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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles short, and the facts authentic, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

## DRAWBRIDGE PROTECTION.

The finding of the coroner's jury in the accident at Atlantic City drawbridge, in which fifty-seven lives were lost, has laid the blame upon the bridge tender, whose duty it was to make certain that everything was in proper order before giving the signal that the bridge was clear for the passage of the train. The signal was given; but the evidence showed that the tracks were not in proper adjustment. A rail end on the draw had failed to settle into proper alinement with the abutting rail on the approach, and its end was still in the raised position facing the oncoming train as the latter passed on to the draw. The coroner's jury evidently accepted the testimony of one of the experts, who stated that he found evidence that this projecting rail was caught by the pilot, and that it had struck a glancing blow upon the leading truck, which had been sufficient to derail it. We notice, moreover, that although the bridge was provided with outside wooden guard rails, the customary steel guard rails on the inside of the tracks had not been laid down. This was a most fatal omission; for had they been in place, the derailed train would probably never have left the bridge.

This deplorable accident raises again the question as to how far safety of railroad travel is to be sacrificed to its speed. In the early days of railroading, it was an invariable rule that trains should come to a full stop on approaching a drawbridge, and not proceed until they had received the signal to go ahead from the bridge tender. This arrangement permits of plenty of time for a thorough examination of the drawbridge, and is a safeguard against hasty and careless inspection; but on the other hand, it involves an additional delay, which the operating department is reluctant to grant in these days, when the demand for high speed is becoming so universal and imperative.

## THE BEHR MONO-RAIL IN BROOKLYN.

At a hearing held last week by the Committee on Plans of the Rapid Transit Commission, plans were presented for the construction of a Rapid Transit Railroad on Long Island, to be built upon the Behr mono-rail system. The members of the commission gave the proposal an extended hearing, and seemed to regard it with considerable favor. If the plans should be adopted, Greater New York will possess the first mono-rail system to be built and operated in this country. It was proposed to the Board that a franchise be granted for the building of an elevated line from the Atlantic Avenue ferry in Brooklyn to Coney Island. Mr. Behr stated to the commission that the road could be built within twelve months of the signing of the contract, and that the system would immediately relieve the Brooklyn Bridge to the extent of accommodating about 45,000 people during each rush hour.

As explained to the Rapid Transit Board, it was proposed to use a special design of car, capable of accommodating 170 seated and 80 standing passengers, and the offer was made to guarantee an average speed of 65 miles an hour including stops. Because of the peculiar construction of the track and cars, including the essential fact that the center of gravity of the cars would be below their point of support, it would be possible to make use of speeds of over 100 miles an hour between stops. The road is estimated to cost approximately \$170,000 per mile, and the estimated cost of the cars, which are of exceptional size, is \$45,000 each. The rail is six feet above the roadbed, and on account of the low center of gravity referred to the danger of derailment on curves is eliminated. A

mono-rail system of this type is in operation in Germany, and it is believed that the conditions in Brooklyn would be particularly favorable to the successful operation of the road.

## EXPORTS AND IMPORTS UNDER THE NEW GROUPING.

Under the new grouping adopted by the Department of Commerce and Labor for the statistics of trade of the United States, it is made apparent that articles in a natural state form a steadily increasing share of our imports, and a steadily decreasing share of our exports. Conversely, articles upon which labor has been expended in preparation for consumption form a steadily decreasing share of the imports and increasing share of the exports. This is proved by an analysis of our trade from 1870 to 1906. At the beginning of that period articles in the natural state formed only 26 per cent of the imports; but in 1906 such articles form 46 per cent of the total; while of the exports, articles in the natural state formed 68 per cent in 1870, but had fallen to 39.88 per cent of the whole in 1906.

At the beginning of the present fiscal year, the Bureau of Statistics adopted a new classification both of imports and exports. Thirty-six years ago, when the exports of the United States consisted chiefly of natural products, the old classification grouped them according to the source of production, rather than according to the condition in which they were exported. The new grouping divides the articles both of import and export into six leading classes: Foodstuffs in the natural state and food animals; crude materials for manufacturing; foodstuffs partly or wholly prepared for consumption; manufactures for further use in manufacturing; and manufactures ready for consumption; while the sixth group includes miscellaneous articles not falling naturally into any of the five classes. This new grouping has been applied to the imports and exports of each year as far back as, and including, the year 1870, and the analysis of the commerce of the United States during that period is of decided interest as showing the trend of manufacture, and the changing conditions as affecting our relations with other trading peoples.

A combination of the first three groups brings into one large class all articles imported or exported in the natural state as taken from the farm, forest, or the mine; while a combination of the last three groups brings similarly into one class the articles which have been advanced from their natural state through the application of labor. In the year 1870 about three-fourths of the imports were articles upon which labor had been expended before their importation, in putting them into condition for use in the United States. By 1880 the proportion had fallen to 64 per cent; in 1890 it was 61 per cent. A decade later it had fallen to 55 per cent, and in 1906 to 54 per cent. In the same intervals the proportion of the imports which came into the country in the natural state grew from 26 per cent in 1870 to 36 per cent in 1880; 45 per cent in 1900, and 46 per cent in 1906. Turning now to the export side, we find that the proportion of the domestic merchandise sent out of the country in the natural state decreased from 68 per cent in 1870 to 52 per cent in 1890, and to less than 40 per cent in 1906; while the proportion of articles manufactured, or upon which work was done, to the total exports from the country, rose from 32 per cent in 1870 to over 60 per cent in 1906.

## CAPE TO CAIRO BY RAIL, RIVER, AND LAKE.

The connected and comprehensive description of the work that has been done and is immediately projected on the so-called Cape-to-Cairo Railway, which is given elsewhere in this issue, will satisfy any impartial reader that this stupendous and romantic dream of the late Cecil Rhodes is destined to see a very practical fulfillment.

That this new transcontinental route will not be "all-rail," but will include long stretches of transportation on lake and river, detracts nothing from its significance, nor, indeed, from its initial usefulness. For in the early stages of the operation of pioneer routes of this character, time is not the vital consideration which it becomes in the later days when trade has developed.

At the present writing the line has been built over 2,000 miles north from Cape Town and some 1,500 miles south from Cairo. With the completion of the 450-mile section which is now being built northward to the southern extremity of Lake Tanganyika, there will remain only 410 miles of railroad to be built in order to give a continuous rail, river, and lake route from Cape Town to the Mediterranean.

The length of the line yet to be constructed extends from the Broken Hill Mine for a distance of 450 miles to Kituta at the southern end of Lake Tanganyika, at which point the sway of the Chartered Company of South Africa, which is carrying out the work, terminates. Survey work upon this section is now in progress, and the line will reach the lake within the next year and a half. From this point onward, the original scheme propounded by Cecil

Rhodes has had to be considerably modified. At the time the project was formulated, knowledge concerning the geographical configuration of the country around Lake Tanganyika was scanty; and subsequent exploration has shown that the rugged nature of the country renders railroad construction well-nigh impossible. On the one hand the lake is hemmed in by towering mountains, to tunnel or climb which would offer prodigious engineering difficulties, while the expense entailed could never be recouped. On the other hand, the lake itself affords a magnificent navigable waterway throughout its entire length of 400 miles, and furthermore it is on the direct line of the railroad to Cairo. Passengers will disembark from the train at Kituta on the southern shore, and be conveyed by steamboat to Usambara at the north end of the lake. Farther north in the same line lies Lake Kivu, separated by a narrow isthmus, only 90 miles across. This link offers no difficulties to railroad construction, beyond involving a steady climb of 2,000 feet. Lake Kivu is 60 miles in length and is similarly hemmed in by precipitous mountains, so that another break in the line will have to be made, and the facilities offered by the waterway adopted.

From Lake Kivu to the Albert Edward Lake is a further 60 miles with a further rise of 2,000 feet to the highest point on the route. The country to the east of this stretch of water is so flat that the waterway could be dispensed with, and a railroad easily and advantageously laid from Lake Kivu through a rich, healthy, and densely-populated country, past the Albert Edward Lake, and down the Semliki Valley to the southern shore of the Albert Lake—a distance of 220 miles. The Semliki Valley is in Congo territory. The road, it is true, could be laid through British territory; but in this event there would be a climb of 2,000 feet and a sudden descent of 3,000 feet; whereas by the former route there is no engineering difficulty before reaching the level of the Albert Lake. Once this sheet of water is gained, there is a continuous navigable channel to the Mediterranean by way of the White Nile, except for a stretch between Dufile and Rejaf, where the river for about 100 miles is broken by swift rapids. This distance would have to be spanned by another short length of railroad.

There is, however, an alternative route through Abyssinia, the emperor of which, under the Frontier Agreement of May, 1902, agreed to extend permission for the construction of the railroad through his dominions from the Sudan to Uganda. At that time the navigable route, via the Nile, was interrupted by the vast sudd, which obstructed the waterway between Fashoda and Lake Albert. This has, however, now been broken up, leaving a perfect fairway. Since the early part of 1904 a regular service of steamers has been plying between Rejaf and Khartoum, a distance of 1,000 miles, and Khartoum is now connected with Cairo by railroad except for a short distance from Wady Halfa and Aswan, where the river is again utilized.

It will thus be seen that when the railroad head reaches Kituta at the southern end of Lake Tanganyika (a distance of 450 miles, which has yet to be covered) there will be a further 410 miles only of railroad to be constructed between the chains of lakes, to give an efficient and combined railroad and waterway connection between Cape Town and Cairo. The exact line which the railroad will take of the various alternative routes at present available has not yet been determined, but the decision will be made during the next few months. In seeking to establish a railroad from the north to the south of the African continent in a continuous stretch for 6,000 miles, the idea of Mr. Rhodes was to avoid passengers changing from boat to train and vice versa, together with the avoidance of breaking bulk in freight, but this disadvantage could be overcome by the utilization of train ferries upon the various lakes. At the same time the transshipping of freight necessitated by the changes from land to water transport constitutes no serious drawback to the general utility of the scheme, at least for the present.

When this project was launched, its originator was not thinking so much of a railroad from north to south for through direct transport, but of the construction of a railroad backbone through the heart of the continent, which would offer an incentive to the development of the interior towns and centers of industry; moreover, he looked for the ramification of short-distance railroads both east and west of the main artery, and this expectation is already being rapidly fulfilled. Extending from the trans-African road are several extensions connecting the trunk line with the coast at various points: Notably those from Beira on the east coast to Buluwayo, and the Uganda Railroad from Mombasa to the Victoria Nyanza. There is also a line some 243 miles in length in course of construction between the southern end of Lake Nyassa and M'Tombi on the Shiré River, whence there is a steamer service to the seacoast via the Zambesi River.

Numerous other railroads projected through the