Shizuoka)

(He979) Genbegawa Irrigation Canal (Shizuoka)

ab Nakago Hot Spring Pond

- ① A hot water pond where the Genbe River flows into.
- ② It stores agricultural water for 13 downstream communities.
- ③ It is an agricultural reservoir built to warm cold spring water.
- ④ A waterfront development project began in 1990, creating a green belt beneath the concrete bank.
- ⑤ As a result, the pond is now home to a total of 100 species of plants and animals.



ab Nakago Hot Spring Pond

concrete bank



He979

- ④ A waterfront development project

ab Nakago Hot Spring Pond

Green area

He979

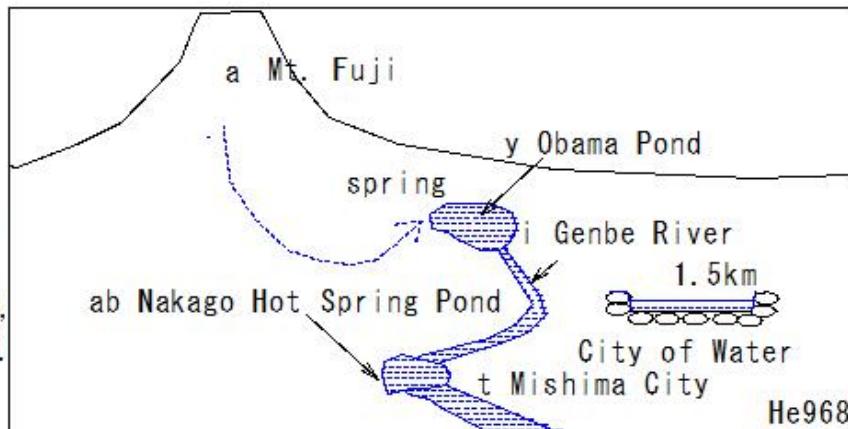
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(He980)Genbegawa Irrigation Canal(Shizuoka)

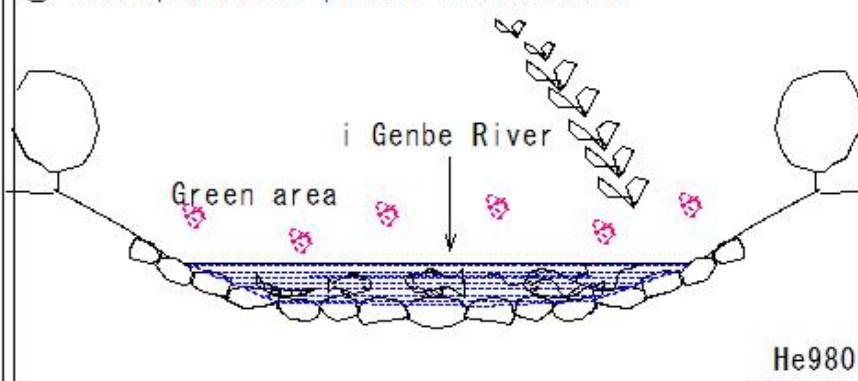
(He980) Genbegawa Irrigation Canal (Shizuoka)

ab Nakago Hot Spring Pond

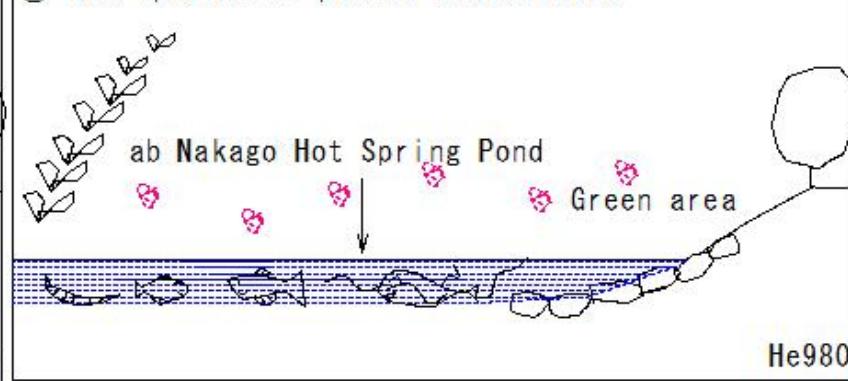
- ① A hot water pond where the Genbe River flows into.
- ② It stores agricultural water for 13 downstream communities.
- ③ It is an agricultural reservoir built to warm cold spring water.
- ④ A waterfront development project began in 1990, creating a green belt beneath the concrete bank.
- ⑤ As a result, the pond is now home to a total of 100 species of plants and animals.



- ⑤ 100 species of plants and animals.



- ⑤ 100 species of plants and animals.



∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He981)Genbegawa Irrigation Canal(Shizuoka)

(He981) Genbegawa Irrigation Canal (Shizuoka)

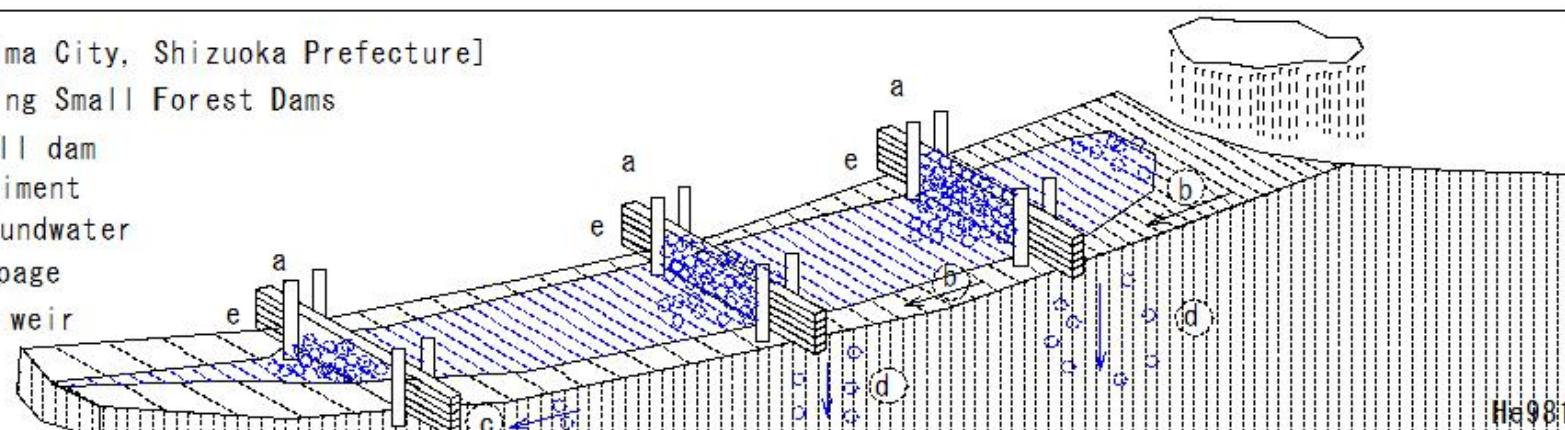
[Mishima City, Shizuoka Prefecture] Building Small Forest Dams

- ① Participation and collaboration with local residents (Building Small Forest Dams)
- ② Enhance the forest's groundwater recharge function by allowing rainwater to infiltrate underground and preventing sediment runoff.
- ③ It also leads to the effective use of thinned logs.
- ④ This project is being carried out as an effort to develop groundwater in preparation for the revival of the Mishima Springs.
- ⑤ "Log Weirs" are installed in mountain depressions where rainwater concentrates, by stacking thinned logs two to three layers high and securing them with stakes.
- ⑥ Each weir is designed to store approximately 200 liters of rainwater.

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir



Φ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He982)Genbegawa Irrigation Canal(Shizuoka)

(He982) Genbegawa Irrigation Canal(Shizuoka)

[Mishima City, Shizuoka Prefecture]

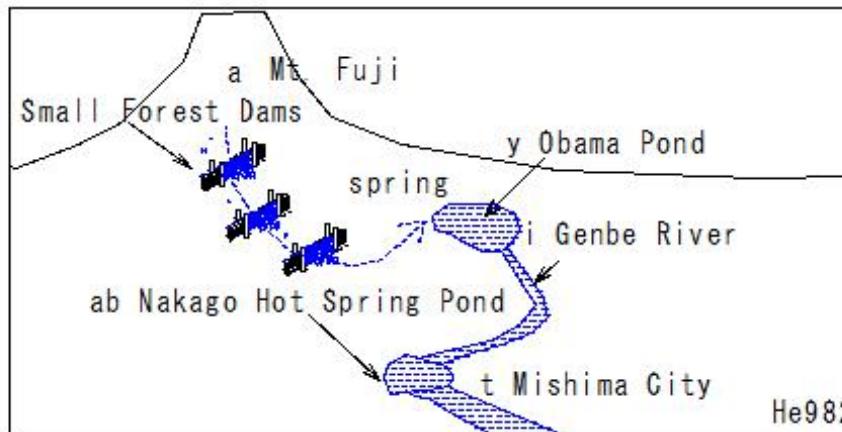
Building Small Forest Dams

① Participation and collaboration with local residents (Building Small Forest Dams)

Participation and collaboration



He982



He982

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

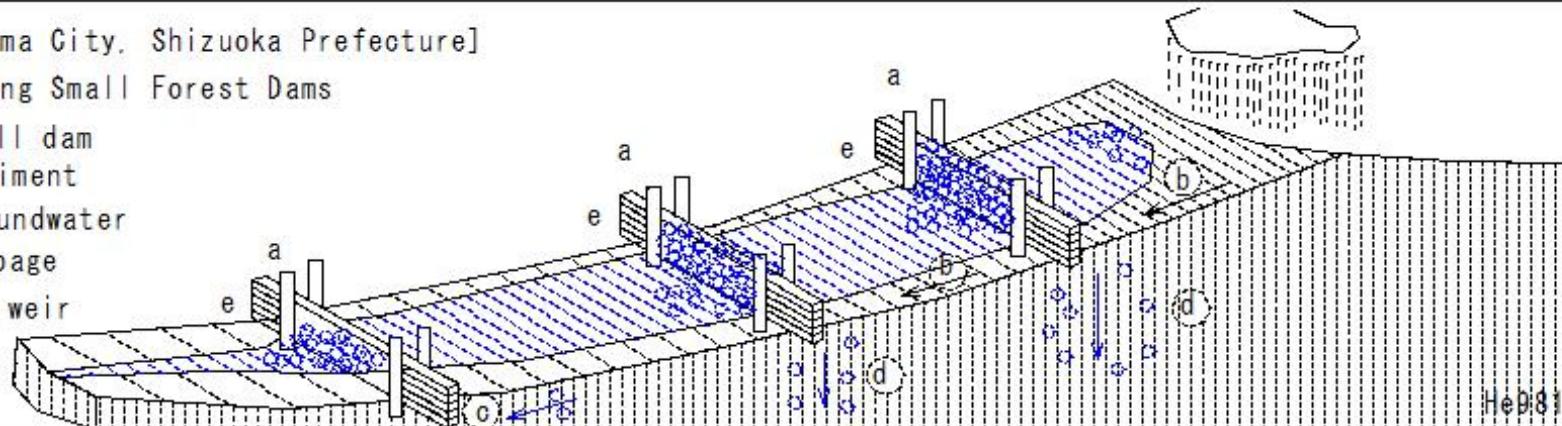
a Small dam

b Sediment

c Groundwater

d Seepage

e Log weir



He981

Φ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He983)Genbegawa Irrigation Canal(Shizuoka)

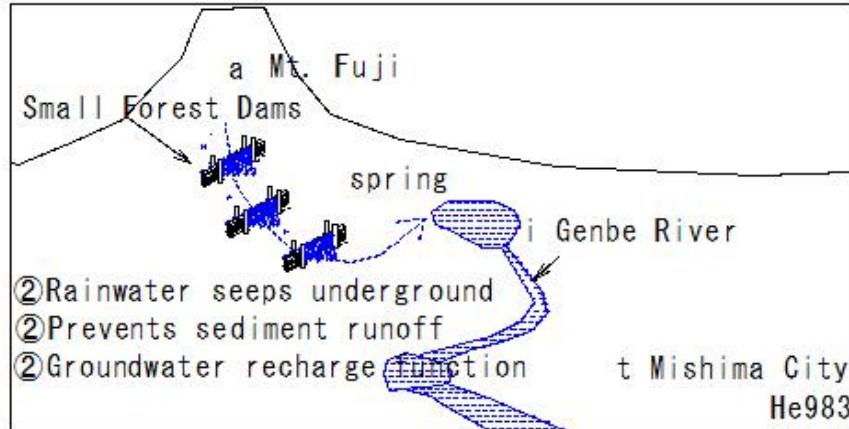
(He983) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- ② Enhance the forest's groundwater recharge function by allowing rainwater to infiltrate underground and preventing sediment runoff.

He983

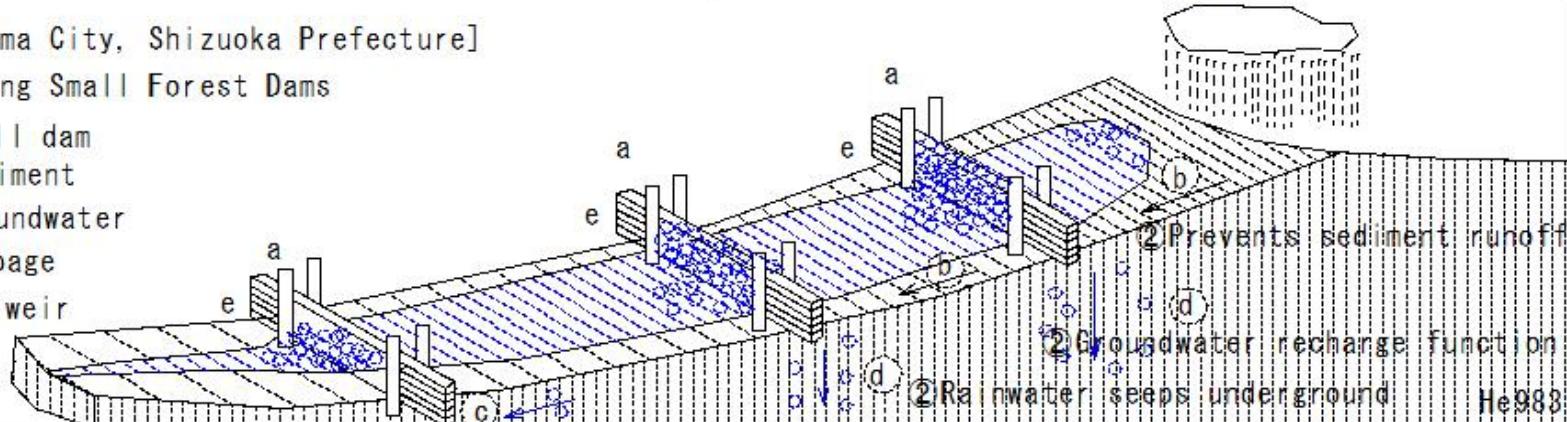


He983

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir



He983

∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

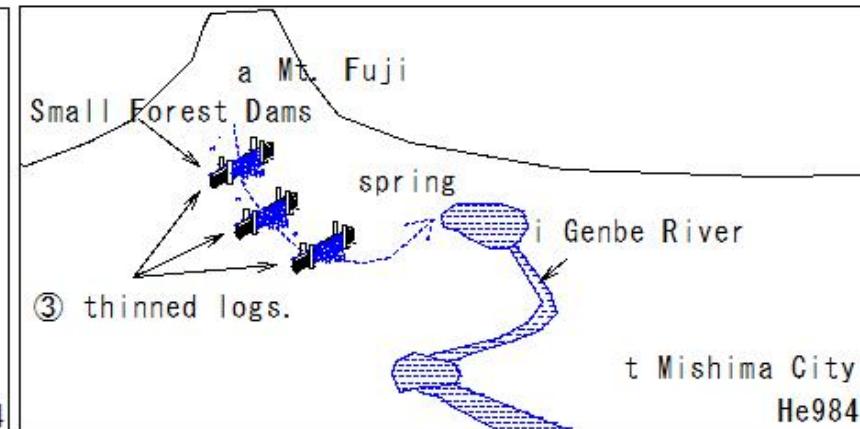
(He984)Genbegawa Irrigation Canal(Shizuoka)

(He984) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

③ It also leads to the effective use
of thinned logs.



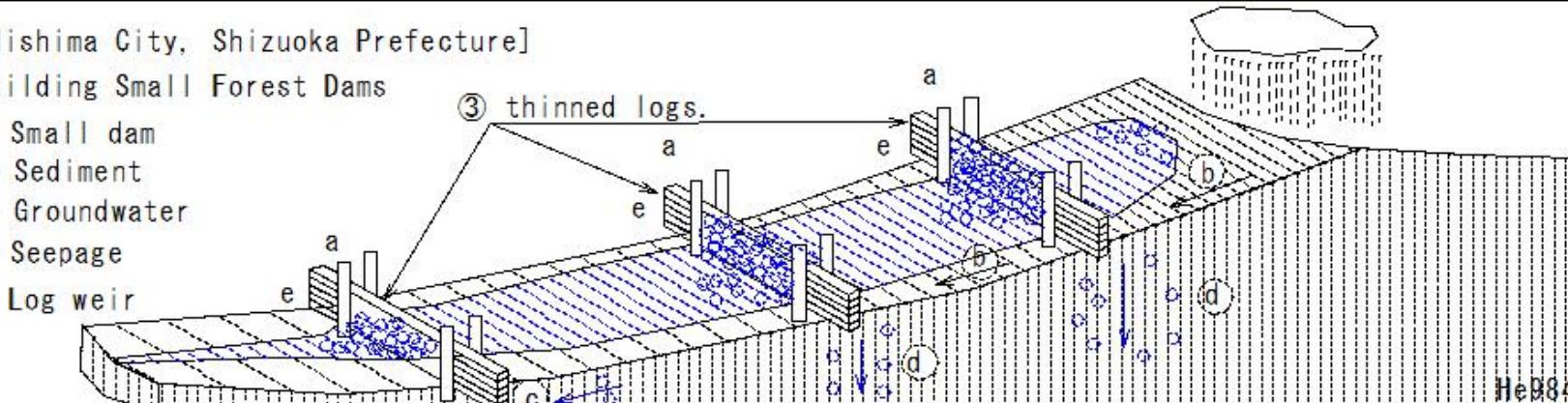
He984

He984

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir



He984

Φ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

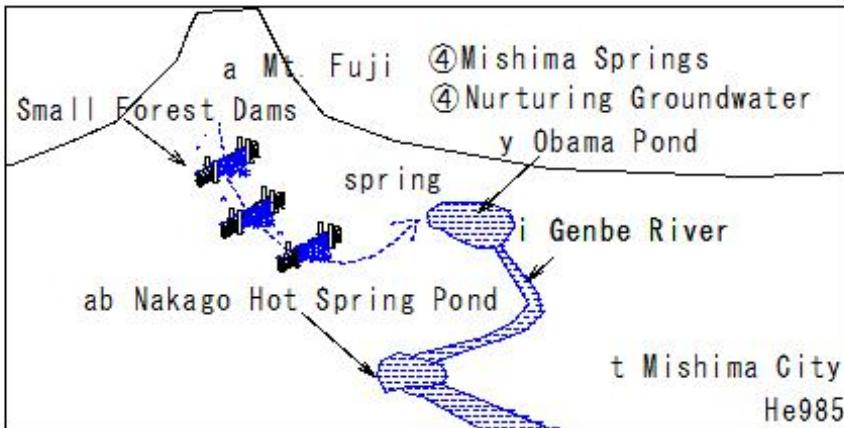
(He985)Genbegawa Irrigation Canal(Shizuoka)

(He985) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

④ This project is being carried out as an effort to develop groundwater in preparation for the revival of the Mishima Springs.



[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

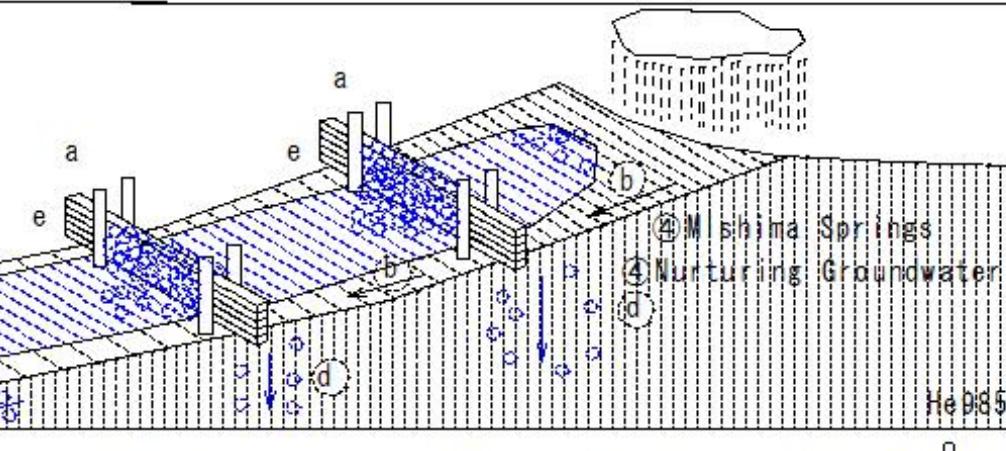
a Small dam

b Sediment

c Groundwater

d Seepage

e Log weir



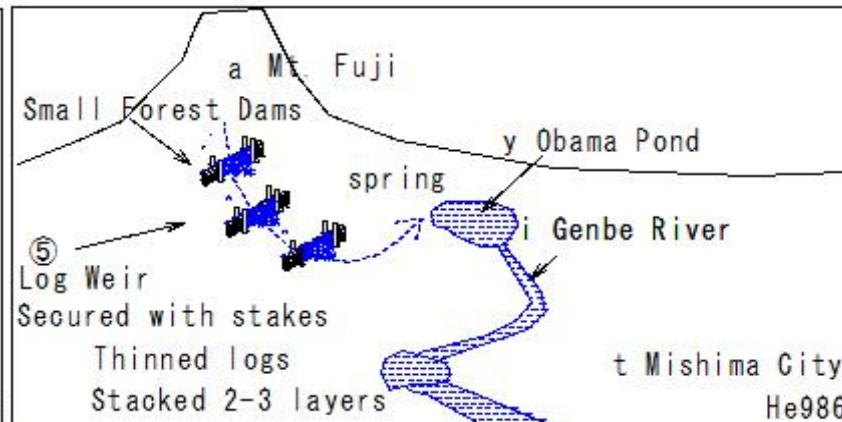
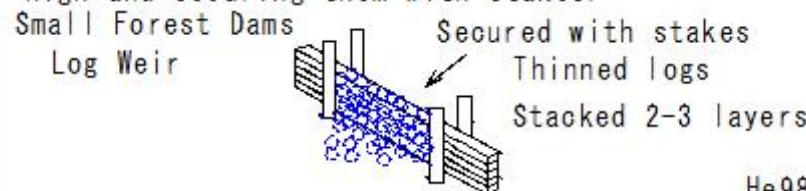
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He986)Genbegawa Irrigation Canal(Shizuoka)

(He986) Genbegawa Irrigation Canal(Shizuoka)

[Mishima City, Shizuoka Prefecture]

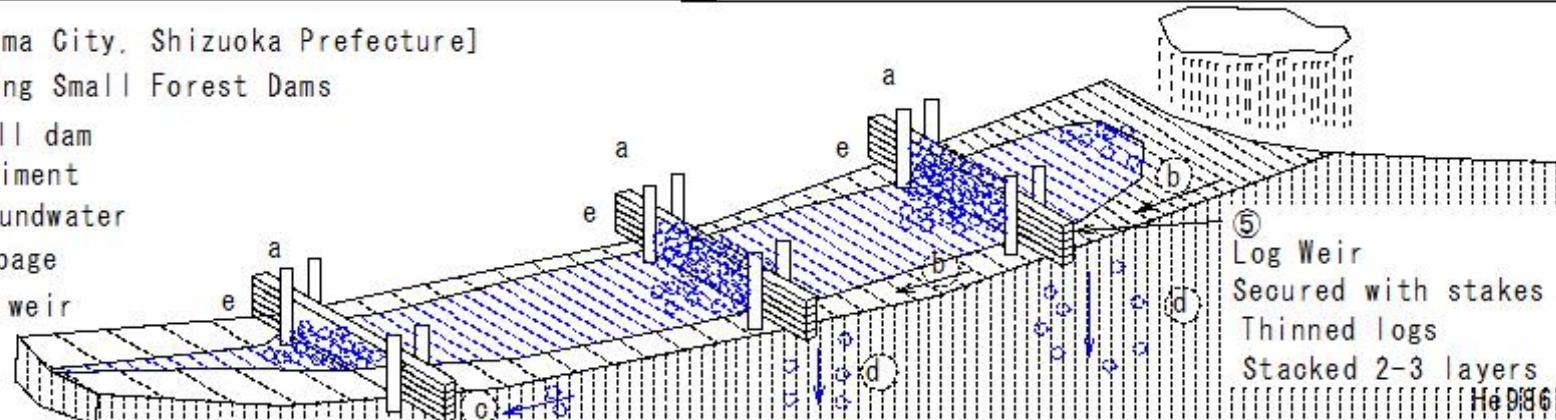
⑤ "Log Weirs" are installed in mountain depressions where rainwater concentrates, by stacking thinned logs two to three layers high and securing them with stakes.



[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir



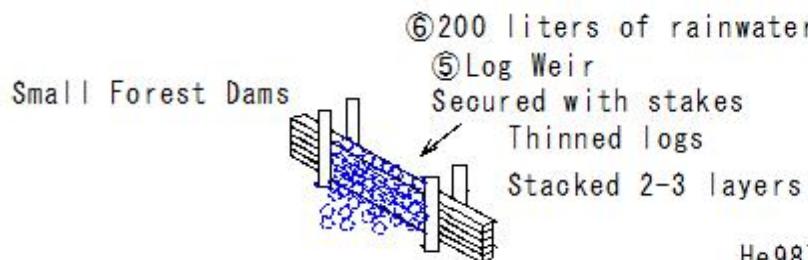
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He987)Genbegawa Irrigation Canal(Shizuoka)

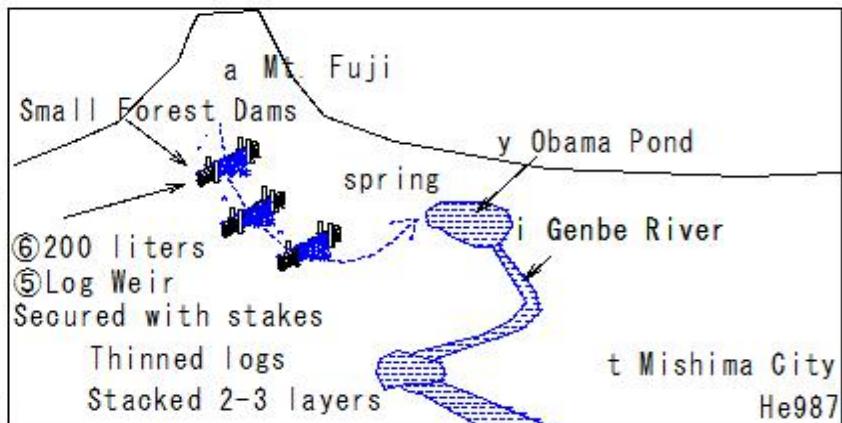
(He987) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

- ⑥ Each weir is designed to store approximately 200 liters of rainwater.



He987

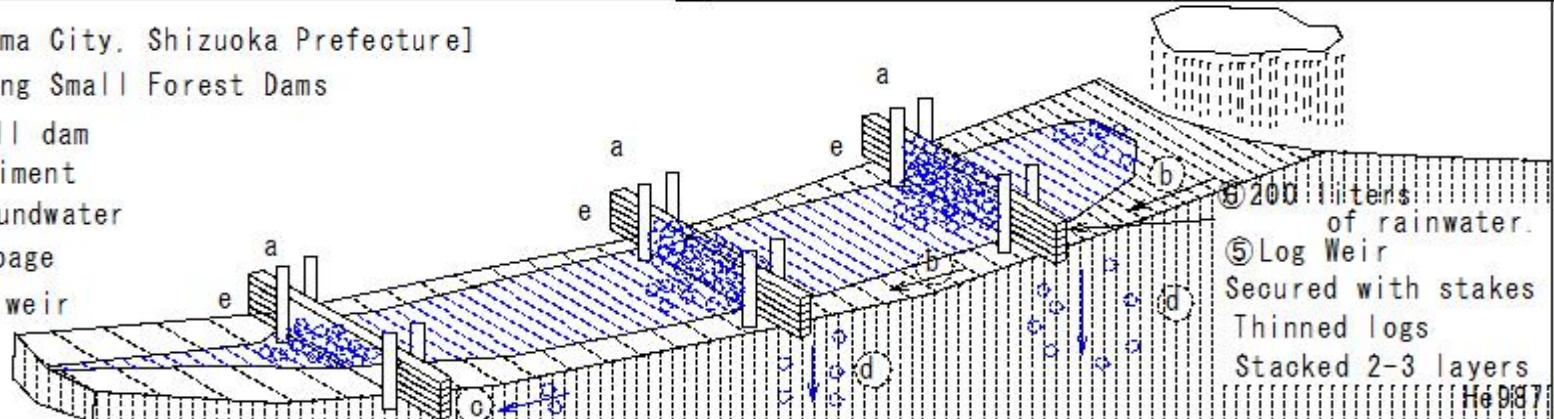


He987

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He988)Genbegawa Irrigation Canal(Shizuoka)

(He988) Genbegawa Irrigation Canal(Shizuoka)

[Mishima City, Shizuoka Prefecture]

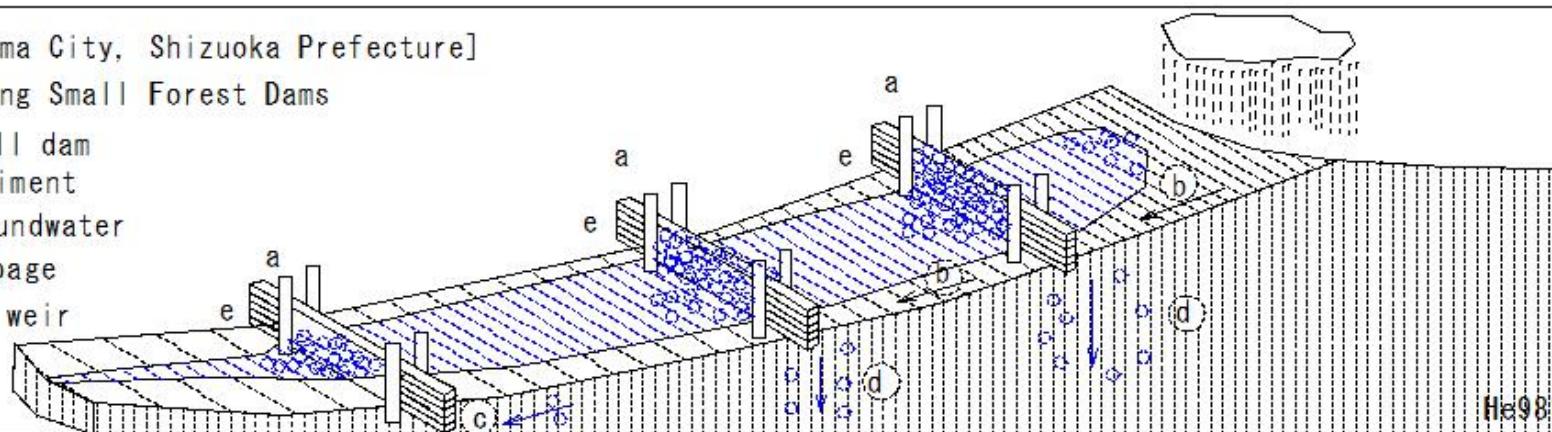
Building Small Forest Dams

- ⑦ The project is carried out with the cooperation of citizen and corporate volunteers.
- ⑧ It is also used as part of environmental studies for elementary and junior high schools.
- ⑨ Forestry classes are also held at the same time to learn about the functions of forests and groundwater.
- ⑩ It serves as a forum for environmental education and groundwater conservation awareness among citizens.

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir



He981

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He989)Genbegawa Irrigation Canal(Shizuoka)

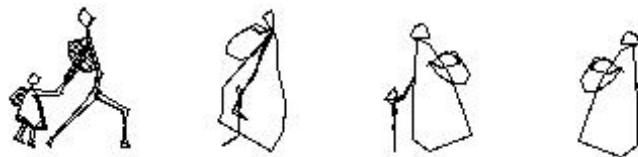
(He989) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

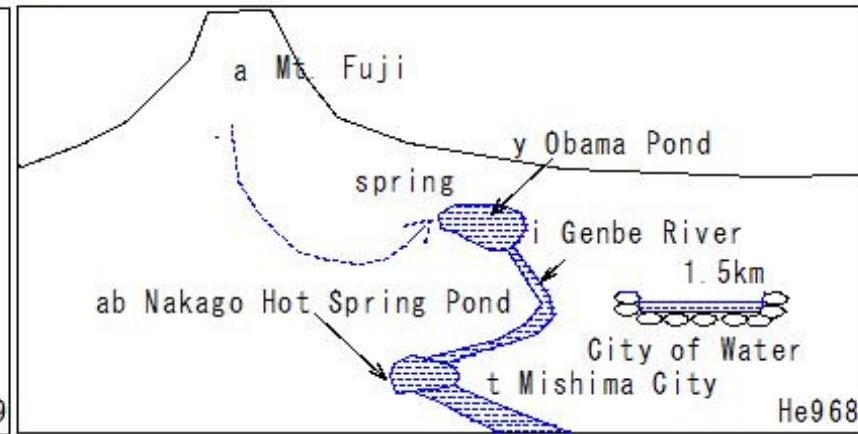
Building Small Forest Dams

⑦ The project is carried out with the cooperation of citizen and corporate volunteers.

⑦ Citizen and Corporate Volunteer Activities



He989



He968

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

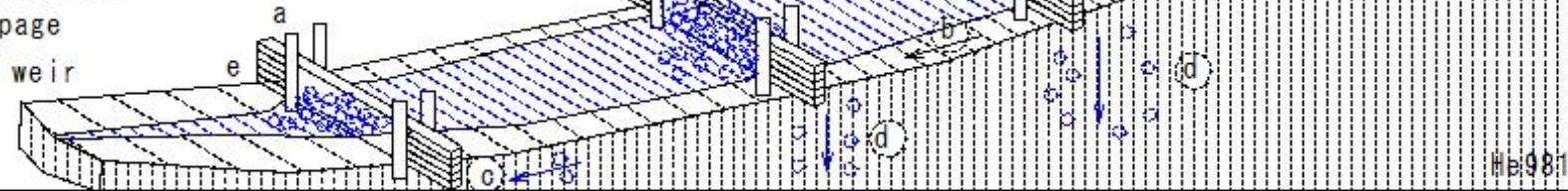
a Small dam

b Sediment

c Groundwater

d Seepage

e Log weir



He981

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He990)Genbegawa Irrigation Canal(Shizuoka)

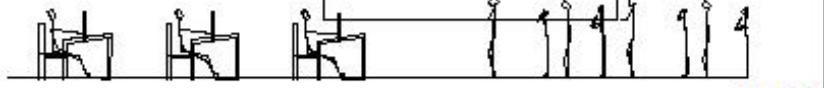
(He990) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

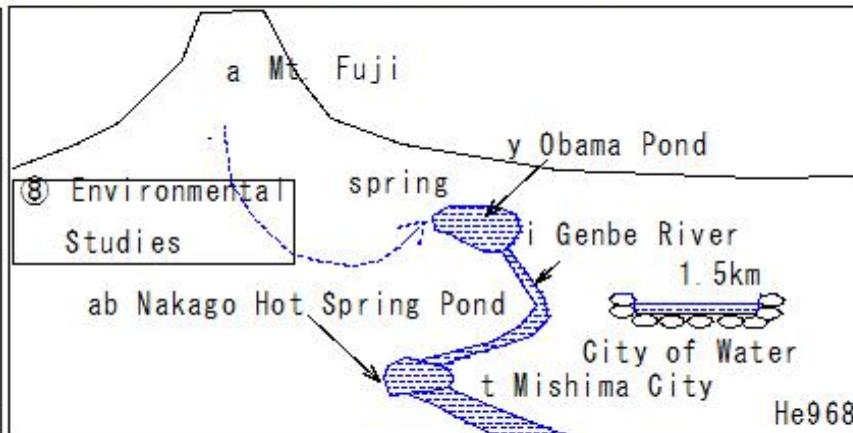
Building Small Forest Dams

⑧ It is also used as part of environmental studies for elementary and junior high schools.

⑧ Environmental Studies



He990



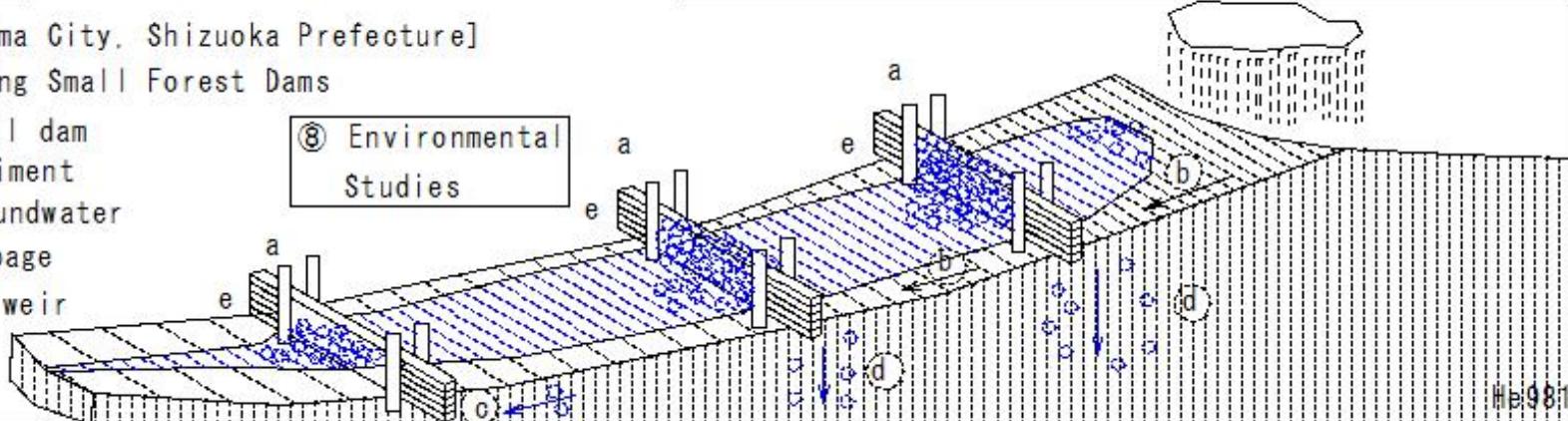
He968

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir

⑧ Environmental Studies



He981

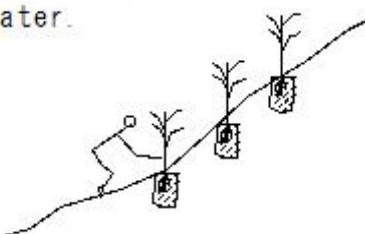
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(He991)Genbegawa Irrigation Canal(Shizuoka)

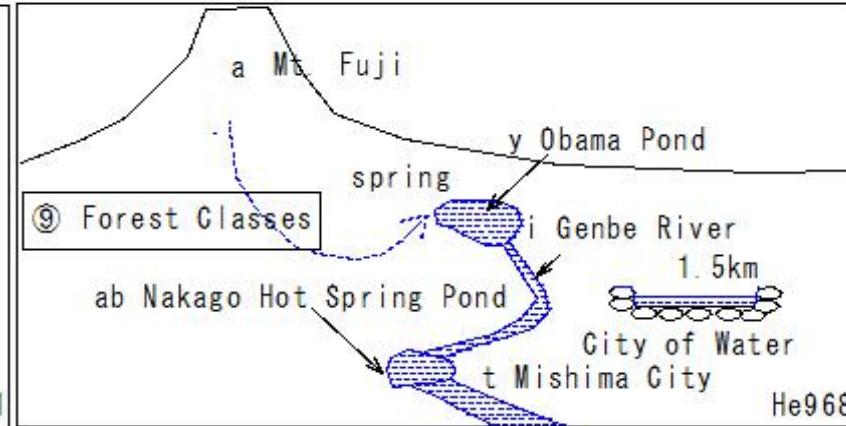
(He991) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]
Building Small Forest Dams

- ⑨ Forestry classes are also held at the same time to learn about the functions of forests and groundwater.



He991

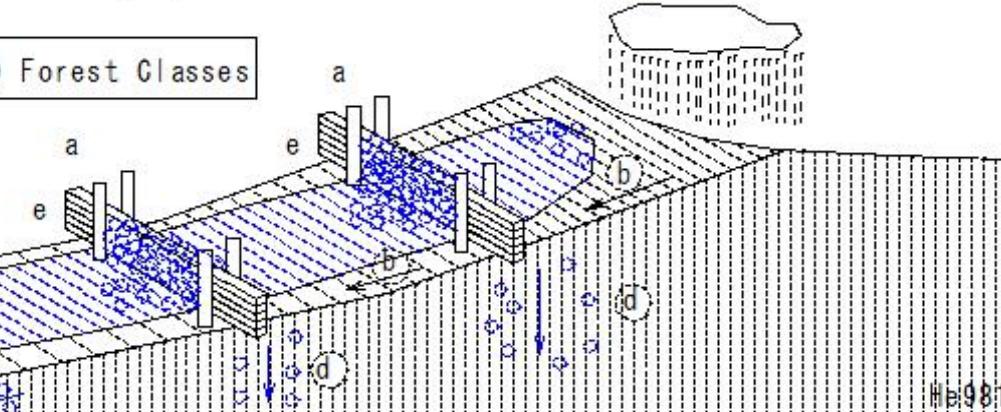


He968

[Mishima City, Shizuoka Prefecture]
Building Small Forest Dams

⑨ Forest Classes

- a Small dam
b Sediment
c Groundwater
d Seepage
e Log weir



He981

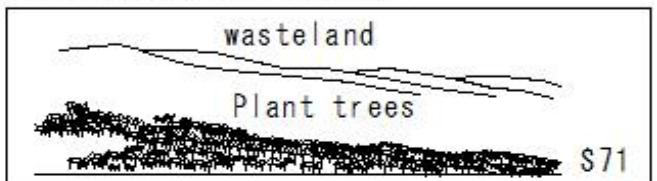
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(He992)Genbegawa Irrigation Canal(Shizuoka)

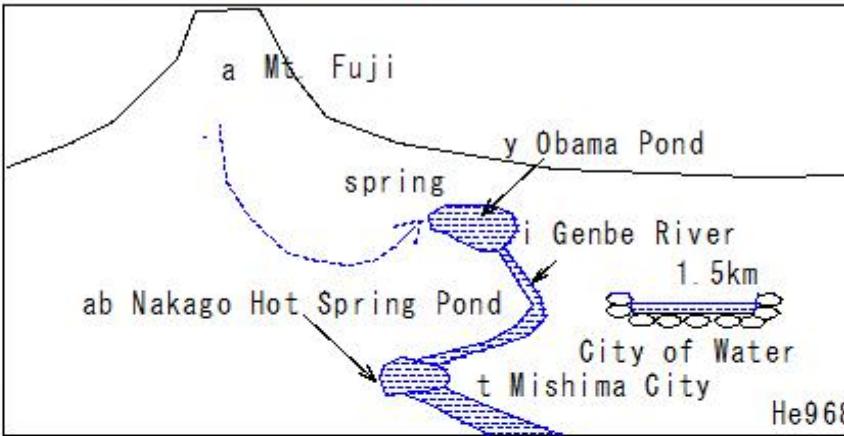
(He992) Genbegawa Irrigation Canal(Shizuoka)

[Mishima City, Shizuoka Prefecture]
Building Small Forest Dams

- ⑩ It serves as a forum for environmental education and groundwater conservation awareness among citizens.



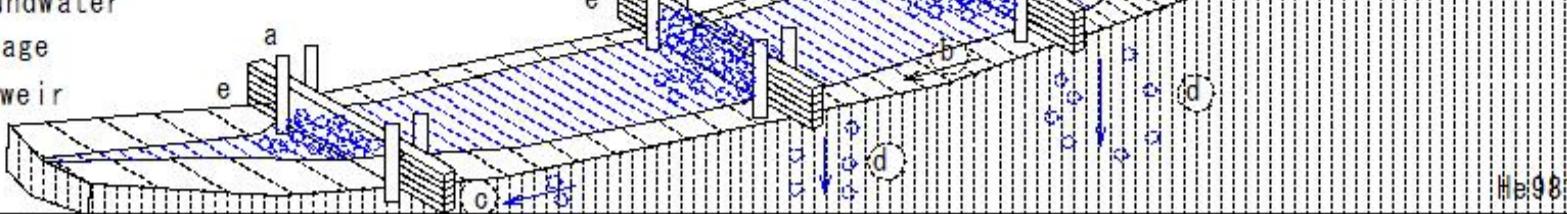
He992



He968

[Mishima City, Shizuoka Prefecture]
Building Small Forest Dams

- a Small dam
b Sediment
c Groundwater
d Seepage
e Log weir
- ⑩ Environmental Education and Groundwater Conservation



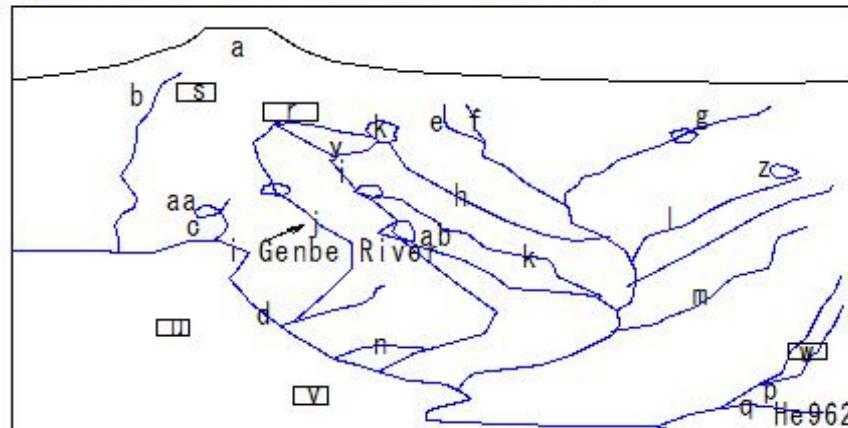
He981

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He993)Genbegawa Irrigation Canal(Shizuoka)

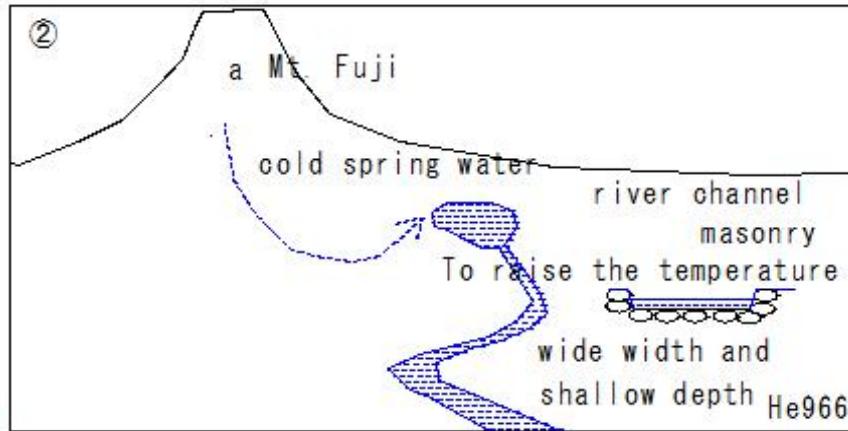
(He993) Genbegawa Irrigation Canal(Shizuoka)

a Mount Fuji	k Goten River	v Numazu City
b Kise River	l Natsuumeiki River	w Kannami Town
c Kakida River	m Miyagawa River	x Komoike Park
d Kano River	n Matsuge River	and Kagami Pond
e Oba River	o Raiko River	y Obama Pond
f Sawaji River	p Raiko River	z Takekura Spring
g Yamada River	q Kakizawa River	aa Kakida
h Sakura River	r Mishima River	River Spring
i Genbe River	s Nagaizumi Town	ab Nakago Hot
j Sakai River	u Shimizu Town	Spring Pond He962



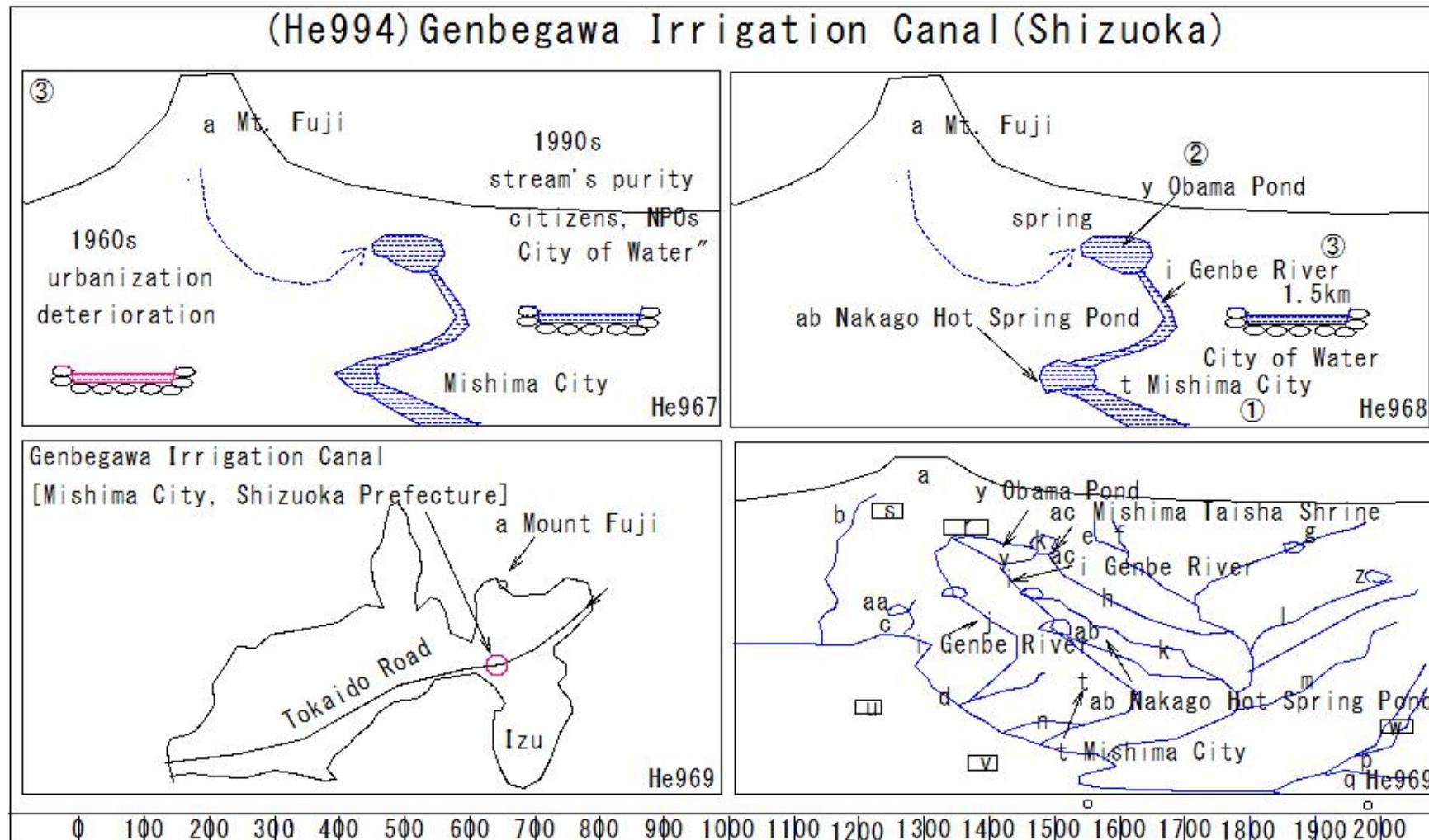
①
Genbe Terao
16th century
irrigation facility

He965

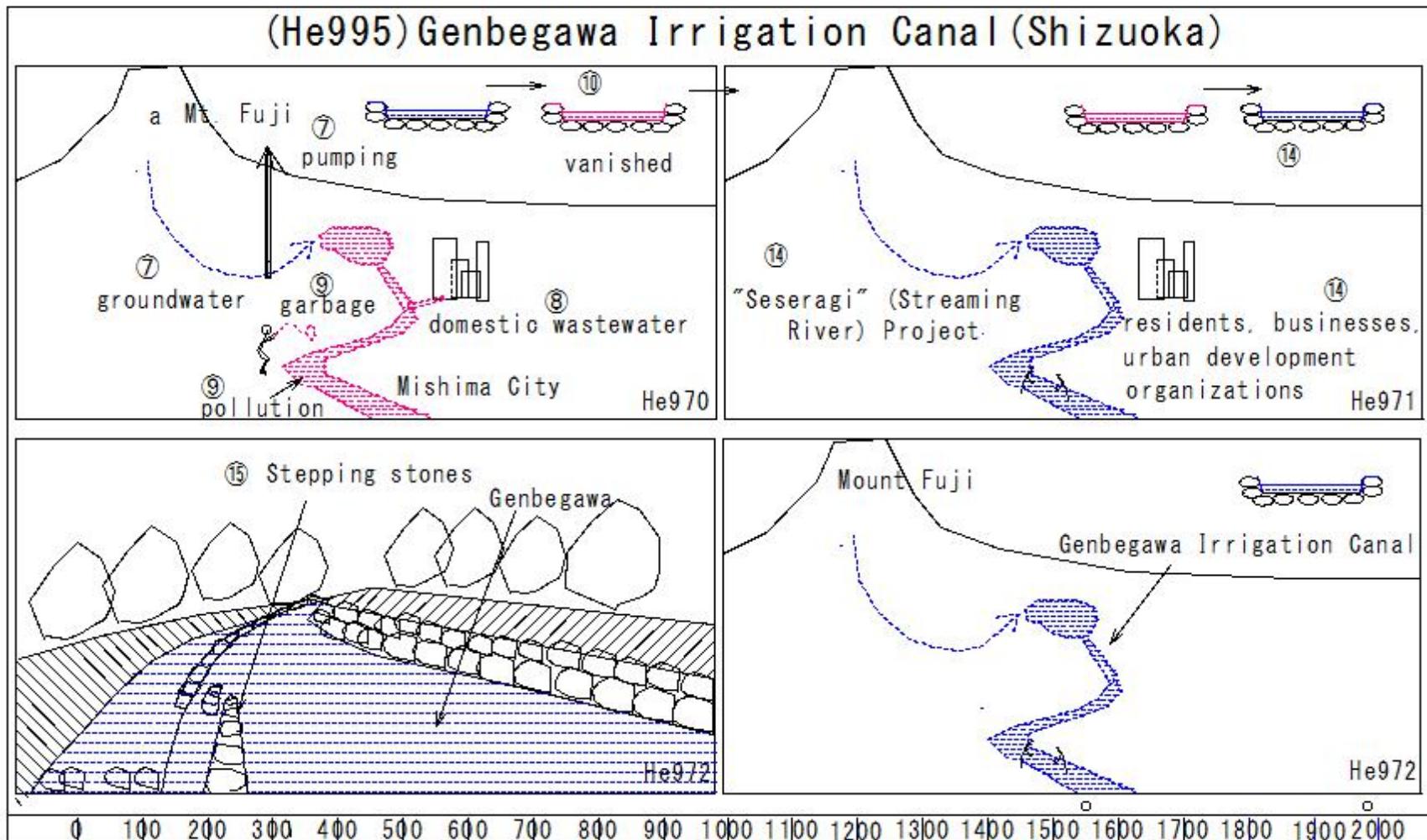


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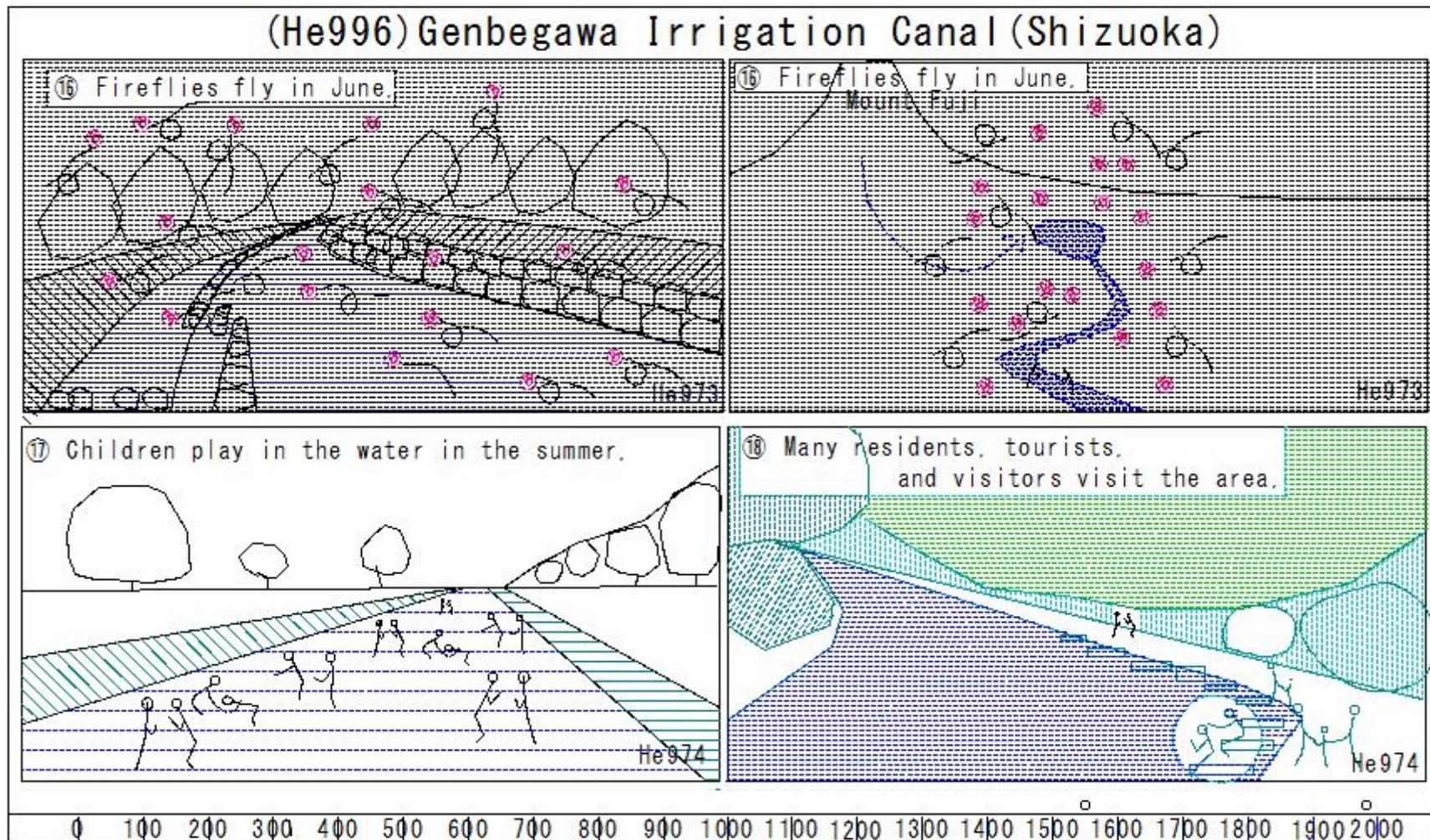
(He994)Genbegawa Irrigation Canal(Shizuoka)



(He995)Genbegawa Irrigation Canal(Shizuoka)



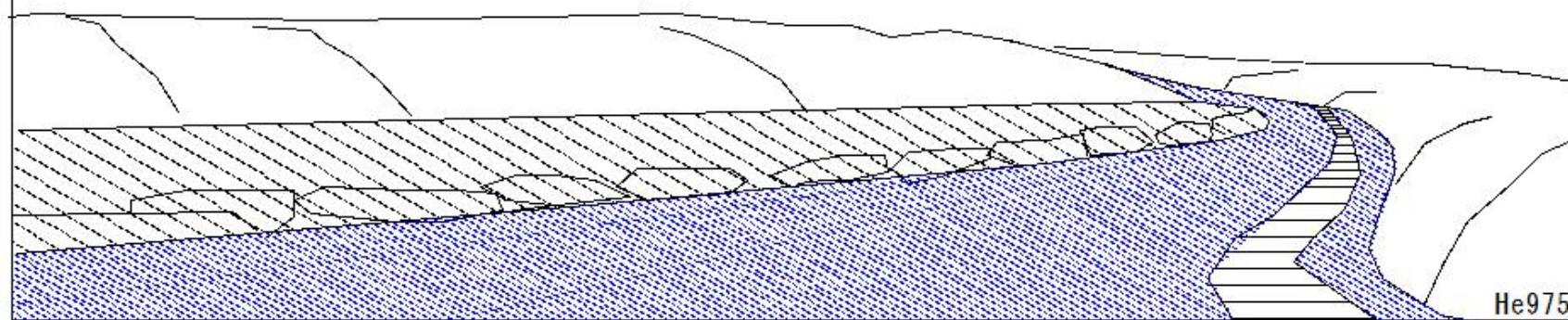
(He996)Genbegawa Irrigation Canal(Shizuoka)



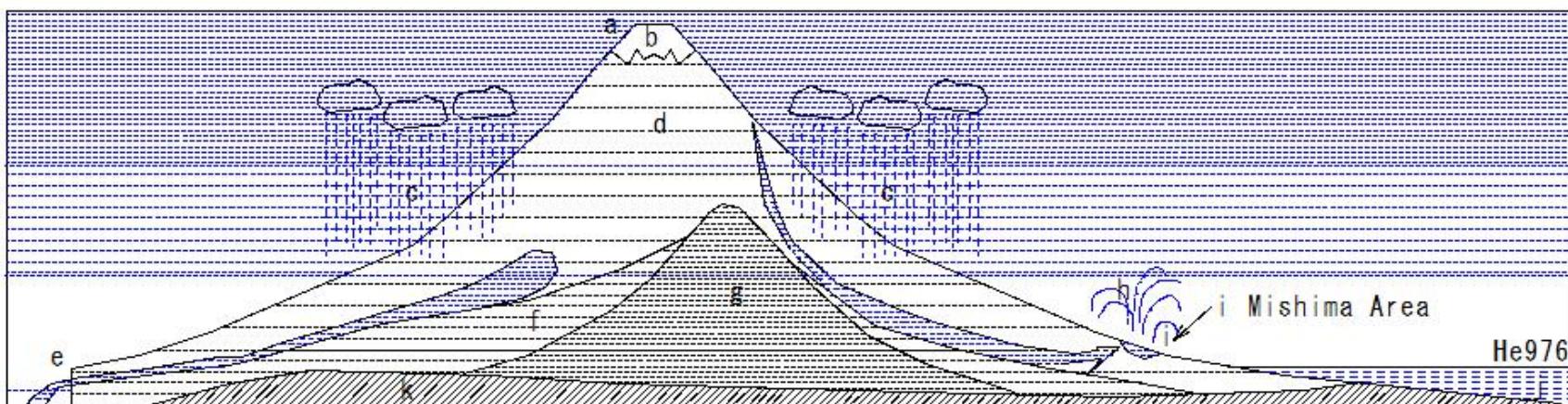
(He997)Genbegawa Irrigation Canal(Shizuoka)

(He997) Genbegawa Irrigation Canal (Shizuoka)

⑩ "Mishima, the City of Water."



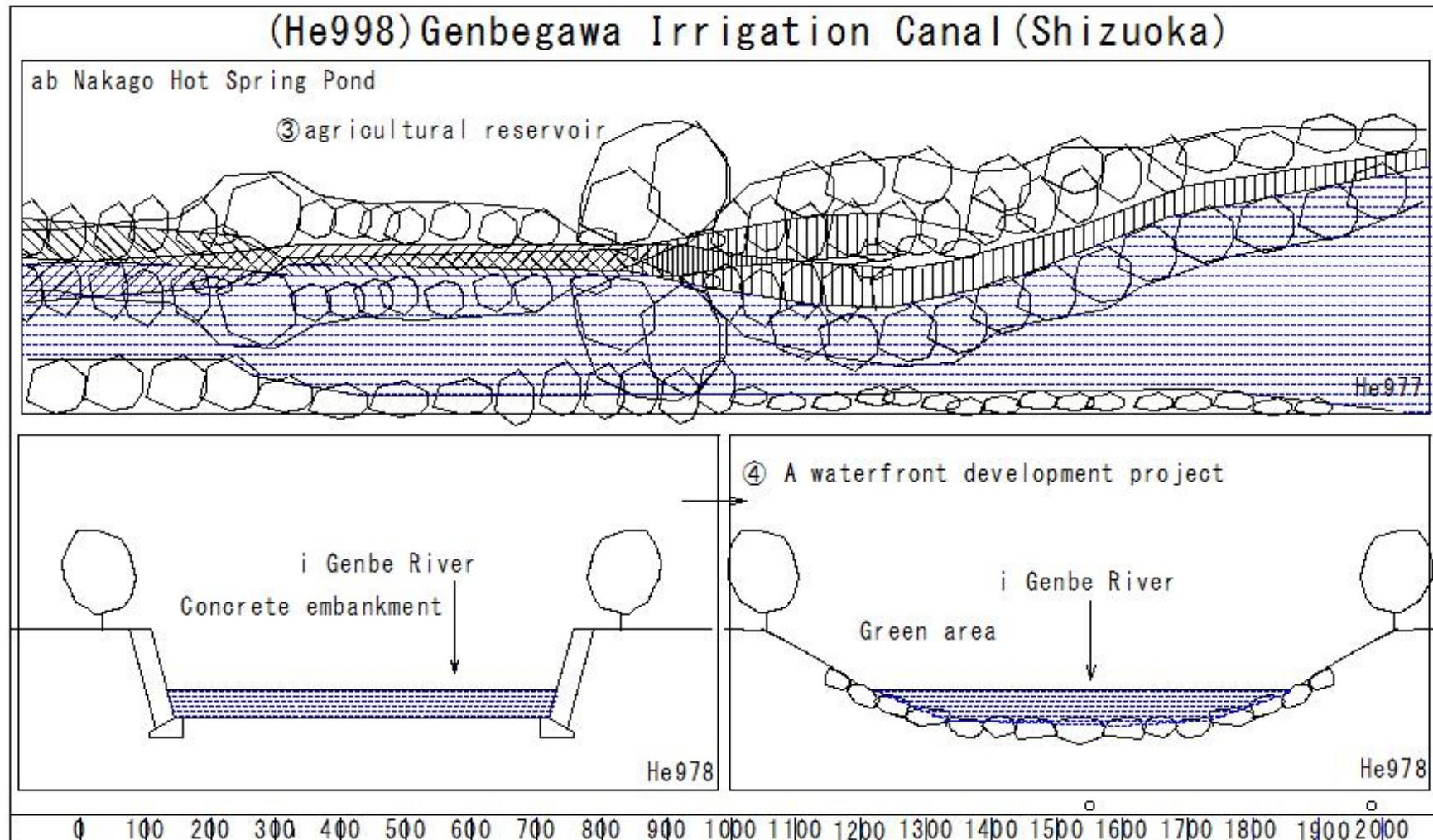
He975



He976

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He998)Genbegawa Irrigation Canal(Shizuoka)



(He999)Genbegawa Irrigation Canal(Shizuoka)

(He999) Genbegawa Irrigation Canal(Shizuoka)

ab Nakago Hot Spring Pond

concrete bank

He979

④ A waterfront development project

ab Nakago Hot Spring Pond

Green area

He979

⑤ 100 species of plants and animals.

i Genbe River

Green area

He980

⑤ 100 species of plants and animals.

ab Nakago Hot Spring Pond

Green area

He980

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He1000)Genbegawa Irrigation Canal(Shizuoka)

(He1000) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

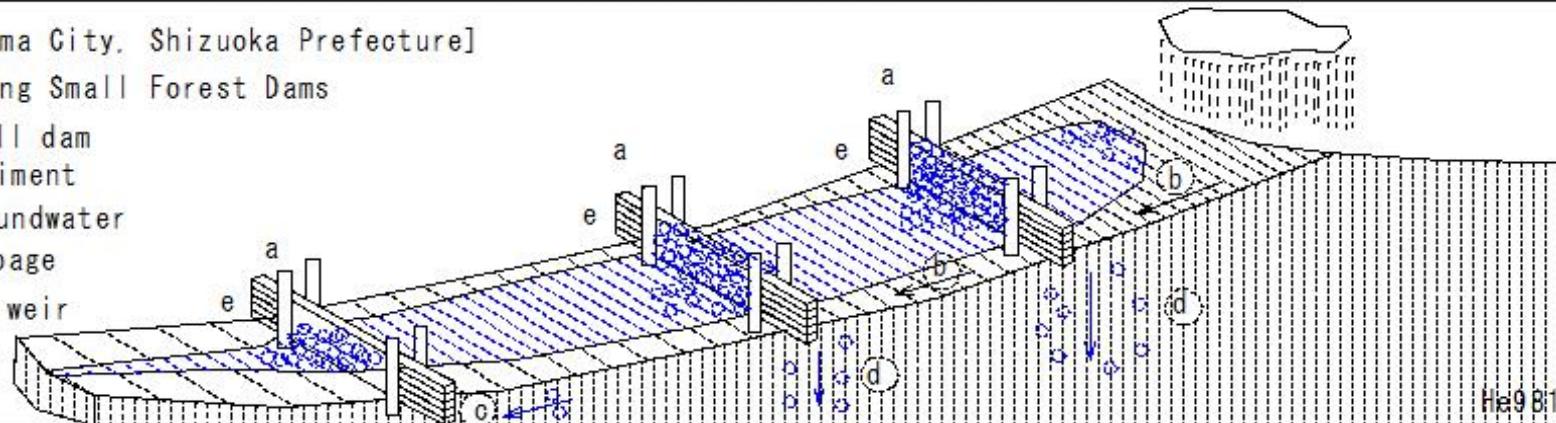
a Small dam

b Sediment

c Groundwater

d Seepage

e Log weir



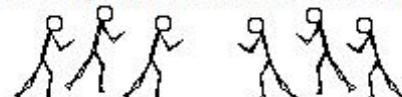
He981

[Mishima City, Shizuoka Prefecture]

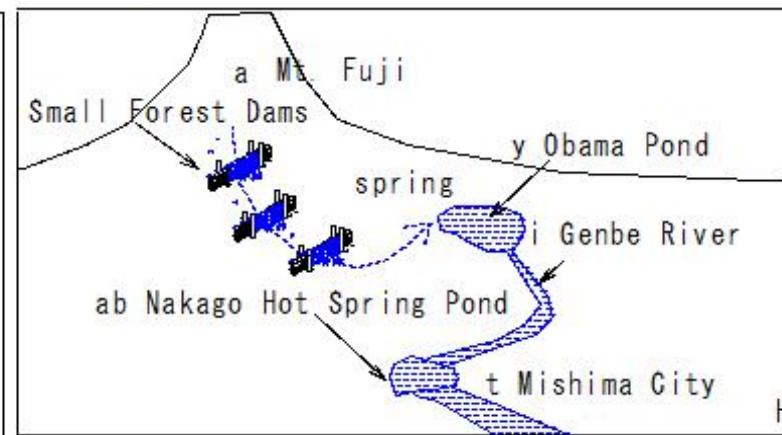
Building Small Forest Dams

- ① Participation and collaboration with local residents (Building Small Forest Dams)

Participation and collaboration



He982



He982

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He1001)Genbegawa Irrigation Canal(Shizuoka)

(He1001) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

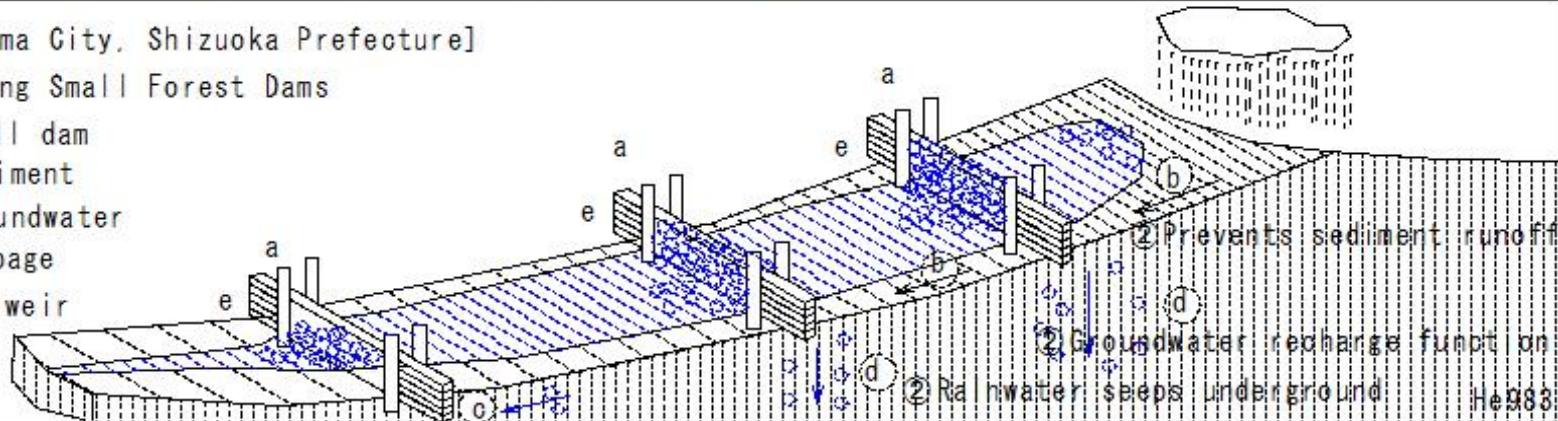
a Small dam

b Sediment

c Groundwater

d Seepage

e Log weir



[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

a Small dam

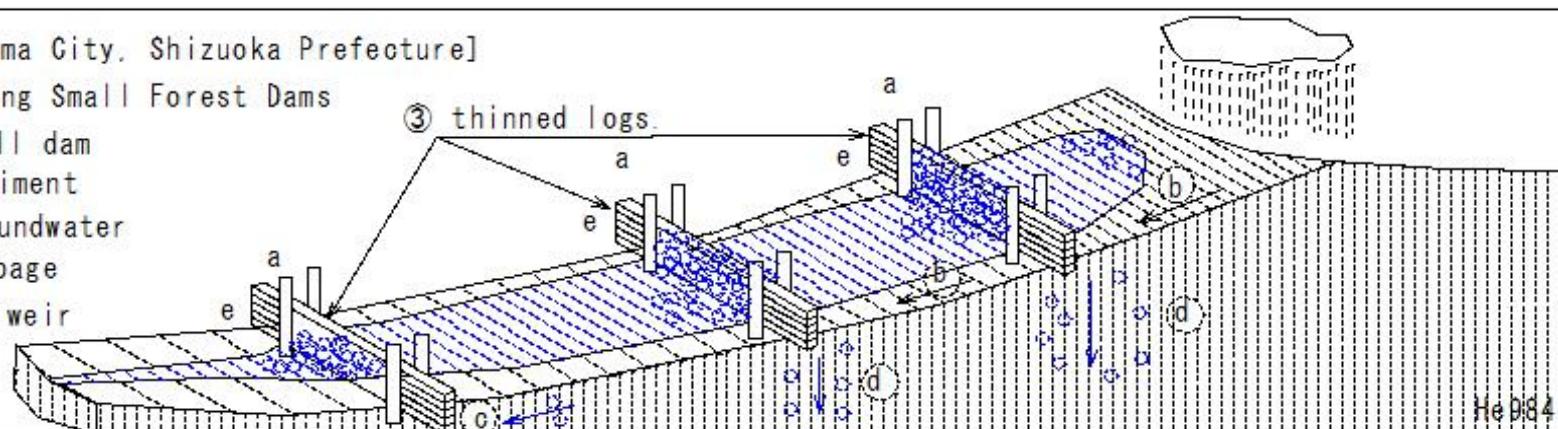
b Sediment

c Groundwater

d Seepage

e Log weir

③ thinned logs



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

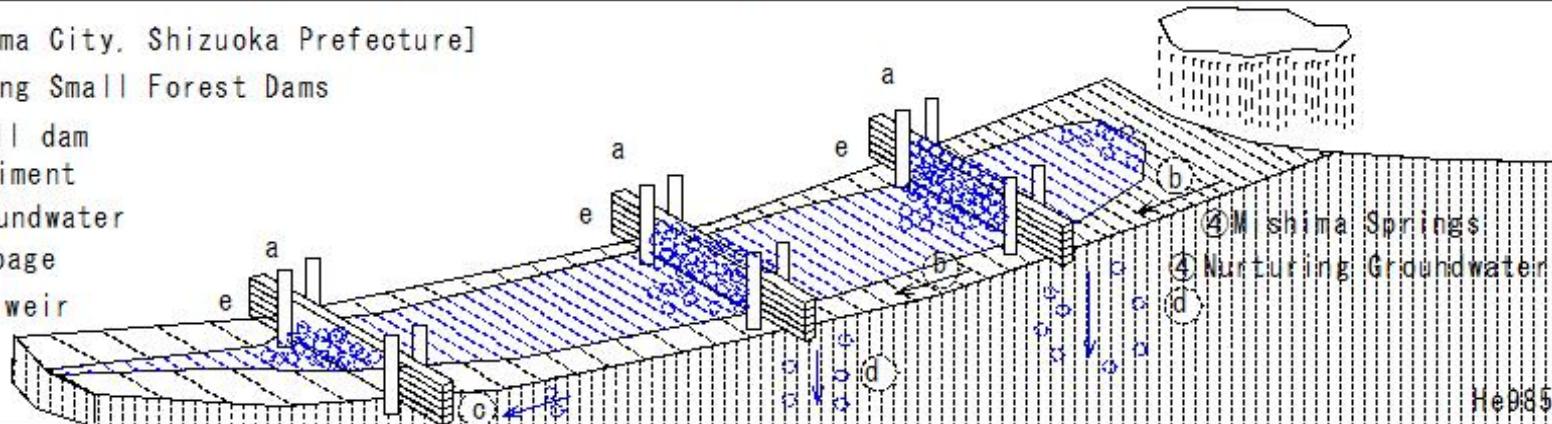
(He1002)Genbegawa Irrigation Canal(Shizuoka)

(He1002) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

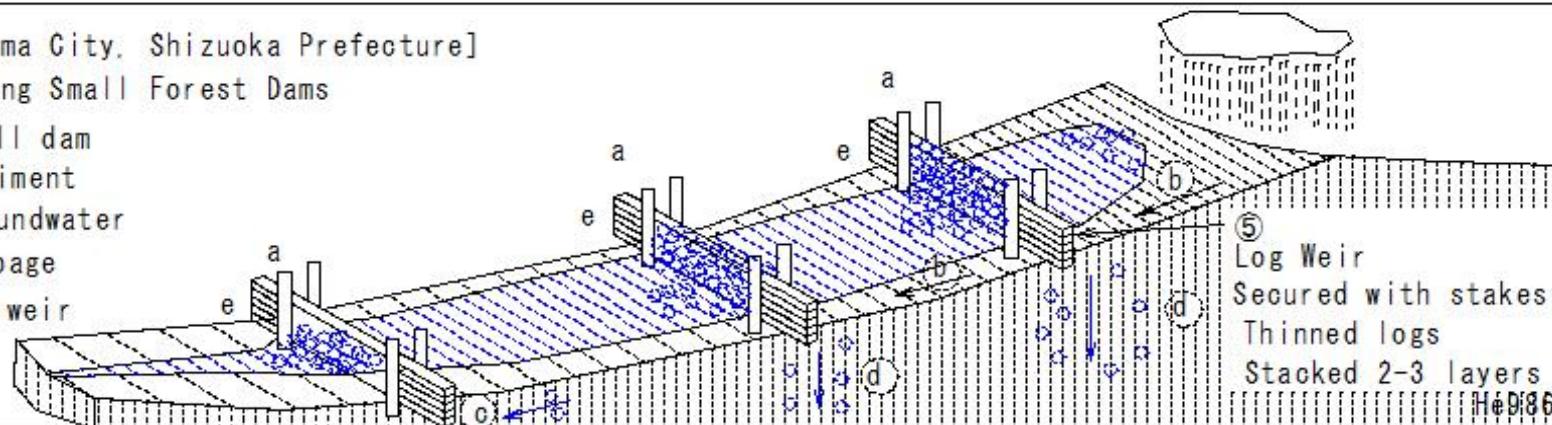
- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir



[Mishima City, Shizuoka Prefecture]

Building Small Forest Dams

- a Small dam
- b Sediment
- c Groundwater
- d Seepage
- e Log weir



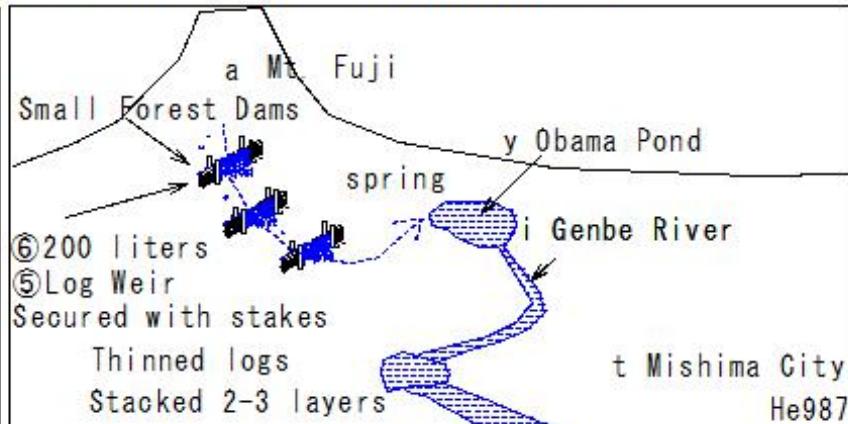
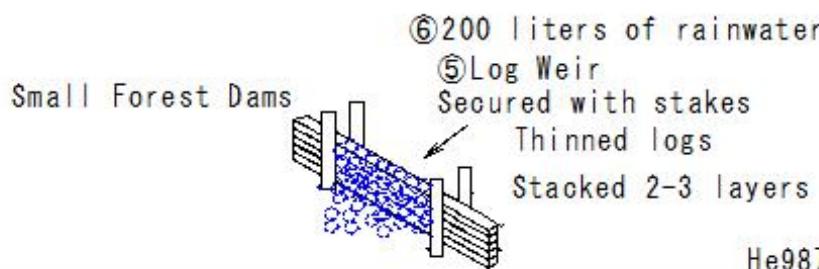
∅ 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He1003)Genbegawa Irrigation Canal(Shizuoka)

(He1003) Genbegawa Irrigation Canal (Shizuoka)

[Mishima City, Shizuoka Prefecture]

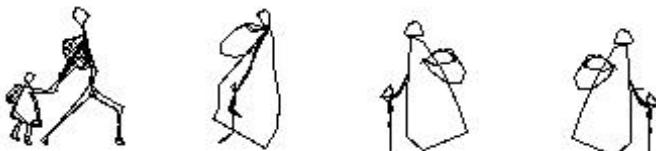
⑥ Each weir is designed to store approximately 200 liters of rainwater.



[Mishima City, Shizuoka Prefecture]
Building Small Forest Dams

of citizen and corporate volunteers.

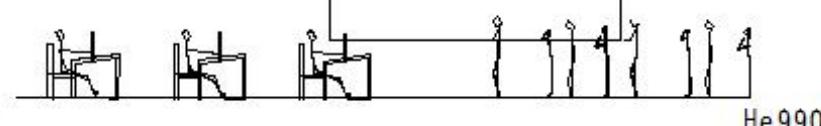
⑦ Citizen and Corporate Volunteer Activities



[Mishima City, Shizuoka Prefecture]
Building Small Forest Dams

⑧ It is also used as part of environmental studies for elementary and junior high schools.

⑧ Environmental Studies



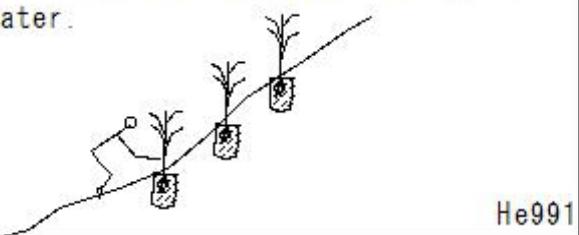
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(He1004)Genbegawa Irrigation Canal(Shizuoka)

(He1004) Genbegawa Irrigation Canal (Shizuoka)

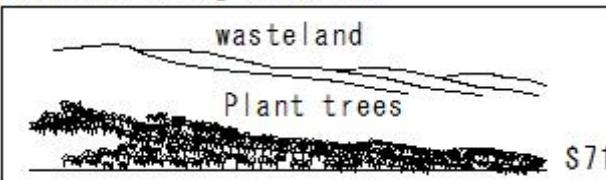
[Mishima City, Shizuoka Prefecture]
Building Small Forest Dams

- ⑨ Forestry classes are also held at the same time to learn about the functions of forests and groundwater.



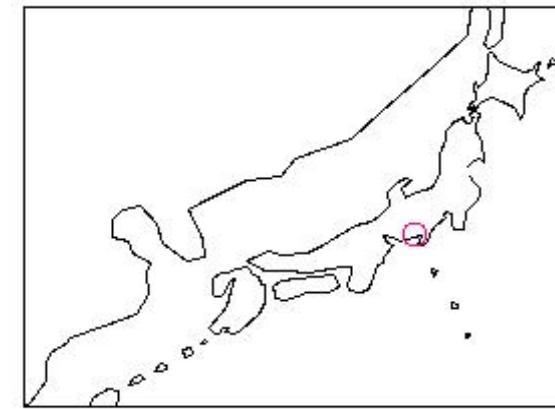
[Mishima City, Shizuoka Prefecture]
Building Small Forest Dams

- ⑩ It serves as a forum for environmental education and groundwater conservation awareness among citizens.



He992

Genbegawa Irrigation Canal
[Mishima City, Shizuoka Prefecture]



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