posing the steam to heat the cylinder at 307° at the commencement of the stroke, and to cool it down to 212° at the end of the stroke, would be 95°×.12983 (specific heat of iron) multiplied by the weight of the cylinder, piston, and that portion of the piston rod subjected to steam heat, estimated in pounds. The product would be expressed in units of heat. It is evident that such loss would be large on heavy cylinders, unless the heat was converted into work by the expansion of steam at lower temperatures. This is done in the compound engines of the Magellan, as, according to Mr. Harrison's statement, the steam performs work to within six inches of vacuum.

Now, will Mr. Emery explain what other than mechanical difficulties impede the attainment of the same result with single cylinder high pressure engines, using condensers?

As the heat leaves the cylinder, what does it do but continue to expand the contained steam, thereby enabling it to follow the piston with greater efficiency down to and below the atmospheric line, the steam exhausting at a pressure of six inches of mercury column? Is this not possible, at least theoretically, in a single cylinder, with a condenser?

The heat abstracted by the cylinder at high pressures, is stored up and imparted again at lower pressures, in both systems; and we maintain still, that, under the same conditions, the same amount of expansion will produce the same economical result. Of course, the surface radiation in compound is greater than that in single cylinders.

If Mr. Emery's theory be correct, the steam jacketing of a cylinder is bad practice; for, though the cylinder abstracts no heat from the steam, as soon as the steam expands, the cylinder imparts heat, the amount of which must be greater when the cylinder is kept at a constant temperature, than when the temperature decreases and keeps more nearly uniform with that of the steam. If the heat imparted by the hot cylinder be not converted into work, it is lost; and we admit that, if allowed to exhaust without condensation, so that expansion can be carried to its lowest practical point, there would be loss; but why this cannot be done in a single cylinder, we, in common with many others, fail to see.

POPULARIZING SCIENCE.

We have seen it stated that, during the siege of Paris, Henry St. Claire Deville, one of the most illustrious, and, at the same time, genial and popular of the scientific men of France, made an address to the members of the Academy of Sciences, which was the occasion of earnest debate; but the text of the speech had not reached us until the English periodical *Nature* gave it in the original French to its readers. Deville says, what all the world had been uttering before him, that France was conquered by the science of Germany. The very discoveries and inventions of their own men had been used to destroy them. "The discoveries of Ampère, the inventions of our military engineers, have been cruelly employed against us, and thus they say on every side, and with truth, that we have been conquered by science," are his words.

In seeking for an explanation of this disastrous state of affairs, Deville gives two adequate reasons: the first, that men of science had been overlooked by the Government, and mere politicians appointed in their places; and secondly, that the members of the Academy had devoted themselves too exclusively to abstract science, and left the world to find out what was going on in the best way it could. He proposes as a security, that the Institute should appoint committees to discuss all matters relating to the government; and, at the same time, seek to popularize science, and, by well edited publications, to familiarize the public mind with the grand discoveries of the day.

It ought not to be forgotten, in this connection, that it was Deville who obtained an appropriation of 50,000 francs from the Emperor, to make investigations into the properties and uses of aluminum. But this was a paltry sum compared with the millions expended by the same ruler on the luxuries and vanities of his court. And yet, out of the research made by Deville has grown the cheap manufacture of sodium, and, indirectly, the preparation of the rare metals aluminum, magnesium, boron, silicon, and the gold amalgamation process. He made the fifty thousand francs go a great way, and showed what might be accomplished if the patronage of the government could be extended to similar investigations in other directions. Deville was, therefore, entitled to call upon his fellow members to come out from the dry bones of abstract science, and try to clothe them with the garments of usefulness and intelligence.

It is certainly true that the French Institute has for a long time presented a curious spectacle to the world. Its members have grown old in the study of theoretical matters. They could not see beyond the ends of their noses, and when the war broke out, and they found themselves shut up in Paris, they suddenly tried to make themselves useful by attacking some of the practical questions of the day, such as proper food for famine times, and deadly weapons and explosives for their enemies.

It is amusing to read what they said about Boston brown, or Graham bread. Payen, who has written volumes, said that he had tasted it, and found it good; Dumas had seen it baked; Chevreul, the founder of all we know about soap and candles, had had some experience with it, and so on, through the list. And these grave men actually decided that "unbolted flour was safe to eat in war times." It is evidently high time that the members of the Institute were woken up, and, as an inducement for them to look more to practical matters, it would be well for the new government to assign them places in the bureaux where a scientific knowledge is requisite. What they need in France is less politics and more science. Would it not be wise for us to investigate matters in this country, to see how far our own Government is conducted by politicians, and how often scientific men are invited to take part in the various branches of administration?

France, by her own showing, has been ruined by politicians; it may be well for us to take note of this and profit by the lesson. In the matter of popularizing science, we can safely challenge criticism, in the United States. There is scarcely a newspaper, magazine, or weekly, that has not a special scientific department, and the SCIENTIFIC AMERICAN, in the course of the year, furnishes an account to its readers, of every invention of importancethat is made in any part of the world.

The result of this wide dissemination of knowledge is that the American people are famous for their practical talent. The universal Yankee is a mystery to European nations, as they have no analogous character with which to compare him. There is more danger of our running to the other extreme, and of our rendering scientific knowledge superficial by too great a desire for popularizing it. It is better to strike an average, and to secure well-endowed universities, as well as technological institutes; and as our journal is outside the arena of politics, we may with propriety suggest that a little less politics and more science, in the administration of the affairs of Government, would enable us to escape the dangers which have brought France so low, and threaten some day to overturn our own Government.

TRIAL OF OLMSTEAD'S ELECTRIC CAR BRAKE.

An excursion party, consisting of members of the press and railroad men, was recently invited to witness the trial and operation of this novel brake on a train of five cars on the Erie Railway.

The levers are of the ordinary kind, and may be operated by hand in the ordinary manner. The electric device is an attachment to one of the levers of the ordinary brake. The electric arrangement is as follows; A horizontal swing shaft is placed within the car truck, parallel with the car axle, on which shaft is a loose shell pulley which receives motion from the car axle against which it rests. Within the loose pulley is a fixed pulley, keyed on the swing shaft. On the face of the fixed pulley are two powerful electro magnets, each capable of sustaining 300 pounds, so that their combined force is 600 pounds; these are connected by wires with a Daniell's battery, on the car; each car having its separate battery. A chain extends from the swing shaft to the brake lever.

The wires, connecting the battery and the magnets, extend to a key board attached to the ceiling of the car, and the electric connection is made at this point by a simple lever or key, operated by the bell cord. On pulling the cord, whether by the engineer or conductor, or by the breaking of the coupling, the electric circuit is made, and the magnets draw the loose and fixed pulley together, whereupon the swing shaft winds up the brake chain, and the brakes operate on the wheels and stop the train.

It may be said that the electricity forms a clutch, and thus holds the brake shaft to a pulley which is kept in motion by the movement of the car. Electricity is therefore employed as an aid to utilize the momentum of a moving train or car.

The party started from Jersey City at 12 30 P. M., and, after passing through Bergen Tunnel, the trials were made on the level grounds of the meadows, as follows:

1st. The train was stopped in 55 seconds with hand brakes.

2nd. The electric brake stopped it in 45 seconds.

3rd. With the electric brake and reversing the engine, the train was stopped in 28 seconds.

4th. The engine was detached from the train when going at full speed, which set the electric brakes in operation throughout the train, the latter being stopped by their action in 22 seconds.

5th. This was the last trial, and consisted in detaching the two rear cars, when the train had attained a maximum speed. The moment they were detached, the electric brakes were set by the cord itself, and the two cars stopped in 13 seconds, while the part attached to the locomotive was stopped in about 40 seconds. The maximum speed in all the above trials was 30 miles per hour.

Every trial was a success, showing the great utility of the device.

The electric brake may be operated by the engineer or by the conductor, by simply pulling the bell cord. In case of separation of the train, by the running off of one of the cars or other cause, the brakes become self-acting, and their force is instantly applied.

On the conclusion of the experiments, which were eminently successful, the party returned to Jersey City, and partook of a sumptuous lunch at the Erie Depot.

We learned that this brake had been in use on the Middletown train of the Erie road, for the last seven months, stopping the train fifty times daily; and further that it was the means of saving the train from a fearful accident at West Paterson Bridge, where the engineer was warned of danger only 2,000 feet distant, and stopped the train within 50 feet of an oil train, in 23 seconds on a down grade.

The brake was patented April, 1870, by J. Olmstead and W. O. Cooke, of Providence, R. I.

OCEAN TELEGRAPHY.

Cyrus W. Field, Esq., in a recent letter to Prof. Morse, states that the date of completion of the first Atlantic cable, between Great Britain and America, was August 5, 1858. This cable ceased to work on September 1st of the same year, after exactly four hundred messages had been transmitted.

An attempt to lay another cable was made in 1865; but on the 2d of August of that year, when about two thirds of the length had been laid, the cable broke from the vessel and was lost.

The second cable, between Ireland and Newfoundland, was completed July 27, 1866.

The third cable (consisting of the lost cable of 1865, which was recovered in 1866,) was completed September 8, 1866.

The fourth cable, from France *via* St. Pierre, N. F., to Duxbury, Mass., was completed July 23, 1869.

During the month of March of the present year, 12,547 messages, or about 405 per day, were transmitted by Atlantic cable.

At present, only one cable—the French—is in working order. The first cable is supposed to have been defective in construction. The second and third cables ceased to work some time ago, owing to defects in the shore ends near Newfoundland. These cables are to be fished up and repaired in June next. All the business is at present done on the French cable.

Telegraph lines now reach as far east as Singapore, a distance of some nine thousand miles from New York. From Singapore to Hong Kong, a line is to be completed within a month; and from this line a cable to Australia is to be completed in November next.

JEAN LAFITTE AND HIS TREASURE.

The reputation for wealth acquired by piracy, which Jean Lafitte has attained, has set many to employ time and means, worthy of nobler ends, in searching for his hidden treasures. Lafitte was not a sailor, nor a pirate. He was a blacksmith by trade, and became agent to an association engaged in the capture of Spanish merchantmen. This association was under a commission from the Republic of Columbia, which was, in the early part of the present century, at war with Spain. Columbia issued letters of marque to the ships of Lafitte's organization, and a great deal of valuable merchandise was seized. The property was taken into possession by the United States Government, and consumed during the defence of New Orleans, in 1814 and 1815. Lafitte's men were released from the prison, in which they had been placed, and sent to man the batteries in Jackson's lines. They were granted full liberty at the end of the war, and received the thanks of General Jackson.

These facts must be in the remembrance of some now living, and are mentioned in books accessible to all the world; but there is a curious superstition among the more credulous of the inhabitants of some of the Southern States, that Lafitte and his followers buried untold mines of wealth in some of the islands outside the Rigolets. The folly of the believers in this "yarn" has led many of them to risk their fortunes in attempts to recover the treasures, and the fact that Lafitte's men, when discharged from service, never visited the place where they are reported to have deposited their property, has not prevented men, even in our own day, from following the chimera. Jean Lafitte was drowned in the Gulf, in the wreck of a little ship of which he was supercargo, and his associates mostly remained in New Orleans, and were always poor men.

Recently, Mr. A. J. Newell, a compositor by trade, and lately employed on the New Orleans *Picayune*, left his home to explore the islands which tradition pointed out as the depository of the treasures. He had received from his father an oral communication (said to be derived from one of Lafitte's men), detailing the place of deposit with minute exactness. Many members of Mr. Newell's family had made similar voyages, and their credulity was not shaken by the always repeated failure. But a disaster has now changed the comparatively harmless folly into a tragedy. Mr. Newell's body was discovered in the water, near the islands, with the marks of a fatal gunshot on it. Thus ends a life made remarkable by its utter engrossment by one idea, spent in pursuing that idea in the teeth of common sense, reason, and history.

CANALS, ANCIENT AND MODERN.

The ancients early recognized the importance of canals as mediums for internal communication. Probably the first work of this kind was constructed by the Egyptians. It connected the Nile with the Red Sea, and in 1798 the work was in such a state of preservation that a company of French engineers reported that it only needed cleansing to render it navigable once more. Herodotus attributes its commencement to Pharoah Necos, in the year 616 BC. Although Pliny, Strabo, and other historians do not agree with Herodotus as to the date of its commencement and the name of its founder, they all agree in that there was such a canal, and that it was commenced some five or six centuries before the Christian era. Strabo says the canal was 150 feet (100 cubits) broad, and that ships were four days in sailing through it.

The Cnidians, ancient inhabitants of Caria, in Asia Minor, designed and dug a channel through the isthmus joining their territory to the continent.

The Greeks made an unsuccessful attempt to cut a navigable passage between the Ionian Sea and the Archipelago.

The Romans built large canals, called "Fossæ Philistinæ," at the mouth of the Eridanus or Po river. The canals of the Pontine marshes were accomplished 162 B. C., and, after a long period of disuse, were restored by the Emperor Trajan.

From time immemorial, the rivers of China have been united by canals, and there is no country on the face of the globe where the advantages of such a network of canals are so manifest; for these canals, with the natural water communications, render the tunnage of that country but a little less than the combined tunnage of the rest of the world. The Grand Canal of China is the most stupendous work of the