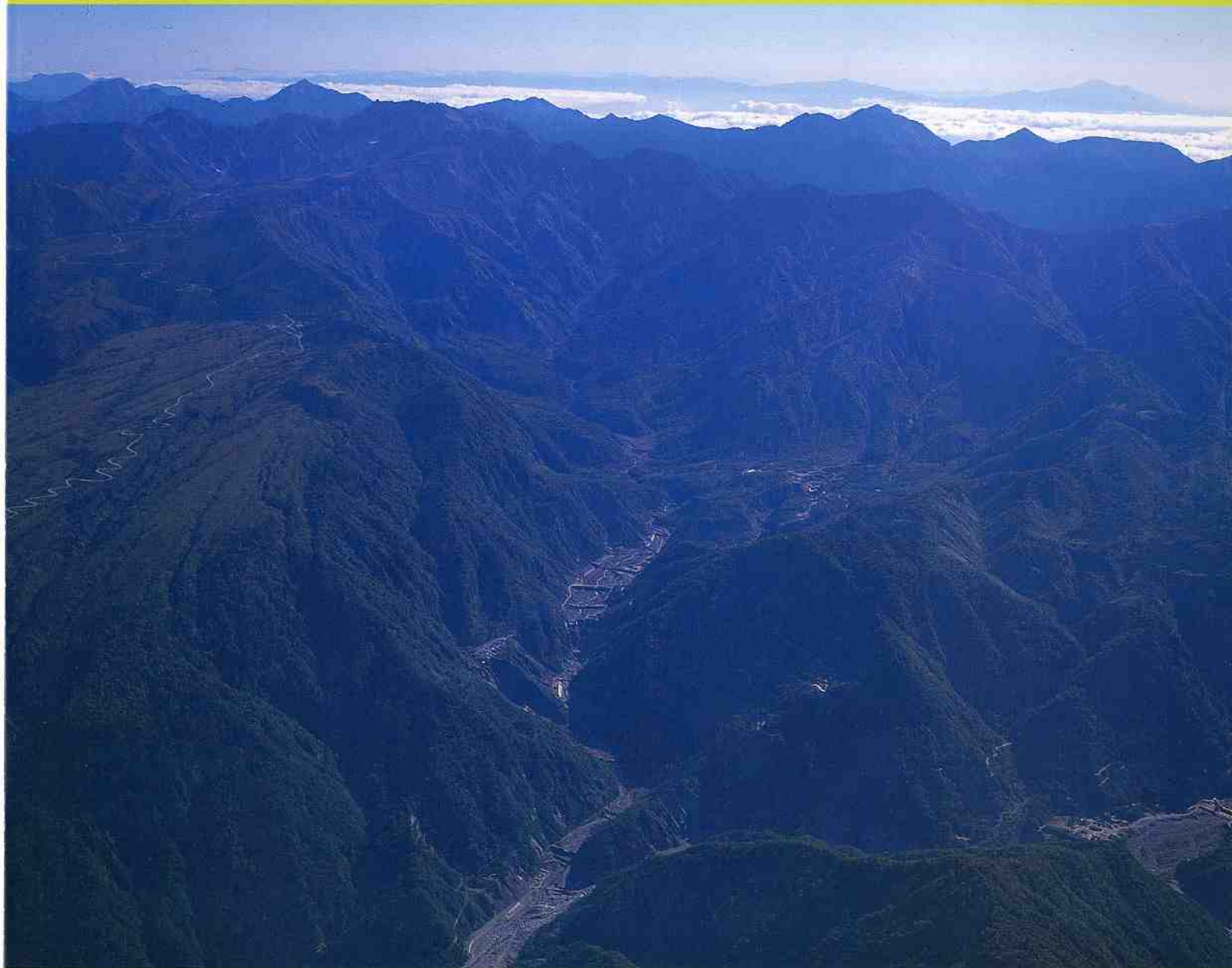
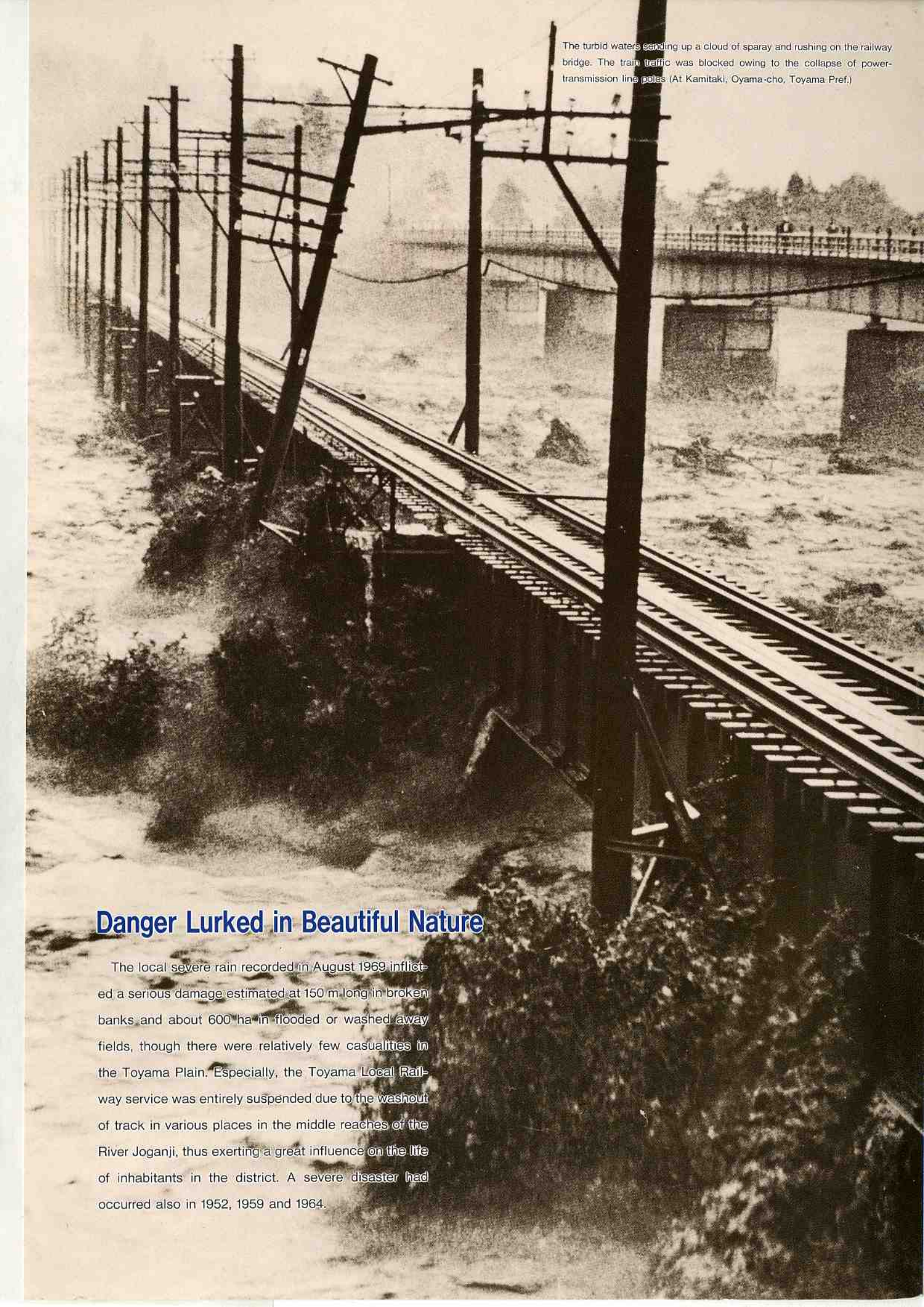


# TATEYAMA SABO

In an Attempt to Improve the River Jogajji,  
a Frequently Flooding Mountain Torrent,  
into a Placid River Causing no Disaster.



Tateyama Sabo Work Office  
Hokuriku Regional Costruction Bureau,  
Ministry of Construction



The turbid waters sending up a cloud of spray and rushing on the railway bridge. The train traffic was blocked owing to the collapse of power-transmission line poles (At Kamitaki, Oyama-cho, Toyama Pref.)

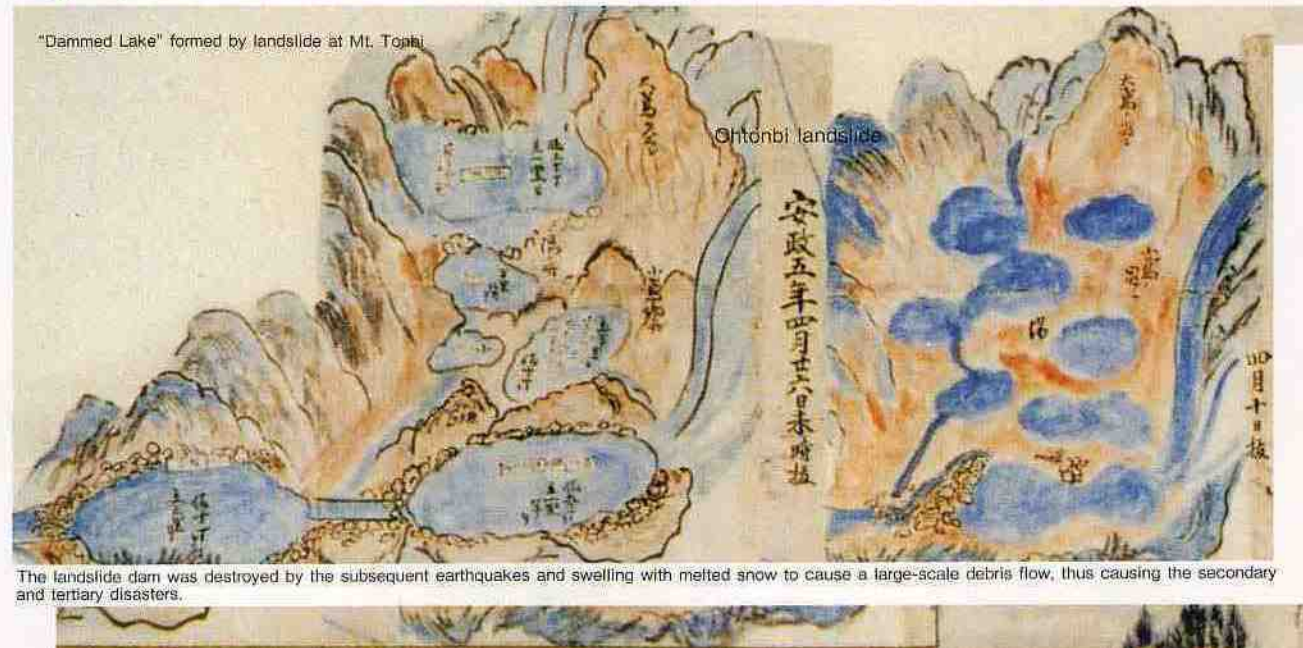
## Danger Lurked in Beautiful Nature

The local severe rain recorded in August 1969 inflicted a serious damage estimated at 150 m long in broken banks and about 600 ha in flooded or washed away fields, though there were relatively few casualties in the Toyama Plain. Especially, the Toyama Local Railway service was entirely suspended due to the washout of track in various places in the middle reaches of the River Joganji, thus exerting a great influence on the life of inhabitants in the district. A severe disaster had occurred also in 1952, 1959 and 1964.

## At Tateyama, There Are Still Scars Left

by the Awful Forces of Nature. River Joganji has frequently been suffered from disasters. Above all, a series of disasters occurred concentratedly in 1858 has been handed down as a terrible calamity recorded in history. It was the earthquake of magnitude 7.1 in estimated scale occurred in February 26 in the year with the epicenter directly under Tateyama that triggered the calamity. This led to the large-scale landslides at Mts. Ohtonbi and Kotonbi with the result that Tateyama Caldera and valleys were filled up with a vast volume of sediment amounting even to 4,100 million cubic meters (410,000,000 m<sup>3</sup>). Thereafter, the basin of the River Joganji was swept by debris flow and mudflow. The resulting damage extended to the Toyama Plain, thus leading to the severe disaster. The casualties were 140 drowned and 8,945 wounded. In consequence of the disasters occurred several times since then, 2,000 million cubic meters (200,000,000 m<sup>3</sup>) of landslide sediment still remains in the caldera headwaters.

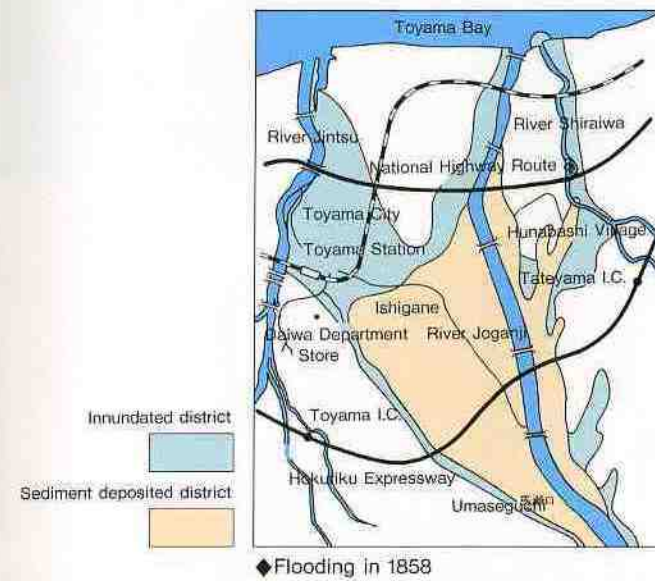
In February 26, 1858, Tateyama Was Attacked by the Earthquake of Magnitude 7.1 in Estimated Scale Occurred with the Epicenter Directly Thereunder.



The landslide dam was destroyed by the subsequent earthquakes and swelling with melted snow to cause a large-scale debris flow, thus causing the secondary and tertiary disasters.



◆ Pictorial view of Mt. Ohtonbi (Flooding in 1958)



## Tateyama Sabo Work for Conservation of Toyama Plain

### Beginning of Modern Sabo Work

At and Around Tateyama complete with the conditions for causing large-scale landslides and debris flow such as mountain torrents including River Joganji as well as weak and brittle volcanic product accumulated in the headwaters, there has been frequent occurrence of sediment disasters since the severe disaster caused by the heavy earthquake in 1858. In order to provide against such emergencies, the Prefectural Sabo Work Project was put in practice in 1906.

In 1926, the Tateyama Sabo Work was re-started as a project under the direct control of the Ministry of Internal Affairs and has been executed up to now. Since then, the Sabo Work Project has incessantly been implemented so as to keep the deposited sediment from flow out and thus prevent a disaster by constructing many Sabo facilities such as Shiraiwa Sabodam and Dorodani Sabodam group mainly in the upper reaches of the River Joganji.

### Great Figures in the History of Tateyama Sabo Work

The man never to be forgotten when talking about the Tateyama Sabo Work is Johannes Drijke. J. Drijke, a Dutch engineer came to Japan in 1873 by the invitation of the Japanese Government. In 1891, he made an inspection of the breaks in the embankment of the River Joganji and mapped out a large-scale river improvement plan. The remark "This is not a river, but a waterfall" he made at the time when he saw the River Joganji for the first time is well-known even now as a brief and apt expression of the difficulty in the way of the Tateyama Sabo Work in those days.

Another unforgettable person is Dr. Masao Akagi, the first head of the Tateyama Sabo Work Office. After arrival at his post, Dr. Masao Akagi worked out a farseeing scheme for sabo works to construct Sabo facilities such as Shiraiwa Dam, Dorodani Dam and Yukawa Dam group, thus establishing the foundation for flood control of the River Joganji. Dr. Masao Akagi who had executed many projects thereafter was referred to as the "Father of Sabo in Japan" and awarded the Order of Culture in recognition of his brilliant services.



Johannes Drijke



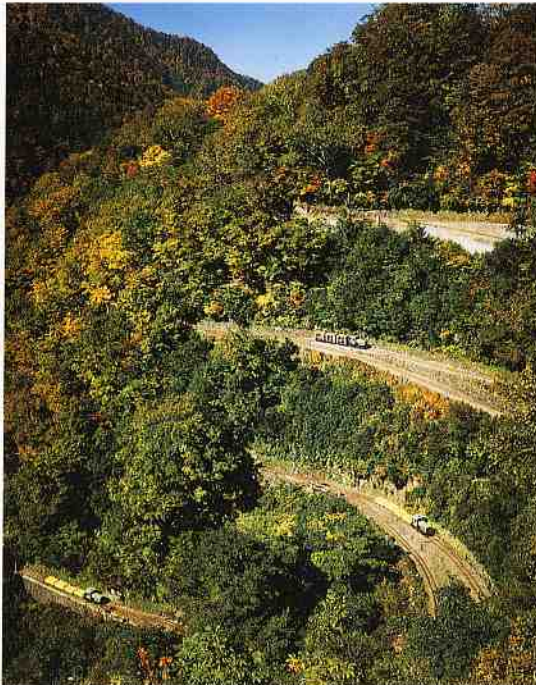
Dr. Masao Akagi

## Shiraiwa Sabodam Conserving the Toyama Plain



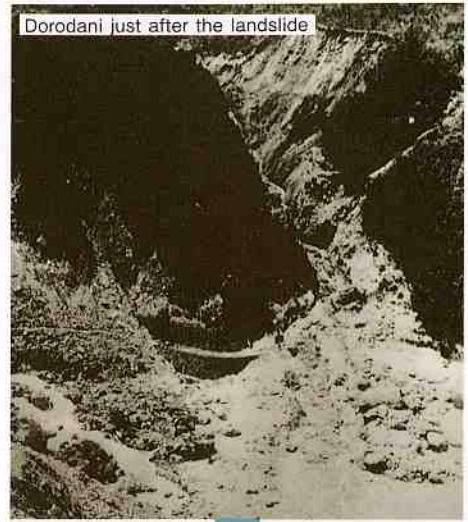
◆The Shiraiwa Sabodam was brought to completion in 1939 after the start of its construction in 1931 as a Sabodam for checking up a vast volume of sediment flowing out from the Tateyama Caldera. It is the largest scale in Japan, being 63.0 m in dam height, thus deserving the name of a leading role in the Tateyama Sabo Work.

## Service Train Supporting the Tateyama Sabo Work

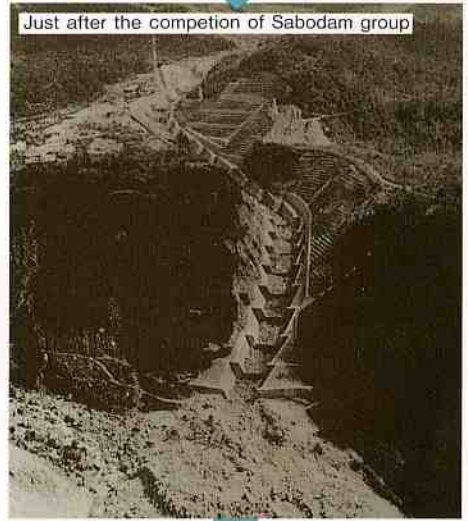


◆The service train (Special Track for Sabo Work) is used for transportation of construction materials from the Tateyama Sabo Work Office to the basin of the Yukawa. It is a unique facility peculiar to the Tateyama Sabo Work in which a switchback system is employed as a rare case in the narrow gauge of 610 mm. Especially the 18-stage switchback system at Kanbadaira is of the largest scale in Japan, capable of going up the slope of 200 m in elevation at a dash.

## Dorodani Sabodam Group Revitalizing the Greens



Dorodani just after the landslide



Just after the completion of Sabodam group



Present condition

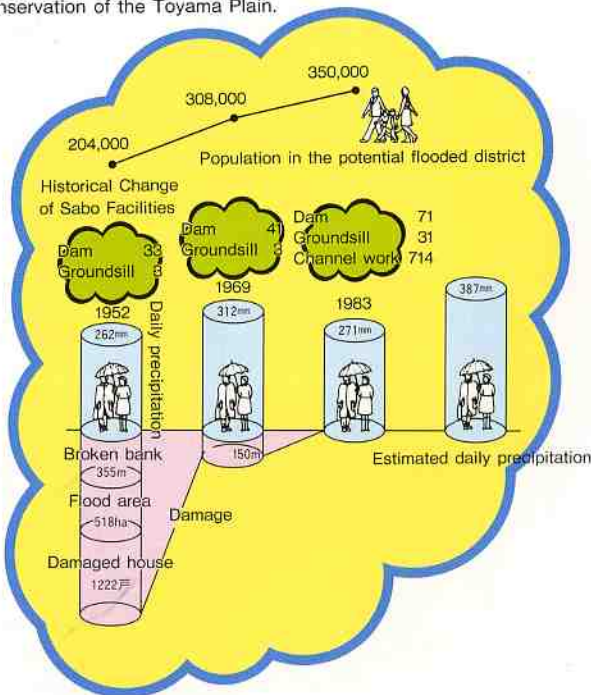
◆In order to prevent the re-erosion of the Dashiwara Plain, the Dorodani Sabodam Group was brought to completion in 1938 as a group of stepped concrete dams combined with hillside works. This is a famous dam group to be recorded along with the Shiraiwa Sabodam in the Japanese Sabo Work history. Thanks to the Sabo work, Dorodani is now restored to its original condition and covered with green to the extent that no traces of landslide may be found.

# Sabo Work Project to Be Executed as a Provision Against an Emergency Paying Due Recognition to the Menace of Disaster

## Effect of Sabo Work Project

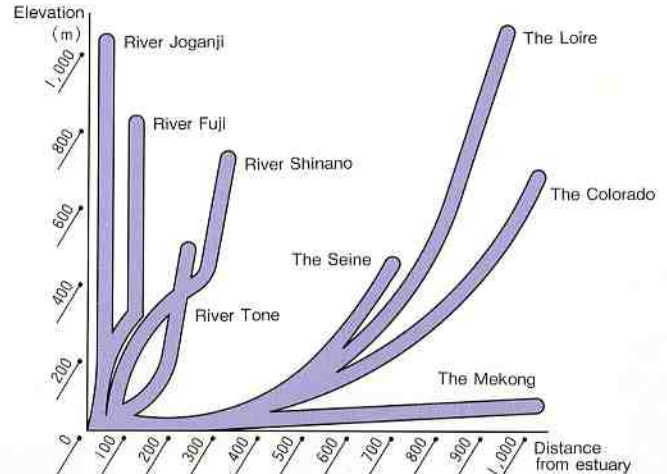
In the basin of the River Joganji where there is a high risk of disaster, the Sabo work project having continuously been executed up to now results in positive decrease of damage. In the heavy rain of 262 mm in daily precipitation recorded in 1952, the Toyama Plain was suffered from the damage mounting to 355 m long in broken banks, 518 ha in flooded area and 1,222 in damaged houses.

Thanks to the subsequent establishment and betterment of Sabo facilities, however, in the heavy rain recorded in 1969, the damage was limited only to 150 m long in broken banks, and in the local severe rain recorded in 1983, no damage such as broken banks, inundated fields and damaged houses was caused. In consideration of the recent increase in population and property in the potential flooded district, however, once a disaster occurs, it may lead to a severe damage. For this reason, it is necessary to execute the Sabo work project continuously for the purpose of preventing the outflow of sediment even in case of the estimated daily precipitation of 387 mm with the aim at much more conservation of the Toyama Plain.



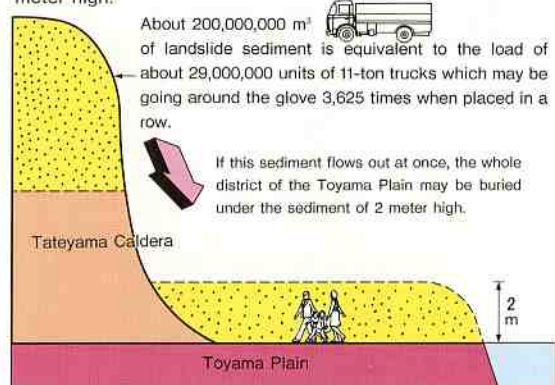
## River Joganji-One of the Most Prominent Mountain Torrents in Japan

River Joganji is one of the most prominent mountain torrents in Japan 56 km long in channel, 368 km<sup>2</sup> in catchment area and 1/30 in average bed slope, and is a raised bed river causing frequent outflow of sediment.



## About 200,000,000 m<sup>3</sup> of Landslide Sediment Left Even Now

The landslide sediment left now in the waterheads of Tateyama Caldera amounts to about 200,000,000 m<sup>3</sup>. If this sediment flows out at once, the whole district of the Toyama Plain may be buried under the sediment of 2 meter high.



\*ROKKOCHAN is the image character of Tateyama Sabo Work.

Playful girl,  
**ROKKOCHAN**

Tateyama Sabo Work  
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Let's Prevent Sediment Disaster!  
**SEDIMENT DISASTER PREVENTION  
MONTH 1 through 30 June**

**Slope Failure Prevention Week 1 to 7 June**  
Ministry of Construction, and Prefectures  
**June is the Sediment Disaster Prevention Month.**