waterbuck's hide, the explorer rushed forward to grasp his hand, but the Englishman stared at him in amazement. A few words of explanation set everything right, and the Englishman, Major Buckworth, told him to help himself out of the stores at the station. The next morning, with a loud shout from the "boys," they came in sight of the Nile — the end of all their troubles. The collections were brought up from Gondokoro and all embarked on the steamer for Khartoum. Here the fifteen remaining "boys" were paid off and started on their pilgrimage to Mecca, while Lieutenant Alexander and José took train for Port Sudan, to begin their own pilgrimage to the white cliffs of Dover.

CROSSING THE GREAT DIVIDE BY ELECTRICITY

THE PLANS OF THE CHICAGO, MILWAUKEE AND ST. PAUL, THE NORTHERN PACIFIC, AND THE HARRIMAN LINES FOR THE ELECTRIFICATION OF THEIR MOUNTAIN DIVISIONS

BY

F. G. MOORHEAD

WITHIN two years, freight and passenger trains will be lifted over the Bitter Root Mountains on the backbone of the continent and dropped into the inland empire of the Northwest by electric power. The Chicago, Milwaukee and St. Paul Railroad is harnessing the "swiftwaters" of the St. Joe River for the electrification of the Idaho and Eastern Washington division of its new transcontinental line. In the "swiftwaters" of the St. Joe, a comparatively little known river of northern Idaho, flows enough power to drive 500 Mogul engines with 160 miles of train, which is more than the St. Paul system now operates on all its lines.

The surveying of the proposed dams has been completed and work on the first of them at the head of Mica Creek was begun last September. This structure will be between 800 and 900 feet long and about 40 feet high. Other dams will be built every few miles along the "swiftwaters" between the mouth of Mica Creek and Black Joe. They will be so close together that they will back water from one to the other, making practically a long, lock-divided lake. The dam at Little Falls will be eighty-six feet high and will back water for twelve miles up the river; but the others will be lower, for in most places the railroad track will be only forty or fifty feet above the river. Theoretically, 200,000 horse-power can be developed on this one river-reach of thirty-five miles. The cost of development is placed by the railroad officials at about $45 per horse-power. Approximately $9,000,000 will be expended, but part of this is for the land which the artificial lake will submerge. One ranch was recently sold to the company at $125 an acre.

In addition to driving the heavy transcontinental trains across the Bitter Roots, the electric power will be used for developing the latent possibilities of this section. The land adjacent to the new line abounds with timber. Heretofore it has been necessary to float the logs down the St. Joe River to Lake Cœur d'Alêne, but from now on the sawmills will go to the heart of the forest.

The St. Joe is primitive country, given over to Indians and to Nature, untouched by railroad track. Last summer, however, work was begun on a large sawmill at the town of St. Joe, and the summer of 1908 is to see a $1,500,000 wood-pulp papermill at the same place. St. Maries, thirty miles farther down the river, is also to have a sawmill and a number of other industries which will derive their power from the harnessed "swiftwaters." One company, subsidiary to the railroad company, has recently acquired 28,000 acres adjacent to the river and the new line of railroad. Some of this timber land will yield as much as 10,000,000 cubic feet to the quarter-section.

Tributary to the St. Joe, St. Maries, and Cœur d'Alêne rivers, and to Lake Cœur d'Alêne, it is estimated that there are 25,000,000,000 cubic feet of standing timber, or enough to keep all of the sawmills of the half-dozen sawmill towns in operation for 150 years, during which time, if the timber is properly cut, nearly three full-grown crops will have matured. Superfluous power may be transmitted to the immense lead mines of the Cœur d'Alêne district, now dependent on Spokane, almost one hundred miles to the west.

Other transcontinental lines are preparing to save hauling coal for their engines to burn while going over the mountains. The Great Northern has ordered four 100-ton electric locomotives to be used in handling its trains through the Cascade Tunnel. They will be delivered in the spring of 1908, when it is hoped the great power-dam in the Cascades will be finished. These new three-phase locomotives are the first of their type to be used for railroad service in this country, and they are larger and more powerful than any in Europe. Each locomotive will be equipped with four motors rated at 325 horse-power, which will make them able to haul a 1,000 ton train (or about 100 loaded cars) at a speed of fifteen miles an hour up a 2 per cent. grade. The motors will be used for "braking" on a down-grade as well as for hauling when going up. Going down they will be used as generators, assisting the air-brakes in holding the train and making additional current for the line. That Mr. Harriman has long planned a similar move is well known. Already the Southern Pacific is electrifying its suburban roads around San Francisco. The great problem of the Union Pacific — the thirty miles of heavy grade over the Sierra Nevada Mountains — may be solved by electrification, for the electric locomotives have less difficulty with heavy grades than steam locomotives have.

Early in October, a press dispatch from Eugene, Ore., said:

"S. W. Curtis, of San Francisco, who during the past two years has made numerous filings on water-power sites on several different streams in western Oregon, including the McKenzie, the Willamette, and the Santiam rivers, has filed with the clerk of Lane County a notice of appropriation of 12,000 inches of the waters of Odell Lake in the eastern end of Lane County. He has located a canal to extend several miles west and flow into Salt Creek. It is thought Curtis is working for the Southern Pacific Company, which has had several crews in that vicinity during the past year ascertaining the amount of power to be developed from the different streams, with a view probably to utilizing it some day in the operation of trains over the mountains when the proposed line into eastern Oregon is built."

That there is water-power in plenty for all comers is conceded. Engineering experts have placed the aggregate for the state of Washington alone at 3,000,000 horse-power, distributed as follows:

Rivers	Horse-power
Spokane	400,000
Columbia	400,000
Chelan	300,000
Pend d'Oreille	200,000
Kettle	200,000
Yakima	200,000
Snake	200,000
Okonogan	150,000
Palouse	150,000
Wenatchee	150,000
Chiwaukum	100,000
Snoqualmie	100,000
Puyallup	75,000
Entiat	75,000
Cedar	75,000
Nesqually	25,000
Nooksack	25,000
Skagit	25,000
Des Chutes	20,000
Other streams	75,000

Approximately 10 per cent. of this has been developed. In Spokane and vicinity alone, over three hundred miles of electric railroad are operated by converted water-power, while the coast cities utilize large amounts. But the projects which are planned, or those actually under construction, have a much wider sweep than any in existence now.

With the power of Chelan Falls, it is proposed to run an electric railway from Spokane to Puget Sound and another from Wenatchee, the famous fruit country, north to the international boundary. Among many other projects is that of the Big Bend Water-Power Company. Sixteen thousand horse-power will be developed at one site, but the company has gained control of the upper falls, where 16,000 to 20,000 horse-power additional can be developed at a comparatively small outlay. The power will be used on a line to be built between Spokane and Wallace, Ida., and some of it may be used by the Oregon Railway

and Navigation Company, which is said to be planning the electrification of its line in Washington and Idaho.

Of the various power rivers in the state of Washington, the Spokane River is perhaps the most remarkable. Experts say that there is probably not another stream in the United States so accessible for the development of energy. From its source in Lake Cœur d'Alêne, thirty-four miles east of Spokane, it has a fall of 1,224 feet to its mouth, at the confluence with the Columbia River. The altitude at its source is 2,124 feet; on its way to Spokane it has a fall of 369 feet, and in passing through the heart of the manufacturing district the fall is 132 feet in 440 yards.

On the west side of the Cascade Mountains there are such falls as the Snoqualmie, 268 feet in height and of large volume. Part of this energy has been appropriated in furnishing power to cities on Puget Sound. Cedar River, and the Nooksack, Skagit, Stillaguamish, Skynomish, Snoqualmie, and numerous other falls on the streams flowing from the Olympic and Chelan Mountains, and the Tumwater and Chelan Falls, with others of smaller volume, furnish almost unlimited power.

The development that has already taken place marks the beginning of an era in which the use of water-power will help to save the diminishing coal fields, and if the electrification of the railroads becomes general, to turn over many thousands of cars that are now carrying coal for the railroads' use to the other uses of commerce.

GARI MELCHERS

A GREAT AMERICAN PAINTER WHO HAS RECEIVED MORE RECOGNITION ABROAD THAN AT HOME

BY

C. LEWIS HIND

THE Englishman wandering over America, if he happens to be interested in the arts, meets delightful surprises and unexpected interests, ranging from the splendor of the modern architecture to the lyricism of the modern landscape.

In Buffalo I found a loan-collection of Impressionist pictures more catholic than any exhibition I have seen in Paris or in London. In Detroit I paused a morning to enjoy, at the house of an enlightened collector, the most complete ingathering of Whistler's works in the world. In Washington there is an unforgettable statue by Saint-Gaudens more impressive than any modern bronze in Europe.

These are a few of the surprises. Let them pass for the moment. The subject of this paper is Gari Melchers, American painter-craftsman, and I am writing it because for years I have known the pictures and the man well enough to be convinced that the man and his achievement are indissolubly one. He lives to paint: he would rather paint than do anything else; life to him would be barren and tedious without his craft. Most other painters have ulterior interests and relaxations — his relaxation is to turn from painting the figure to painting landscape. When, not long ago, he rented a room on the water-front, to study the North River, that was his holiday, his Newport or Atlantic City.

George Moore once remarked to me, "How should I fill the day if I didn't write books? I don't want to read. I loathe exercise. I can't see my friends until the evening, so I pass the time writing books. It bores me less than anything else." Painting fills Gari Melchers's time; but it does not bore him, any more than it really bores George Moore to write books. For we all groan or skip, according to mood or health, along the line of least resistance —whether it be painting, shooting big game, composing sonnets, or trimming hats. I suspect that, outside of painting, most diversions bore Gari Melchers. He is a worker. Work begets work. The zest increases the more we concentrate, if worry does not intervene. Mr. Melchers loves long spells of solitary labor — months of it — and resents the inroads of other folks' allurements. Yet he