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NEW YORK, SATURDAY, NOVEMBER 17, 1906.

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 Soudan 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

various foreign colonies lining the Cape to Cairo Railroad on either side are being proceeded with, which will act as feeders to the trans-African trunk railroad; and as the country around the various towns such as Mafeking and Buluwayo is rising in importance and increasing in prosperity, short-distance roads are being linked up with the main artery in all directions at such points.

PEARY'S "FARTHEST NORTH."

On July 16, 1905, Commander Peary's polar steamship, specially designed for Arctic exploration, left New York on her quest for the North Pole. She had a crew of twenty men, under Capt. Bartlett. Commander Peary did not go with the ship from New York, but joined her later at Sydney, Cape Breton, where she took on coal and additional supplies. The "Roosevelt" left Sydney on July 26. She was next reported at Domino Run, Labrador, July 29, from which point she crossed to Greenland. The vessel was next heard from at Etah, North Greenland. She passed Cape York August 7, and reached Etah on August 16. The expedition's auxiliary steamer, the "Erik," in the meantime had visited various settlements in Greenland and obtained natives and dogs for the explorer and turned them over to the "Roosevelt" on August 13. At Etah the "Roosevelt" overhauled her machinery, took on board her last supply of coal from the "Erik" and thence proceeded north with twenty-three Eskimos and about two hundred dogs.

What Commander Peary did and his experiences during the last year in the frozen North are rather curtly but tellingly summarized in a communication received by Herbert L. Bridgman, secretary of the Peary Arctic Club. The communication follows:

Hopedale, Labrador, *via* Twillingate, Newfoundland, November 2.

"Roosevelt" wintered north coast Grant Land, somewhat north "Alert" winter quarters. Went north with sledges February *via* Heckla and Columbia. Delayed by open water between 84 and 85 degrees. Beyond 85 six days. Gale disrupted ice, destroyed caches, cut off communication with supporting bodies and drifted due east. Reached 87 degrees 6 minutes north latitude over ice, drifting steadily eastward. Returning ate eight dogs. Drifted eastward; delayed by open water; reached north coast of Greenland in straitened conditions. Killed musk oxen and returned along Greenland coast to ship. Two supporting parties driven on north coast Greenland. One rescued by me in starving condition. After one week recuperation on "Roosevelt," sledged west, completing north coast Grant Land, and reached other land near 100th meridian. Homeward voyage incessant battle with ice, storms, and headwinds. "Roosevelt" magnificent ice fighter and sea boat. No deaths or illness in expedition. PEARY.

The United States, therefore, holds the record of "farthest north," 87 degrees 6 minutes. The Arctic explorer failed to reach the North Pole, as he had confidently hoped to do with his specially-constructed vessel, the "Roosevelt," but he penetrated nearer to the Pole than the Duke of the Abruzzi's expedition, which had held the Arctic record, 86 degrees 34 minutes.

The best previous records are:

Duke of Abruzzi, 1900	86.34
Fritjof Nansen, 1896	86.14
Robert E. Peary, 1902	84.17
A. W. Greely, 1882	83.24
C. S. Nares, 1876	83.20
W. E. Parry, 1827	82.45
C. F. Hall, 1870	82.11
Julius Payer, 1874	82.05
Walter Wellman, 1889	82.00

Peary planned to have his headquarters 350 miles north of Cape Sabine. From that point he intended to make his actual journey to the pole, a distance of five hundred miles, across a desert of ice and snow. This final dash he expected to make in a month or six weeks from the time he left headquarters.

Peary's experiences will at least serve to dispose of Capt. Nares's views of a paleocrystic sea—views first formulated after Nares in 1876 had entered the ocean north of Grant Land, and based on the discovery of "floebergs" and floe ice as much as thirty miles in area and often fifty feet thick. It was argued that this sea, covered with enormously thick ice, was of great extent, and also that it was a shallow sea, and it was believed that most of the floes grounded on the bottom. Because of these formations, thought to be due to the unmelted accumulation of Arctic snows, this region of the Arctic Ocean was christened by Nares the "Paleocrystic Sea." Many of the floes were supposed to be centuries old. If sledges could be drawn over these floes, there would be a very stable foundation to travel over, not likely to float away and leave some explorer in the lurch who should happen to get between the paleocrystic ice and the North Pole.

The ice that Peary met was not grounded on the bottom of the sea, for anchored in this way it could not have drifted off to the southeast on the persuasion of a high wind, giving Peary and his belongings involuntary transportation to Greenland, which was just where he did not care to go.

We heard early last summer that the winter had been unusually mild in all parts of the Arctic from which reports had been received. Peary's report seems to show that these conditions prevailed very far to the north in the American Arctic. This fact may have had a large influence in disintegrating the Arctic ice, so that it was more easily broken up by great windstorms.

Peary, by actual experience, has put an end to this theory of enormously thick ice covering a large part of the Arctic Sea, to the north of America. He found the ordinary floe ice thick, but not ancient.

The ice of the sea to the north of Grant Land is no more stable than it is to the north of Asia and Europe, where the "Fram" drifted for many hundreds of miles to the northwest and where Capt. Cagni, of the Abruzzi expedition, drifted some sixty miles to the west when he was trying to make a straight road back to camp after reaching his highest north.

The failure of the ice in the American Arctic Ocean to afford a more or less stable highway for a sledge expedition to the North Pole will probably destroy the last illusions as to the advantages offered by polar ice anywhere for sledge travel poleward. The American Arctic sea ice had not been fully tested in this respect until Peary went on this last journey.

The ice was broken up into big and little islands and was floating off to the southeast.

Peary achieved the highest north in spite of the fact that in the long run the ice as a sledge route failed him utterly as a route to the pole.

BREAKFAST FOODS.

There is such a bewildering variety of cereal breakfast foods on the market, with such differences in appearance, taste, and claims to nutritive value, that it is hard to make an intelligent choice between them. For that reason the bulletin by Dr. Charles D. Woods and Prof. Harry Snyder recently issued by the Department of Agriculture should prove of interest. True economy here, as with other kinds of food, depends upon the amount of digestible nutrients which can be obtained for a given sum of money.

Of the five cereals most commonly used for breakfast foods, oats contain perhaps the largest quantities of the important nutrients, with a fairly low proportion of crude fiber. Wheat ranks very close to oats in all respects, however, and even when prepared with the bran is freer from crude fiber. Many persons consider that the bran contains so much protein and desirable mineral matters that it should be retained in spite of the crude fiber which it contains. Digestion experiments indicate, however, that the crude fiber makes the whole material so much less digestible that more protein is actually available to the body when the bran is excluded. Moreover, the ordinary mixed diet probably furnishes all the mineral matters which the healthy body needs, so bran is not needed for this purpose. The bran-containing preparations should be avoided by persons of weak digestion, but are often useful in cases of constipation. Such differences are, however, too small to be of importance to normal, healthy persons, and all the ordinary varieties of breakfast cereals are wholesome. Individual taste must determine which are most palatable. Appearance, palatability, and relative cost will always and rightly be important features in the selection of all these cereal breakfast foods. Corn and its preparations are rich in carbohydrates and fat, but are slightly less digestible than the other cereals. Rice is poor in protein, but remarkably free from crude fiber, and consequently furnishes a large proportion of digestible carbohydrates. Barley contains a fair proportion of nutrients and is moderately digestible. All these differences in composition and digestibility are comparatively slight and may be disregarded by healthy persons living on the ordinary mixed diet.

Thoroughness of cooking is a factor which has a bearing upon digestibility. It not only makes the cereals more palatable, but also breaks down the walls of indigestible cellulose which surround the starch granules and other nutrients and produces other changes so that the digestive juices can work on the nutritive ingredients more effectively. Poorly-cooked cereals are less palatable than the same dishes well cooked and may cause indigestion and be really harmful. When the partially cooked preparations are used care should be taken to insure sufficient recooking before serving. The majority of the ready-to-eat brands are apparently thoroughly cooked.

In choosing between the various breakfast foods it must be remembered that a novel appearance and a quasi-scientific name do not necessarily represent any unusual food value. Unless something is added during the process of manufacture, all brands must have just about the same composition as the cereals from which they are made, as manipulation cannot increase the amount of food material, though it may modify its appearance and flavor. As far as the claims to predigestion are concerned, it is safest to assume that in at least the majority of cases the goods do not contain a much larger proportion of soluble—i. e., partially digested—starch than any thoroughly cooked cereal. Fortunately, the matter is of little importance to healthy persons, since they are probably better off for doing their own normal work of digestion. If any one is so ill as to need predigested food, he should depend upon the professional advice of a competent physician in selecting it. The predigested and malted cereals should be judged by the same standards as the others.

It should not be forgotten that breakfast cereals of all sorts are usually free from harmful adulterants and that, especially in the case of package goods, they reach the consumer in a clean, fresh condition.

The investigations made at the agricultural experiment stations have thus far failed to discover any uniform relation between price and nutritive value. The retail prices of breakfast cereals run all the way from 3 cents a pound for some of the plain meals sold in bulk to 15 cents or more for some of the ready-to-eat brands. The proportion of nutrients supplied, pound for pound, does not differ greatly. The partially cooked brands, usually medium priced, are certainly easier to prepare than the raw grains and may be more truly economical in households where time, labor, and fuel are scarce. In general, the ready-to-eat brands are higher in price than the partially cooked goods, though they have practically the same nutritive value, pound for pound, as other classes of cereal breakfast foods. The extent to which they should be used for their special flavor and the variety they give to the diet must be decided according to individual circumstances. It is only fair to add, however, that, whatever the relative food values of malted and unmalted foods, the cost of the former to the manufacturer is greater, and the increased price is to this extent justified.

In the selection of cereal breakfast foods the consumer may be guided by the results of analyses of disinterested chemists, by the digestibility as determined by actual tests, by cost, by taste, by economy, or by the observed effects of the goods upon individuals. It seems fair to conclude that the chemical composition, considered in connection with digestibility and cost, furnishes a satisfactory guide for selection, due attention being paid to palatability and individual preferences.

All things considered, the cereal breakfast foods as a class are nutritious, convenient, and reasonably economical foods and worthy of an important place in the diet when judiciously combined with other foods.

THE CURRENT SUPPLEMENT.

A description of the mastless steamer "Teucer" for freight-carrying traffic opens the current SUPPLEMENT, No. 1611. Teeming with wholesome advice is President Alexander C. Humphreys's address on the engineer as a citizen. Mr. C. F. Jenkin discourses illuminatingly on the advent of single-phase electric traction. A new process for electrically depositing copper has been invented by Mr. Sherard Cowper-Coles, a well-known English metallurgical chemist. A full description of his process is published in the current SUPPLEMENT, accompanied by clear illustrations. Prof. R. S. Hutton gives a very excellent account of recent inventions in the electrical metallurgy of iron and steel. Mr. H. P. Fairchild takes up Shop Photography as his subject. A good description is given of how platinum is mined in Russia. Most valuable to the alcohol producer is Dr. H. W. Wiley's excellent discussion of the sources of industrial alcohol. "Coal Mine Explosions: Their Causes, Prevention, and Methods of Rescue," is the subject of a very clear article. Mr. Richard Schelies writes on some experiments with a beating-wing flying machine of his own invention. The work of the Weather Bureau and its relation to transportation is outlined by Mr. Edward H. Bowie.

THE NUMBER OF WORDS AND LETTERS IN THE BIBLE.

The number of words in the Bible and the number of letters was ascertained in three years' work of a painstaking compiler and given to the world in Horne's "Introduction to the Study of the Scriptures." The figures refer to the King James version:

	Old Testament.	New Testament.	Total.
Books	39	27	66
Chapters	929	260	1,189
Verses	33,214	7,959	41,173
Words	593,498	181,253	774,751
Letters	2,728,100	838,380	3,566,480

The similar record for the Apocrypha is: Books, 14; chapters, 183; verses, 6,031; words, 125,185; letters, 1,063,876. Similar statistics are the following: The middle line is found in II. Chronicles, iv., 16. The middle verse is Psalms, cxviii., 8; the middle chapter is Psalms cxvii., and that is the shortest chapter as well. The shortest verse is John, xi., 35. The longest verse is Esther, viii., 9. In Ezra, vii., 21 occur all the letters of the alphabet save j.