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# THE MUSEUM OF MODERN ART

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## MUSEUM OF MODERN ART EXHIBITS SWISS BRIDGES REMARKABLE FOR BEAUTY AND ENGINEERING

"Maillart's bridges seem to jump over rivers and  
abysses with the elegance and swiftness of greyhounds."

Little known to the outside world and only beginning to be appreciated by his fellow countrymen at the time of his death in 1940, Robert Maillart, Swiss engineer, will be honored at the Museum of Modern Art by the first exhibition of his work ever to be held. Opening June 25 this presentation--through enlarged photographs and models--of the most beautiful bridges of modern times has been prepared, with the cooperation of the Museum's Department of Architecture, by Dr. Sigfried Giedion of Zurich, Switzerland, whose felicitous description of Maillart's bridges is quoted above.

Much beauty is added to the photographs by the wooded background of ravines and valleys over which most of Maillart's bridges were built--a circumstance peculiarly due to his constant struggle against official opposition and public apathy. Because Maillart's bridges were too radical in theory for his fellow engineers and too unusual in form for the public, he was forced to build most of them in remote valleys. This natural background as the setting for the grace and purity of line of the bridges adds attractiveness to the exhibition, which consists of two large photo-murals, two models, and 14 panels on which are mounted enlarged photographs and explanatory text.

One panel in the exhibition illustrates in bitterly telling fashion the difficulties encountered by architectural genius vs. official stupidity: one of Maillart's rare commissions in a populated area was for the capital of Switzerland. He prepared an elegant three-hinged arch but was forced to build a heavy stone bridge with a monumental Roman arch. Both the finished structure and a drawing of Maillart's original design are shown, also his comment regarding the attitude of the officials: "Heavy vaulting gives the beholder a sense of security; light profiles are more apt to frighten than please him."

Robert Maillart was born, 1872, in Canton Berne. He studied in Zurich from 1890 to 1894 and then entered the firm of Francois Hennebique, the great contractor and pioneer in the development of reinforced concrete. As an employe in this firm, Maillart constructed his first large building--a sanatorium at Davos. In 1912 he went to Russia, where he built large factories in Kharkov, Riga and Leningrad. After the Revolution he returned to Switzerland heavily in debt. During the following years he built bridges throughout Switzerland from his offices in Geneva, Zurich and Berne, the most important of which were completed during the last ten years of

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his life. He died in 1940 at the age of 68.

Reinforced concrete is a composite building material made up of concrete--a mixture of stone, sand and cement--and steel reinforcing rods. It combines the structural advantages of masonry, which can withstand compression (the pressure of heavy weights) with the advantages of steel, which can resist tension (pull). This extraordinary new building material, which came into general use only at the turn of our century, permits a freedom of expression hitherto unknown in building. Because reinforced concrete can be molded, it makes possible to the engineer-artist the creation of new forms, which until recently could be seen only in the art of sculpture.

Maillart's great contribution to modern engineering was his revolutionary use of reinforced concrete. His bridges were radical in construction and comparable in esthetic importance to the works of great modern sculptors. One has only to compare Brancusi's Bird in Space with the lines of Maillart's three-hinged arch bridges to observe his amazing combination of engineering with pure sculpture.

Maillart spent his lifetime perfecting one basic idea: structure as monolithic. To this end he used the reinforced concrete slab in a new way--as an active structural member capable of bearing all kinds of stress, whether used horizontally as part of a beam or up-ended vertically to become a stiffener rib for an arch. He stripped his bridges of all non-functional parts and pared them down to the minimum demanded by structural soundness. This passion for economie de moyens enabled him to create bridges which were unique in their phenomenal lightness and slenderness. As Giedion says: "Maillart's bridges were sometimes on the verge of the impossible, but they were right, they were exciting and they were beautiful."

Besides the three-hinged arch system of concrete bridge construction, Maillart used one other: the stiffened arch bridge, in which the arch is a thin curved slab connected to the roadway girder by thin vertical transverse walls. The roadway and parapets together form a rigid girder which resists local bending under concentrated moving loads. The principle involved is similar but opposite to that of a suspension bridge. This system of construction can be used only for small spans, since it lacks the elasticity of the three-hinged arch system.

The exhibition will be on view at the Museum through October 12. Primarily designed for circulation, it has already been shown in a slightly different version in several cities. At the close of the exhibition at the Museum the Department of Circulating Exhibitions will again send it on a tour of other towns and cities in this country.