

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT  
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

For "The American News Company," Agents, 121 Nassau street, New York.  
For "The New York News Company," 8 Spruce street.  
For A. Asher & Co., 20 Unter den Linden, Berlin, are Agents for the German States.  
For Trubner & Co., 60 Paternoster Row London, are also Agents to receive subscriptions.  
Messrs. Sampson, Low, Son & Marston, Booksellers, Crown Building 185 Fleet street, London, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XIX., No. 18... [NEW SERIES.]... Twenty-third Year.

NEW YORK, WEDNESDAY, OCTOBER 28, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

*Novel Device for Heating and Ventilating Railroad Cars.....	273	Rapid Telegraphic Communication.....	276
*Improvement in Mandrels for Turning.....	273	Chromo-Lithography.....	278
The Ice Trade.....	273	Submarine Telegraphy—A Curious Phenomenon.....	278
French Leather—How it is Made.....	274	Sleep—The Amount Necessary.....	278
Preservation of Leather.....	274	Heat in Mines.....	278
Influence of Smoke on Vegetation.....	274	Editorial Summary.....	278
New Application of the Spectroscope to Determine the Motion of the Stars.....	275	Manufacturing, Mining, and Railroad Items.....	279
Water Seeking—The Divining Rod.....	275	Recent American and Foreign Patents.....	279
Returning Condensed Steam to the Boiler.....	275	Answers to Correspondents.....	279
How to Catch Rats.....	275	*Proposed Railroad Suspension Bridge across the Hudson River.....	280
The Shifting of the Center of Gravity of a Revolving Wheel Tested by an Astronomical Fact.....	275	East Indian Opium.....	280
An Aerolite.....	275	New and Important Patent Office Rule.....	281
*Johnson & Froggott's Patent Horseshoe.....	276	Prehistoric Archeology.....	281
The Sempole's Steering Apparatus.....	276	Alcohol—Its Nature, Uses, and Effects.....	281
A New Way of Estimating the Motion of the Stars.....	276	The North Pole and its Seekers.....	281
*Improved Direct Acting Steam Hammer.....	277	American Silk Manufacture.....	282
Can Water be Solidified by Pressure?.....	277	Literature for Workmen.....	283
		Weather Prophecy.....	283
		Hardening Moldboards of Flows.....	283
		Patent Claims.....	283
		New Publications.....	286

NEW AND IMPORTANT PATENT OFFICE RULE.

Commissioner Foote, in his firm purpose to break up certain practices in vogue in the Patent Office, has promulgated a very stringent and important rule, which ought to be understood by all inventors who intend to apply for Letters Patent.

It has hitherto been the custom of the Office to permit applicants, or their attorneys, to withdraw papers either before or after a rejection, for the purpose of making amendments. Hereafter this practice will not be allowed. Papers once filed must remain in the Office, and are not to be inspected for any purpose whatsoever, either by the applicant or his attorney.

The rigid enforcement of this rule renders it doubly important that specifications and drawings should be carefully prepared, in the first instance, by experienced and competent attorneys, and not by those who have little or no knowledge of the rules and practices of the Patent Office.

We admit that the new rule will operate somewhat severely upon such inventors as do not feel able to employ an attorney, yet we doubt not Commissioner Foote has had good reasons for promulgating the rule.

A BRITISH AMERICAN INTER-OCEANIC RAILWAY.

One of the papers read before the British Association related to a proposed railway to cross the American continent on a line lying wholly north of the United States. The author of this paper, Mr. Waddington demonstrated that the Pacific Railroad now so rapidly approaching completion would eventually throw the entire carrying trade between Europe and the East into the hands of the United States unless competitive measures were adopted. The only means of preventing such a result are in his opinion the immediate construction of a rival railway through the British possessions. The line he proposes, is from Ottawa to Fort Garry, 1165 miles; thence to Jasper's House, a further distance of 1,100 miles, thence by the Yellow Head Pass, 620 miles to the head of Bute Inlet opposite Vancouver's Island; the entire distance being 2,885 miles. He gives as a rough estimate of the entire cost of the road, rolling stock, stations, etc., the nice little sum of one hundred and thirty-five millions of dollars. But the cost is not to be considered as a serious matter when the results are properly estimated. Here is the argument:

"We shall be told that such an outlay is far too great to be thought of. But what we have to consider is not merely the amount, but the object to be attained, and whether that is commensurate with the outlay. If the commercial supremacy of England is at stake—and that has been pretty clearly shown—what are twenty million pounds sterling compared with the sad downfall which must inevitably follow such a loss, and the decay and ruin of our country? Never was so large a sum more usefully, more wisely applied; and in vain might we ransack the history of our national debt to find a parallel. In times past a single subsidy to some Continental potentate has cost more."

The history of the national debt of England, shows that heretofore no amount of money was considered too large to be used for the assertion of national and commercial supremacy. If then the facts are as stated by Mr. Waddington, there is little doubt that the money would be forthcoming, if the project were proved to be feasible and likely to pay. These are in our opinion big *ifs*, and although he claims that the severity of the climate has been exaggerated; that the country between Ottawa and Fort Garry is with a single ex-

ception, north of Lake Superior, level and fertile; that the difficulties in crossing the Rocky Mountains though serious can be surmounted, it is impossible for us to conceive how the road could become self-paying, as Mr. Waddington believes, in six years from its completion, if indeed it would ever become so. The past history of railroad enterprises has shown that such projects must be based upon something more than the advantages secured by the location of their termini. There must be enterprise, manufacturing and agricultural facilities along the lines sufficient to warrant increase of freight and travel from intermediate points. The route under consideration has neither of these advantages. Its climate would always prevent its competing with the Pacific Railroad for passengers, and it is too distant from the seaboard to become a manufacturing district. Altogether we think that this road would if built, become the most extraordinary white elephant ever owned by the British Government.

PREHISTORIC ARCHEOLOGY.

Man's first appearance upon the earth, or rather the time of his first appearance has, in the light of modern science, become a most interesting subject of inquiry. It seems already established that this event took place much further back than has been usually believed. Such an announcement as this would have been much more startling a few years since than it is now, when it has come to be acknowledged that the Mosaic account of the creation of the world conflicts with science only so far as it is imperfectly understood. The six days, in which all things were created, has been shown to mean six distinct periods in which the great work was accomplished, the appearance of man being the last and crowning act.

The orthodox world is no longer alarmed at the relative attitudes of science and theology. It has come to see that time is no element in the working of the allwise Creator, and that by whatever process creation was accomplished, the same power must be acknowledged. To draw an argument from a celebrated biblical author. Everything that exists either always existed, or it had a beginning. Grant a beginning, and you admit a cause. An examination of the works themselves gives the evidence of intelligent design. Therefore, the cause is an intelligent one. By the same method, all the attributes of deity may be discovered, so that without the Bible, God is revealed in His works.

Should man, therefore, be found to have existed for six millions of years, instead of six thousand, the fact proves nothing adverse to revealed or natural religion. It strengthens them rather. For certainly the methods which science reveals are more in accordance with the nature of an infinite and all-wise being than the interpretations which have been given to the Mosaic record. That record states the fact, and the order in which creation took place, and science fully sustains the record. The precise length of the periods, which have been rendered "days," has nothing to do with the matter. Creation is still going on around us every day, every moment. A grain of wheat is no less created now, than at the beginning, and the same power that created it then creates it now. But creation is now a gradual process, and the multiplication of species, was undoubtedly a long and gradual work, but a *work* nevertheless.

The science of philology has been one of the instruments by which the prehistoric existence of man has been determined, but we can not in this article attempt anything further than a mere recognition of its aid in solving the problem. The theories of Agassiz, and others, regarding distinct geographical centers of origin has also had much weight in forming opinions upon this subject, but the proof of the existence of man at very remote periods, is based upon more solid grounds than either of those we have mentioned. Not only the implements and utensils of man, but human bones have been found, in positions, and under circumstances which give undoubted evidence of very great antiquity. The veteran geologist, Lyell, has fixed the antiquity of some of these remains at two hundred thousand years, which is considered by many as too small.

In view of these facts, the examination and study of human remains, everywhere, are becoming of the greatest interest, and prehistoric archeology is assuming the proportions of a science. It has its facts, and the conclusions based upon them are rapidly being systematized. The "whence and whither," of mankind are the most interesting subjects which the mind of man can contemplate, and although the latter is the one of most vital importance, there is a peculiar mystery about the origin of man which must ever render it peculiarly fascinating to scientific men.

ALCOHOL—ITS NATURE, USES, AND EFFECTS.

While we never intend to use the columns of the SCIENTIFIC AMERICAN as a vehicle for the promulgation of the ideas of extremists, either in science, mechanics, or morals, nor to assume the rôle of teacher of morality, or social science, yet the domain of the moral reformer so often trenches upon or overlaps the province of natural science and the arts, that it would be strange indeed, if we did not recognize the fact. No product of natural or artificial chemistry—if such a term may be allowed—has ever had so widespread and searching an influence on the social habits and personal morality of men as alcohol. The nature and the use of this agent then is worthy attention, even if viewed simply in a scientific light. Such a view comes properly within our domain, as the editors of a scientific and mechanical journal.

Common alcohol is designated by the formula, C<sub>4</sub> H<sub>6</sub> O<sub>2</sub>—Carbon, 4; Hydrogen, 6; Oxygen, 2. It is called by some writers the "spirituous or intoxicating element in all intoxi-

cating liquors;" by others, "rectified spirit." Wine drinking peoples seem to agree in the name by which it is designated. The French call it *Esprit de vin*; the Germans, *Rectificirter Weingeist*; the Italians, *Acquavite rettificata*; the Spaniards, *Espiritu rectificado de vino*—spirit of wine, or rectified or purified spirit of wine.

But whatever may be learned of its composition, we judge of its qualities more by its effects when used. It is a natural result of one kind of decomposition called fermentation; and this fermentation, and the consequent production of alcohol is not confined to the action of the still, nor to influences outside the human organism. As an instance in support of the latter statement, we may mention that we have repeatedly seen an old Micmac Indian get "gloriously" drunk on sweetened water, a solution of common brown sugar in water. In this case the fermentation could not have taken place in mixing and dissolving in the tumbler, but in the Indian's stomach.

Ginger pop, root beer, ale, all fermented liquids, and vinegar (unless formed by the distillation of pyroligneous acid), contain more or less alcohol; and these so-called harmless beverages depend as much for their exhilarating quality upon the alcohol they contain as on the carbonic acid gas in their composition. It may be possible, for one whose stomach is unused to stimulants, to feel sensibly, after drinking these beverages, the same effects, although in a less degree, that the habitual drinker seeks in the rum or whisky bottle. But it is hardly to be credited that the stomach would contain enough of these liquids to produce real intoxication.

We judge of the nature of alcohol by its effects on animate and inanimate bodies. Take the latter, first. Alcohol is one of the best, if not the very best antiseptic known. Matter, which could be by no other means so well preserved from decay, change of form, or alteration of structure, is held *in statu quo* by alcohol. Extracts of the qualities of herbs, minerals, and animal substances, useful in medicine and the arts, can be preserved in their purity and power by no other agent so well. Beside its antiseptic qualities, alcohol is a stimulant, aiding in the effect of the drugs or extracts with which is combined. It stimulates the physical forces of the human system, when rendered inactive by disease; it is a "force-put," a "make-shift," as mechanics would say; useful to keep the enfeebled body from the grave, and to impart new life to organs almost past sensation by other means.

And there its usefulness ends. It never imparted additional strength to the robust; it never made the old young; it gives nothing; it only acts on what there is. When pure, it is a deadly poison, antagonistic to life. Its effect on the lining of the stomach, intestines, and other internal organs—the mucous membrane—can be produced even upon the epidermis or external skin, to such an extent as to blister. Alcohol does not assimilate—has no affiliation with the secretions of the human organism. It passes out of the stomach in precisely the same condition in which it entered it. It shows itself in the breath of the habitual drinker, in his perspiration, his evacuations. It is still alcohol. Part may be retained in the blood, which it thins and weakens. For a time it is held in the brain, stimulating it to unnatural activity; but it leaves the organ as it was before, or rather enfeebled by the task it performed while under the subtle influence of the wine spirit.

But we shall not be betrayed into a homily against the use of alcoholic stimulants. We desire only to present the facts, and leave each to judge for himself. We are aware that eminent physiologists, and others, have written labored defences of alcohol; but those who have experienced its effects upon themselves—on their physical system—leaving out its influence on their mental powers, are well fitted to judge of the value of the statements, arguments, and facts, produced by these defenders of the habitual use of a rank poison. Plain, palpable facts, are stronger than philosophical disquisitions; but, *chacon a son gout*.

THE NORTH POLE AND ITS SEEKERS.

North of Spitzbergen the Atlantic Ocean is exceedingly deep. Soundings have been attempted, and, although a mile or more of line has been used, the bottom has not been reached. The warmer currents, of which the Gulf Stream is the most notable, flowing from the Equator toward the pole, of course keep the surface, while the cold currents flow near the bottom. This well known fact has led to the belief that there must be, somewhere, a limited region where the warmer currents, meeting, would form a sort of eddy, and constitute an open polar sea. The observations of explorers have given strength to this belief. An exchange, in discussing this part of the subject, remarks that "the great Gulf Stream which is continually pouring an enormous volume of water—far warmer than the ocean through which it flows—into the Arctic Seas, must largely affect the condition of the North Polar regions. Where this stream finds an outlet, and by what course its waters find their way round Greenland into the Baffin's Bay current, are yet moot points among seamen. But whatever opinion we may form on these questions, there can be no doubt that an enormous quantity of heat is liberated somewhere in the neighborhood of the North Pole through the agency of the Gulf Stream; and it is far from being impossible that, during summer, at any rate, the circumpolar ice fields are wholly melted away."

"It is a singular fact, that in whatever direction the North Pole has been approached, traces should always have been noticed of a comparatively warm circumpolar sea or Polhynia. Baron Wrangel started northward from the coast of Siberia, over the vast fixed ice fields which cover the Arctic Sea there. He supposed that these extended far toward the North Pole, but before long he found open water, and was compelled to