A TREE BRIDGE.

To the Editor of the SCIENTIFIC AMERICAN:

I send a copy of a photograph of a novel bridge, which may interest your many readers.

The bridge is one Douglas fir log, 4 feet in diameter and 54 feet between supports, and is used by prospectors to cross a stream on the western slope of the Cascade Mountains.

The view shows the Washington State Road Commission crossing the structure. This photograph is one of a number of kodak views I took during the past summer while exploring a route for State wagon road across the Cascade Mountains.

B. W. HUNTOON,
Engineer State Road Commission.
Fairhaven, Wash., October 22, 1895.

A TREE BRIDGE.

Dalmatian Insect Flowers.

According to De Boisse, the active principle of Pyrethrum cinerariæfolium is a yellow resin soluble in ether, insoluble in water and very slightly soluble in alcohol, carbon bisulphide, or fatty bodies. It is readily decomposed by alkalies. To extract the active principle the author exhausts the flowering tops of the plant with ether. The principle thus extracted is described as being of the color and consistence of virgin wax, with an apple-like odor. From the fresh plants the active principle may also be extracted by macerating the finely-chopped flowering tops with half their weight of ether, vaselin oil, colza, or petroleum, according as the product is intended for medicinal or agricultural use. The mixture, after trituration, is allowed to macerate for seven or eight hours. It is then strongly pressed, the resulting liquid allowed to stand, and the supernatant yellow oily liquid separated from the watery portion, which is rejected. When prepared with vaselin oil, the oily solution is useful for human medicine, being a powerful insecticide. The solutions in colza or petroleum have a wide application in agriculture to destroy insect parasites, being applied direct to trees or shrubs. Emulsified with forty times their volume of soot water, they may be used for spraying the twigs and leaves.—Rev. de Scient. Natur.

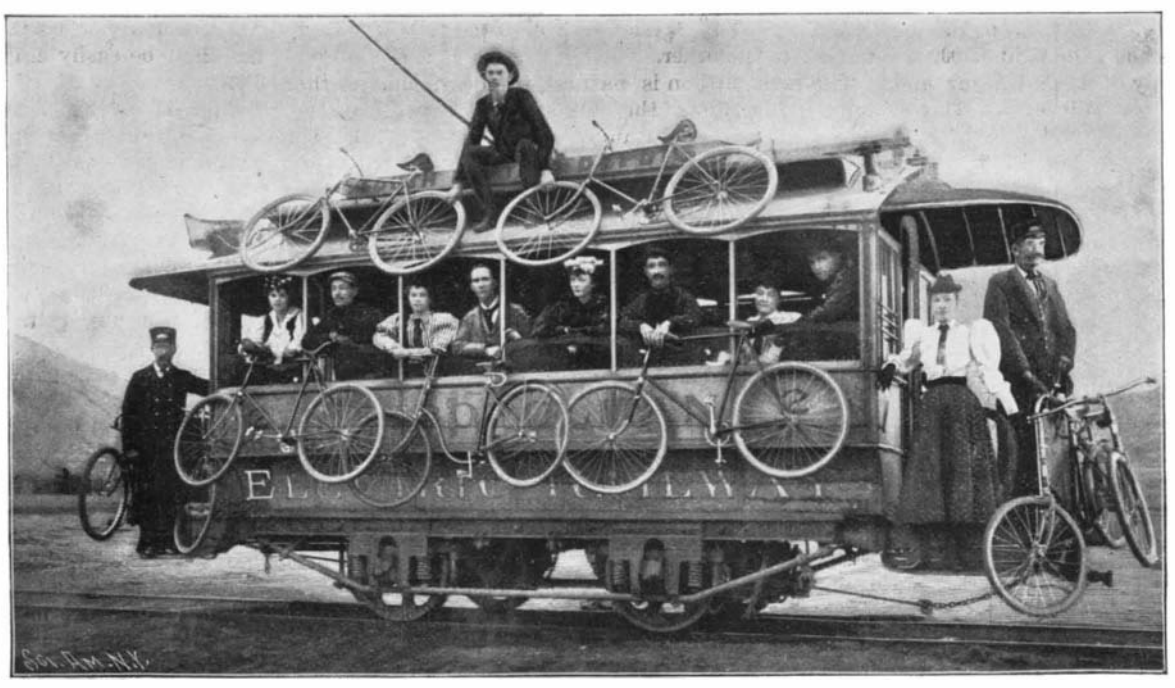
STREET CAR HOOKS FOR BICYCLES.

One of the obstacles in the way of cycling in New York City, and in other cities, is the lack of facilities for the transportation of wheels on the street cars. Hundreds of wheelers, anxious to take a morning or an afternoon spin, are deterred on account of the long and dangerous trip required over stone pavements and car tracks before the open country roads can be reached.

The street car people make no provision for the cyclers, and will not permit their wheels to be carried on the platforms. They do things differently at Butte, Montana. There the street cars are provided with exterior hooks on which cyclers may hang their wheels, as shown in our photograph. The plan is a great success and is an accommodation greatly appreciated by all lovers of the wheel. It might be adopted very easily by all street car companies and would add considerably to their revenues.

In Brooklyn, N. Y., on Sundays and holidays the elevated steam railways have become so far liberalized that they admit wheelers and their wheels to the smoking cars, a charge of two extra fares being made for the wheel. Hundreds of cyclers avail themselves of the privilege.

We are indebted to the Street Railway Review for the photograph from which our plate was made.



STREET CAR WITH HOOKS FOR BICYCLES.

Hollis W. Moore.

Hollis W. Moore died at Olean, N. Y., on November 14. He was born at North Leverett, Mass., in 1832. Mr. Moore was well known as an inventor and patentee. He was the manager of the International Steam Power Company, which manufactured his high pressure water tube safety boiler. He also invented the Black Giant shear punch and upset, the Ram's Horn spring for carriages, a patent circle for carriages, and other devices in the line of carriage work.

The Invisible Spectrum.

Dr. Huggins, in concluding his spectroscopic lectures at the Royal Institution, alluded to the wonderful advances recently made in ascertaining the character of the invisible parts of the solar spectrum. The rays of the sun, when received through the prism of the spectroscope, appear to the eye as a ribbon of rainbow colored light, across which are drawn a multitude of fine black lines, representing the screening or absorptive effect of the solar atmosphere. From the character and position of these lines the spectroscopic chemist is able to say what chemical elements in the gaseous atmosphere of the sun are causing this absorption. But this visible portion of the spectrum compasses but a fraction of the total rays that are speeding to us from the great fountain of energy upon which the life of the earth and its fellow planets depends. Beyond the violet end of the spectrum there is a whole gamut of invisible rays which only revealed themselves by their effect in promoting chemical action. Similarly beyond the other end of the visible scale—the deep red—there is a gamut of invisible or dark rays which are only perceived by their heating effects.

Some idea of the importance of the "ultra red" may be gathered from the fact that it has been traced to a distance nearly ten times as long as the whole range of the visible or light-giving region of the spectrum. To learn the character of these mysterious dark rays, then, it is clearly necessary for science to fit itself with some new sort of eyes that can see what ordinary eyes cannot—namely, heat rays and chemical rays. The photographic plate has answered admirably as an eye for the chemical rays, and brought out some wonderful facts. But with the invisible heat rays the problem was more difficult. Something in the nature of an extremely delicate thermometer is here required, which will pick out all the fine absorption lines as colder spots in the spectrum. The beautiful instrument known as the bolometer has recently been used by Professor Langley in feeling for these absorption lines, which, being regions from which the rays are stopped out, are, of course, colder than the remainder of the spectrum.

This bolometer, like all the finest applications of science, is an extremely simple thing. It is a strip of fine wire through which a feeble current of electricity is always flowing. This wire is slowly passed along the invisible gamut of the spectrum, and as soon as it comes to one of the absorption lines the spot is shown by a minute fall of temperature in the wire. This has an instantaneous effect on the flow of the electrical current. More current will pass through a cool wire than a warmer one, and the alteration is promptly shown by a delicate mirror galvanometer, which flashes its mimic signals onto a slowly revolving photographic ribbon. In this way Professor Langley has been able to pick out and locate hundreds of dark absorption lines in the great invisible spectrum which lies beyond the red.

Not only is the absorption of rays by the solar atmosphere shown by the method, but the absorption lines of the earth's atmosphere are equally apparent. Dr. Huggins anticipates that the meteorologist will soon be applying the system to weather forecasts. Some final remarks of the lecturer in regard to the photography of the corona of the sun are of interest as indicating the enormous energy which is at work in the solar furnaces. He stated that fiery spurts of calcium vapor (calcium is the metal of which quicklime is the oxide) have been photographed, extending in fantastic shapes to a distance of 280,000 miles from the sun's surface, and traveling outward at a speed of something like 20,000 to 40,000 miles an hour.

The World's Tallest Structures.

The tallest chimney was built at Port Dundas, Glasgow, Scotland, 1857 to 1859, for F. Townsend. It is the highest chimney in the world (454 feet), and one of the loftiest masonry structures in existence. It is, independent of its size, one of the best specimens of substantial, well made brickwork in existence. In Europe there are only two church steeples that exceed this structure in height—namely, that of the Cologne Cathedral (510 feet) and that of the Strassburg Cathedral (468 feet). The great Pyramid of Gizeh was originally 480 feet, although not so high at present. The United States outtops them all with its Washington Monument, 550 feet high, and the tower of the Philadelphia Public Buildings, which is 537 feet high.

The Eiffel Tower, at Paris, France, surpasses all other terrestrial metal structures with its altitude of nearly one thousand feet. The "Great Tower," for London, England, in course of construction from designs of Mr. Henry Davey, C.E., will outtop all metal structures, being built of steel, and its extreme height will be 1,250 feet when finished.

The highest and most remarkable metal chimney in the world is erected at the imperial foundry at Halsbrucke, near Freiberg, in Saxony. The height of this structure is 452·6 feet and 15·74 feet in internal diameter, and is situated on the right bank of the Mulde, at an elevation of 219 feet above that of the foundry works, so that its total height above the sea is no less than 711·75 feet. The works are situated on the left bank of the river, and the furnace gases are conveyed across the river to the chimney on a bridge through a pipe 3,227½ feet in length.

The highest artificial structure in America is the water works tower at Eden Park, Cincinnati, O. The floor of the tower, reached by elevators, is 522 feet above the Ohio River. The base is 404 feet above the stream. If the height of the elevator shaft be added to the observation floor, the grand total height is 589 feet.

The highest office building in the world is the Manhattan Life Insurance Company, of New York City. Its height above the sidewalk is 347 feet, and its foundations go down 53 feet below the same, being 20 feet below tidewater level, making a total of 400 feet. The foundations consist of fifteen masonry piers, and are carried by the same number of steel caissons. The latter were sunk to bedrock by the pneumatic process. The cantilever system was used for the foundation.—Machinery.

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