head, while the feet remain in a cold stratum constantly re-enforced from opening doors The use of tanks of hot water under the feet preserves the temperature of every part that cannot be adequately clothed and mollifies the general atmosphere without poisoning it. Any feasible distribution of heated air cannot prevent the universal misery of cold feet The present system of running to the stove to toast them, and then back again to escape the headache, is better than any system of moderate heating by stoves The calorific contrivance, whatever it may be, must lie under the feet And hot water tanks, changed at water stations, would probably, in effectiveness, certainty of operation cost and expedition, excel all other heaters Water is admirably adapted for this purpose. It has the greatest capacity of any substance for holding heat, and its fluidity renders it the easiest of all substances to handle By means of little doors in the sides of the car, between the seats, a couple of porters could change the tanks every 30 or 50 miles, as the weather might require. In case of collision, the wrought-metal tanks would be unlikely to burst, and there would be no setting fire to the *debris*

Baker's system of warming cars by water in pipes is already used in the best drawing-room and sleeping cars, both of East and West The heat is pleasant and temperate and it is applied where it is wanted—at the bottom of the car—at the feet of the passengers Of the apparatus, the Chicago *Railway Review* says: The principle is very simple—that of the circulation of hot water. From the water-enclosed furnace, placed at one end, or suspended underneath the car, the hot water—charged with 33 per cent. of salt, to at once prevent freezing and increase its capacity for retaining heat—flows out through the pipes distributed along the floor of the car, returning automatically to the furnace as it becomes cool. The apparatus would be little liable to accident from fire in any case; and, *to make assurance doubly sure, the water surrounds* the fire, so that in any case of accident, it would put it out. The economy of fuel (three-fourths) and labor is extraordinary—the furnace being filled, for instance, at Chicago, locked up, and requiring no further attention till Buffalo is reached In another important respect, the economy is notable, as compared with the stove-heated car. Instead of two stoves, one furnace is used. As this (placed in one corner) gives out no heat directly, there is a practical saving of six seats in each car a common stove not only occupying the place of a single seat, but rendering the two adjoining seats uncomfortable.

A new method of heating cars tried on the Connecticut River Railroad, is thus described —

A bonnet is placed on the top of the car at each end, to catch the wind while the car is in motion, the air rushes down a pipe into a water box, where it is thoroughly washed, and thence into a hot air chamber surrounding a stove, whence it is forced in a pure state into pipes that run near the floor, the whole length of the car, on each side and under the seats At proper intervals these pipes are perforated with small holes, through which the heated air escapes. The warmth is distributed equally throughout the entire length of the car, and coming low down towards the floor will enable passengers to always keep their feet comfortably warm.

Another much needed railway accommodation would be the timely indication of stations. On many roads stations are not habitually called out by the brakemen; on most roads they are indistinctly called; on all roads they are not called till the train stops, thus giving too little time for ladies and children to alight. And as the attendants on American trains are few and very busy at stations, passengers must, in the majority of cases, know the station, or take pains to get and ask, or be carried on. A revolving sign at each end of the car, legible to all, and to be set by the brakeman just before stopping at stations, would be simple and effective. Such an apparatus has been introduced on the Ogdensburg and Lake Champlain Railway. It consists externally of a box surmounted by a bell, and having a glass plate in front, under which the name of a station appears in letters of about three inches in length. When the train arrives at the station named on the indicator the bell on the top of the box rings, and presently the name of the next station on the line appears under the glass plate.

Speaking of attendance, the following railway order is commended to railway managers without many exceptions. It is posted in the station houses on the Rutland Railroad, in Vermont:—

"*Baggage men at the depots, and men on the trains*—freight as well as passenger—are expected, and are employed by this company, not only to do their work well, but pleasantly—to give every facility to travellers by information and by act'r. Any departure from civility of conduct, and that courtesy due the patrons of the road will render them unfit for its service, and they will be dismissed accordingly Travellers may be unreasonable, but this will be considered no excuse for any of the employees to be so in return."

It is hardly necessary to add, that the railway dinners and lunches of America, as well as of England, may be improved.

The New York *World* says that Mr. Charles Dickens has again set on foot in England, a much needed reform. "Mugby Junction" has done more for the railroad commissariat than all the sanitary regulations, newspaper agitation, and individual growling put together. John Bull stung in his stomach by satire, has set to work in good earnest to reform the refreshment saloons on the great railway lines, and it now seems likely that the very simple and excellent plan of supplying "locomotive luncheons" at one station, neatly and compactly arranged in baskets, which are left at the next station is to become general. But it is in America, above all other places, that an economical and expeditious system of victualling passengers, should be devised, for here the routes are longest and the stations isolated.

ARTIFICIAL MINERALS.

UNTIL the commencement of the present century, all of the ultra-marine of commerce was prepared from a mineral called *lapis lazuli*. This stone is found in China, Thibet, Tartary, and sparingly in the United States, and the preparation of the blue color from it is attended with much trouble and expense If the world had been dependent upon this source, there never could have been more than four or five pounds *per annum produced* Hence the discovery of an artificial method of manufacture was one of the most important contributions made to the arts this century. Instead of four pounds yearly production, we now have at least twenty million pounds per annum, and as its applications are daily extending, the production increases in proportion

It could never have entered into the imagination of any man that the blue color which Raphael and Guido used with so much effect in their paintings, and which cost several times its weight in gold would in the nineteenth century be made by the ton, and sold so cheaply that every household could use it in for the ordinary purposes of the laundry. It may be of interest to give a sketch of this important industry. The German chemist, Christian Gmelin, of Tubingen, was the first to prepare a small quantity of ultra-marine artificially, in 1822. About the same time a French chemist, Guimet, was occupied with similar studies, and to him is ascribed the credit of the invention in France.

The first manufactory on any considerable scale was established in 1834. A single sentence in "Dumas' Applied Chemistry," edition of 1828, is said to have inspired one of the principal founders of the industry to undertake the work. Dumas says: "There is no doubt that we shall hereafter be able to prepare ultra-marine from alumina and sulphide of sodium" This sentence attracted the attention of a Nuremberg chemist, and he immediately set to work to find a process for the cheap manufacture of ultra-marine. He did not live to see the task accomplished, but his successor pushed it forward to completion.

Since that year, one establishment after another has been started in Germany and France, so that at the last Paris exhibition a single manufactory was able to send at least a ton of the most beautiful ultra-marine to be placed on exhibition There are single establishments that produce two or three million pounds per annum, and this article of commerce is now employed in the manufacture of paper, in the whitening of sugar, as a bluing in the laundry, to correct the yellow color in a large class of articles, in the manufacture of colors, and for many purposes that would have been inconceivable a few years ago.

The *lapis lazuli* of the ancients is now chiefly employed in the manufacture of mosaics, and is no longer ground up as a color, and what was formerly called ultra-marine because it came from beyond the seas, is now a home-made article, brought to our doors and rendered available to any one who may wish to use it. It is not surprising that Liebig should pronounce this the crowning discovery in the artificial preparation of minerals. Ultra-marine is essentially a mixture of silica, sulphur, alumina, sulphuric acid, iron and soda, and the proper proportions to take for *its preparation vary according to the manipulation in* different manufactories. The best brands come from France and Germany.

The number of minerals made artificially is daily on the increase, and we shall probably be able at some time to prepare a majority of the stones found on the face of the earth. Recently Clanet has succeeded in making chrome iron by mixing concentrated solutions of sulphate of iron and chloride of chromium so that the metals, iron and chromium are in the same proportions as in the native ore, then adding a slight excess of ammonia and fusing the precipitate with carbonate of ammonia in a platinum crucible. The product possesses all of the physical and chemical properties of the native stone; its specific gravity insolubility in strong boiling acids, its color and metallic lustre bear the closest resemblance to chrome iron ore. By two equivalents of oxide of iron and one equivalent of chloride of chromium, and fusing with borax, beautiful octahedral crystals are obtained

AMERICAN WHALE FISHERIES.

FROM an interesting review of the whale fisheries of New Bedford and other Eastern ports we learn that *during the past year this branch* of commerce has been prosecuted with very fair success. The number of vessels owned in the United States, now engaged in the whaling business, is 338—176 barks, 89 schooners, 49 ships, 24 brigs. Of these vessels New Bedford has 178, Provincetown 55, New London 20, Westport 10, and Boston 9. Fourteen other ports have from 1 to 8. The total number of vessels in 1868 was 322, tonnage 76 696. The total tonnage this year is 74,199, which shows a decrease of 2,497. It is stated, however, that 1,202 tons of this is only apparent—a result of remeasurement by the new system. Of the total present tonnage, 74,199, Massachusetts has 66 553. During last year 47 vessels sailed from New Bedford, and 36 from Provincetown—the clearances from all other ports ranging from 1 to 9. The arrivals for the same period at New Bedford were 48; at Provincetown 39; at all other ports 1 to 8. The New York and Westport whalers generally come to and depart from New Bedford Considerable quantities of oil and bone are landed at Panama for transhipment.

The receipts of oil and bone in 1868 were 48,029 barrels sperm oil. 63,169 whale oil, and 870,497 pounds of whalebone. The exports during the same time were 18,783 barrels sperm, 1,927 barrels of whale, and 221,278 pounds of whalebone. The stock of sperm oil in first hands, January 1, 1869, was 13,000 *barrels*; whale oil, 16,700 barrels; bone, 209,069 pounds. The price of sperm oil steadily declined through the year. At the close of the previous year, it was held at $2 15 per gallon, from which it fell ultimately to $1.75. The average was $1.96 against $2.34 in 1867. Whale oil, however, ruled higher than in the previous year, the average price having been 83 cents against 74 in 1867. The average price of bone for the year was $1 01 against $1.16 in 1867. For twenty-five years past, sperm and whale oil have both, with occasional intermissions, steadily risen until the price is about tripple what it was at the commencement of this period. The amount of tonnage employed in the whaling business, for the same *period, has decreased from 238,655 in 1845* down to 74,199 in 1869. It fell off very much, of course, after the commencement of the war. It would seem that some splendid and many quite remunerative, voyages were made, while a few were nearly total failures. The right whaling business in the Arctic seas, which at first threatened to be a complete failure, proved ultimately a decided success. In Cumberland Inlet and adjacent waters, the whale fishery has, for several successive years, turned out unremunerative. Some very promising voyages in the Pacific, Atlantic and Indian oceans are now in progress. The *Florida*, of San Francisco, Captain Frazer, now in the North Pacific, has 1,750 barrels of oil, which is said to be the largest catch of the season. A New London whaler was engaged in sealing, on the Alaska coast, during the season, and secured 42,000 skins. Thus, notwithstanding the universal employment of petroleum as an illuminator, as well as its extensive use for other purposes, in which whale and sperm oils were formerly employed, together with other drawbacks, the whale fisheries show no signs of permanent decay We are of opinion that the growing wants of commerce are such as to compel a reparation of the wastes and losses that have been inflicted upon this branch of commerce, during the last ten years.

LUMBERING OPERATIONS SUSPENDED.—Owing to the great depth of snow in the woods the lumbermen in this section of the country have been obliged either to materially contract their operations or suspend altogether. The snow in many parts is from four to five feet deep on the level, and it is found impossible to get through the woods with teams The result is that nearly all teams except those owned by the lumbermen themselves have been discharged

A Georgia editor estimates the value of the cotton crop in that State at $35,000,000, of which sum $10,000,000 will have to be paid to the Northwest for pork and bacon; $11,250,000 for corn; and $1,750,000 for mules leaving only $12 000 000 as a surplus, part of which willl be required to pay for iron, salt, manures, &c.

The United States produced twenty-five millions worth of cheese, and a hundred millions worth of butter last year.

RAILWAY TRAFFIC RETURNS

FOR THE MONTH OF JAN, 1869.

NAMES OF THE RAILWAYS.	Passengers.	Mails and sundries	Freight	Total. 1868.	Total corresponding period of 1867.
	$	$	$	$	$
Great Western Railway	112,453	14,655	290,918	394,039	316,816
Grand Trunk Railway	103,941	27,000	467,600	638,210	663,253
London and Port Stanley Railway	851	104	968	2,023	2,011
Welland Railway	1,033	201	420	1,659	1,636
Northern Railway	10,334	1,163	22,075	33,636	37,169
Port Hope, Lindsay, & Beaverton Railway	2,500	257	3,778	6 535	7,037
Cobourg and Peterborough Railway*	...	...	...	...	...
Brockville and Ottawa Railway	2,398	970	7,723	11,091	8,883
St Lawrence and Ottawa Railway	4,023	821	7,116	11,990	12,205
Carillon and Grenville Railway*	...	...	...	...	...
St Lawrence and Industry Railway*	...	...	...	...	...
Stanstead, Shefford and Chambly Railway†	...	...	...	...	...
New Brunswick and Canada Railway	901	682	4,251	5,165	6,301
European and North American Railway	3,922	30	7,409	12,008	11,483
Nova Scotia Railway†	318	...	206	524	...
Total	221,922	46,891	778,730	1,147,043	965,937

* Roads closed.
† No Returns.

JOHN LANGTON, *Auditor*

Audit Office, Ottawa, 26th Feb., 1869.