and life-saving raft. Each mattress bas a buoyancy sufficient to support one person in case of necessity, and is provided with compartments for holding water and provisions. By means of hooks, any number can be fastened together so as to make a raft of any required size. Of that almost endless variety of devices for boat detaching, brought forward consequent upon an act of Congress in July, two years since, making it incumbent upon all vessels to carry such apparatus, we find but three on exhibition, of which the pioneer in this class, Brown & Level's, is manifestly the best. The bronze medal awarded for this tackle at the Paris Exposition is placed in a prominent position.

The Union power capstan claims for itself superiority over all others, working forward and backward as a simple capstan, and with a purchase of four and one-half to one, also forward and backward. It can be taken apart on shipboard with no other tool than its own parts supply. Spaulding & Coffin, of Boston, are the exhibitors.

The fifth group is devoted to implements and materials used in printing and engraving. Messrs. Hoe & Co. take the lead in this line, exhibiting sets of printers' materials, and a variety of forms of copying and embossing presses. The Novelty printing press is a Boston notion, and is designed to furnish a cheap, simple, job printing press for business men to amuse themselves with during leisure moments, and for a merely nominal sum furnishing the source for a rare combination of convenience, pleasure and profit. The bed of the press is stationary and nearly vertical, and against it the platen is brought by the power of a toggle joint with treadle attachment.

In group No. 6, is placed the differential pulley of T. A. Weston, of Buffalo, N. Y., and Doyle's Empire power tackle, the latter apparatus being the especial favorite of the youthful visitors, who, apparently, firmly believe that its sole purpose is the early development of the juvenile muscle. Without attempting to explain the course of reasoning of the committee in assigning burglar-proof safes to the "department of intercommunication" especially, as is the case with those now on exhibition, when said safes are securely locked, we would speak very favorably of the external appearance of the bankers' safes of Terwilliger & Co. We confess ourselves also unable to explain exactly in what way steel cannon fall under the same classification, unless considered as a means of intercommunication, in which case we would in conclusion draw attention to the model made by Thos. Prosser & Son, of an eight inch cast-steel breech-loading rifled cannon.

THE PNEUMATIC RAILWAY.

It is an interesting sight to stand at the mouth of the great tube and observe the arrival and departure of the car with its loads of passengers. The car fits the tube like a piston and travels both ways with the utmost regularity and steadiness. Nothing can be more gentle and pleasant than the start and stoppage; no jerking or wrenching of any kind is observable, and although the car is not provided with springs it rides along very easily. The tube is 107 feet in length, 6 feet in diameter, and is composed of fifteen layers of veneers, laid and cemented in alternate spirals, forming a total thickness of an inch and a quarter. This peculiar construction gives great strength and rigidity. The car carries twelve passengers, and its body is rounded on the same curve as the tube. Indeed, the body was made of a section of the tube cut in halves and the ends united forming a long open cradle without roof, with seats on each side, presenting the appearance of an omnibus sleigh. The wheels project three inches through the shell of the body, turn in boxes arranged under the seats, and run on a small track laid through the tube. One end of the car is provided with a disk or head which fits the tube and forms a traveling piston. There is a door in the disk, also ventilating valves; the lights and water gages are also arranged upon the disk. The disk presents a superficial area of 28 feet against which the atmospheric pressure acts to propel the car.

The Æolor or blowing wheel is made in the form of a screw propeller. It is 10 feet in diameter, made of wood, has eight blades, and revolves at the mouth of the tube opposite to that at which the car enters. When the screw turns in one direction it sucks the air through the tube and the car is drawn in. The car, as it passes along, moves a lever which gives a signal and by the time the car arrives near the screw the latter is reversed which forces a blast of air into the tube and drives the car back. The Æolor is capable of producing a far greater pressure than can be safely used upon the car in so short a length of tube.

There are two of the Æolors at the Exhibition. One of them works the Pneumatic Railway, the other, of smaller size, the Postal Pneumatic Dispatch. Both are driven by one of Root's little trunk engines, diminutive in size but exceedingly compact, runs beautifully, and gives out abundant power.

The visitors at the Exhibition manifest a lively interest in the Pneumatic Railway, and all seek for the ride. To be carried along by the air pressure is an entirely new sensation. More than twenty-five thousand persons have already been safely carried, much to their enjoyment and satisfaction. Mr. John D. Gilbert is the conductor and accompanies every train. It is probable that a Pneumatic Railway of considerable length for regular traffic will soon be laid down near New York under the auspices of the Pneumatic Dispatch Company of New Jersey, of which Mr. Beach has lately been elected President. Great credit is due to the Holske Machine Company who were the builders of the Pneumatic Railway and the Pneumatic Postal Dispatch as presented at the Exhibition. The whole work, tubes, cars, blowing screws and all, were constructed by them in the short space of six weeks. Considering that every thing was of a novel and experimental character, this was making good time. The work was conducted under the immediate personal superintendence of Mr. W. F. Holske, who is one of our most reliable, experienced and energetic mechanical constructors. It has been his business for many years to build experimental machinery. He is quick to appreciate a new idea, and prompt in putting it into bodily form. Many of the best patent models that come to our office are from the establishment of the Holske Machine Company, 528 Water street, New York city. We shall give a description of the Postal Pneumatic Dispatch in our next.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Artesian Wells.

MESSRS. EDITORS:—The ascension of water in Artesian wells is not very satisfactorily accounted for, and the cases reported by your Chicago correspondent, on page 163, current volume, is an unique instance.

From a depth of more than 700 feet, and rising more than 80 feet above any surrounding source of production and higher than any land of that elevation within a hundred miles or more, as is the case, is an anomaly in hydro-dynamics

The prevailing *rationale* of the subject has generally been this: High sources in elevated land, with dipping stratified rocks, which being tapped by boring, forming the inverted syphon, the water must inevitably rise to the level of its source; but this contingency does not prevail at Chicago, nor in hundreds of other localities where water is always found, if the borings are continued deep enough in quite or entire horizontal rocks, the syndinal or antidinal pitch of the strata are never consulted or required. This theory is hardly a rational explanation of the results.

Another explanation is, that as all the sedimentary and even the primitive rocks are the result of crystalization or deposit from water, the hardening and shrinking of the strata leaves interstices and cavities filled with water which, when tapped, the superincumbent pressure forces it up and it follows the law governing fluids in like cases. But in this case it would be fair to presume that the source in time would become exhausted, like the oil wells of Pennsylvania.

Another, and to my mind the most rational one is, that as it is universally admitted that the center of the globe is in an incandescent or even fluid state, its great heat must produce from the lower portions of the 40,000 feet of the sedimentary rocks, steam, which penetrating the pores, fissures, and laminated portions, arrives at the condensing point under great pressure, which, on being relieved by boring, would in all cases produce a constant and unchangable flow.

Mr. Schufeldt's question in hydraulics is an abstruse and difficult subject for elucidation. Let us suppose that the source of supply is not a great basin or reservoir which the boring has penetrated, but a region of rock containing lamina and porosity, where the water by force has remained in a quiescent state for all time; on being relieved from its imprisonment by boring, it is produced from all quarters by flowing and segregation. On rising to nearly a balance of power, the antagonistic principles of weight and upward pressure are slowly adjusted and take time to assert their rights.

On turning the stop cock at the surface, there is no accumulation of water or head, there is no absolute space to contain it, and it is simply locked in a quiet state as it was before its release, and consequently when nearly on an equilibrium of forces, must necessarily rise very slowly.

I regret that Mr. S. did not report the temperature of the water, as well as that of the springs or wells, that we might compare the results with other locations, as to its increase according to depth. I should expect it to be about 70° Fah., well water being 55°. L.

Rochester, N. Y.

[Several other communications on the same subject account for the phenomenon on the principle of the inverted syphon, well understood by students of natural philosophy. One from the Pensylvania oil region gives an account of similar performances. The presence of carbonic acid gas in subterranean caverns communicating with the well hole, is suggested by one correspondent as a possible explanation of the Chicago well performance; but we do not understand that theory as sufficient to satisfy all who make physics a study. The reason for the intermittent, almost capricious action of the Chicago well is probably yet to be ascertained. Its exhibition is by no means new. For years travelers have known of similar wells—natural—in the Tyrol, and in Sweden such phenomena in wells dug for domestic purposes are not rare.—EDS.

The Comets Again.

MESSRS. EDITORS.—In No. 13, current volume of the SCIENTIFIC AMERICAN, Mr. P. G. Yendell has endeavored to refute the theory advanced by me in No. 10, current volume of your paper, namely, "that the tails of comets are refracted light." Mr. Yendell has evidently not seen Dr. Ramsay's article in No. 6, current volume of the SCIENTIFIC AMERICAN, in which that gentleman advances the theory that the tails of comets consist of reflected light. My communication is merely a modification of Dr. Ramsay's theory. If Mr. Yendell will read Dr. Ramsay's very interesting paper, he will get a very good explanation how it is that although light moves in straight lines the tails of comets appear curved. Mr. Yendell says "that he cannot resist the conviction that the tails of comets are composed of nebulous matter as evidently left behind by the motion of its head as the smoke of a locomotive by the progress of a train."

According to this theory the tail of a comet would follow precisely in the path or orbit of the same and would spread to the rear even when receding from the sun which your correspondent perhaps by experience knows it does not. If the appendage of a comet was nebulous matter left behind from the nucleus, like smoke, the nucleus would soon be dissolved and would disappear entirely unless it could be explained where it got the material from to feed and keep up the nebulous tail.

Before advancing a new theory it should have been proved that the old existing theory was not correct. The question to settle now is "is it possible and in harmony with the known laws that govern the universe that the tails of comets consist of nebulous, ponderable matter?" To me it appears impossible and entirely against the law of gravitation that a nebulous appendage could be formed many millions of miles in length, apparently much rarer than the body of the comet; it seems to me as impossible, as it is, that the atmosphere surrounding the earth could form an appendage and follow in the orbit of the same.

My supposition is that comets are worlds of a more recent formation than the other planets of the solar system; they are going through the process of development and are perhaps in a liquid and vaporous condition holding in solution all the elements to form a crust as on the planets. As long as this crust is not formed the body of the comet is not opaque, the rays of the sun can pass through it and are refracted, and in this way the tail is formed. AUGUST WILHELM.

Philadelphia, Pa.

The Rotary Force Centrifugal.

MESSRS. EDITORS:—You have been coquetting for some time in your journal with the essence of matter, the centrifugal force, and with Helwolt'z's theory of vortex motion by calorical force.

This theory is opposed by an old discovery—neither heat nor electricity, when set free, are motive forces. They pass through bodies, disturbing the molecules, and leave them as before.

Your other questions, the essence of matter and the centrifugal force, are subjects of deep interest, and will be better understood if we state first what are the real discoveries that are made, and what is yet conjectural in the science of motion. At present there is no genius, no scholarship, no proofs that will satisfy the public mind, until it is guided out of the dark problem of Sir Isaac Newton's theory of attraction of gravitation. His great discoveries that have awed public opinion into submission to his views, were made from his observation of the phenomena of motion, and not on his problem of attraction. His problem itself is centripetal, and if it proves any thing clearly, it brings all bodies in motion to a state of rest.

It so completely ignored the centrifugal force, that for generations it has been unrecognized by science. Witness recent calculations of how long before the earth will fall down upon the sun. Now, if I at all understand the hidden power in the rotary force, which the attraction of gravitation fails to account for, it discloses more than is yet known of motion, by the aid of Sir Isaac Newton's discoveries. By comparing the phenomena of motion, which the attraction of gravitation fails to explain, with the phenomena of motion which it does account for, we shall gain the share which the rotary force controls in the movement of bodies in space.

And first, gravitation explains why the planets, comets, and sattelites, revolve in elliptical orbits, or curves, consisting of circles, ellipses, parabolas, etc. Secondly, it explains the unequal velocities of these bodies, in their orbital movements, together with the perturbations common in the movement of the planets.

Sir Isaac Newton says all these phenomena are susceptible of explanation and computation by his theory of universal gravitation; and here the domain of the law stops.

It fails absolutely to account for the force which revolves the planets on their axes; it does not explain why the planets and sattelites revolve in orbits so nearly circular; it does not answer the significant question, why the planets revolve around the sun in the same direction. Gravitation would have accounted for this motion if the planets had circled around the sun in opposite directions.

All these questions therefore remain for the rotary force to explain. Moreover, gravitation gives no reply to the question why the planes of the planetary orbits are so nearly coincident, or why the planets all rotate on their axes, in the same direction in which they revolve in their orbits, or why the sattelites obey the same rule, and the sun itself in like manner rotates on its axis in the general direction of the motion of its attendant sattelites.

From what is conceded to Sir Isaac Newton's theory of the attraction of gravitation, and what it fails to account for, we may see how much is concealed from us in the hidden power of the centrifugal, and its resultant rotary force.

Rhinebeck, July 23, 1867. F. V. M. D.

Pumping Hot Water for Boilers.

MESSRS. EDITORS.—My attention has been attracted to a paragraph in the SCIENTIFIC AMERICAN from your correspondent, on the subject of pumping hot water and your observations thereon, because it is one of much importance in regard to the safe working of steam engines, etc. It might be considered a matter of course, by many, that if a force-pump of given dimensions will inject a certain volume of cold water into a boiler within a stated period and continue to do so uniformly, that the same pump will inject a like quantity of hot water in the same length of time.

I am of opinion that somewhere about here lies the key to the solution of so many mishaps in the bursting of steam boilers, and that the explosions generally arise from the want of a sufficient supply of water by the force pump. My theory is that a force-pump for water of a high temperature ought to have twice the capacity of that used to pump cold water

when the volumes to be pumped are alike, because it is a fact that although water does not boil in an open vessel under 212 degrees, it is quite otherwise in a vacuum or a partial one. Hence, it does appear that in the case of hot water, the moment that the plunger forms the vacuum, just then, the hot water being relieved from pressure, forms into steam more or less and partially fills the pump chamber and thus prevents the regular passage of water through the valve. I therefore conclude that if the water to be injected is of a high and varying temperature its regular flow is not to be depended upon unless the pump be made sufficiently large to contain both water and steam in quantity at the same time, owing to its sudden transition from water, in the supply pipe, to steam, in the vacuum chamber of the pump.

Owen Redmond.

Rochester, N. Y.

Volumetric Estimation of Barium.

Messrs. Editors:—All the metals of the third and fourth groups must first be removed by means of suitable reagents, either sulphide of ammonium or sulphureted hydrogen. Acetate of soda is then added in sufficient quantity to displace the acid present, by acetic acid. Heat about thirty-five grammes of bichromate of potassa in an oil bath until all the water of crystallization is thus expelled. As soon as cool weigh out 21.518 grammes of it, and dissolve in one liter of distilled water, then each cubic centimeter ot this solution will precipitate .01 gramme of barium, as may be seen by the following proportion:—Ba ; Ko, 2 C O_3 :: 10 : x ; or, 685 : 147.4 :: 10 : x .·. x=21,518 ; .·. since a liter precipitates 10 grammes, one cubic centimeter precipitates .01 gramme. A burette holding 100 cubic centimeters is then filled with the standard solution and placed in a burette stand over the barium solution. The standard solution is then allowed to run into the beaker until no precipitate is formed after the precipitate has subsided, in the supenvatant liquid on the addition of a drop of test solution. This point can be determined more exactly by putting a drop of nitrate of silver upon a glass plate and adding to it a drop of the solution; if a crimson precipitate is produced it is necessary to add more liquid from the burette; this is repeated very cautiously until there is no longer any reddish tinge produced in the nitrate of silver. The number of cubic centimeters is then read off, and the amount of barium in the original solution found a simple calculation; as for example, suppose that 78.9 cubic centimeters have been used, then the amount of barium present would equal 78.9÷1000×10=.789 grammes.

G. H. Mann.

Troy, N. Y.

The Sun's Diameter.

Messrs. Editors:—I find in the Scientific American, page 179 of the present volume, that the sun's true distance is ascertained to be 92,340,,000 miles. If this be correct, the sun's mean horizontal parallax is 8.85″, and not 8.5776″, as was settled upon by the council at London some years ago. Now, taking 92,340,000 miles as the mean distance of the sun, either the apparent semi-diameter is more than 16′, as is generally given, or the real diameter is less than 886,000 miles, and which is it? A. J. Harris.

Wanseon, Ohio.

Ammoniacal Gas as a Motive Power.

The idea of using ammoniacal gas as a motive power in place of steam has been entertained by many inventors, but has never before, we believe, been successfully carried out. A few years ago, MM. Tellier and Flandrin proposed to propel omnibuses through the streets of Paris by its means. They started, or proposed to start, with a vessel of the liquified gas, and supposed that when this was opened, by turning a tap, the gas would be discharged into a cylinder with sufficient force to drive forward a piston; and water being then admitted to the cylinder, the gas would be condensed, and a vacuum formed, and the piston driven back by atmospheric pressure. Our readers will thus see that the principle of an ammonia engine is pretty much the same as that of Newcomen's steam engine. The plan, if at all feasible, is obviously better suited for stationary than locomotive machinery, and the most reasonable application of ammonia has been made by M. Fromont, who proposes to work a pump by its agency. His engine differs somewhat from that of M. Tellier, inasmuch as he drives the piston in both directions with the gas.

A recent visit to the Paris Exposition has shown us an engine of his actually at work—or, rather, in action, for it was not usefully employed—and driven by a mixture of steam and ammoniacal gas. Strong liquid ammonia is used in the boiler, and the vapor generated is said to be a mixture of at least 80 parts of ammoniacal gas and 20 parts of steam, so it may be fairly called an ammoniacal engine. The principal recommendations of ammonia when applied as a motive power consist in the small amount of fuel required, and the short time it takes to get up the steam, so to speak. The economy in fuel is very considerable, being about one fourth of that required to generate steam alone. As regards the boiler, it may be of either of the ordinary forms, the only complete novelty being the apparatus for condensing the steam and ammonia. The gas disengaged (about six atmospheres at 110° Cent., with an ordinary solution of ammonia) does its work in the cylinder and then escapes into the tubes of a condenser, where the steam is condensed and the gas is cooled. The gas then meets with water from an injector which dissolves it, and the solution is carried on into a vessel called the "dissolver," from which it is pumped back into the boiler to do its work over again. The water for the injector is taken from the boiler, and is cooled before meeting with the ammoniacal gas by passing through a worm surrounded with cold water. These arrangements are necessarily a little complicated, and could not be fully understood without drawings. It is, however, satisfactory to see that an ammonia engine is a possibility, and thus power is obtainable where fuel and water are both scarce.—*Mechanics' Magazine*

Ober's Patent Toilet Glass.

Not ladies only, but gentlemen frequently feel the want of a convenient mirror by which a view of the back of the head can be obtained when dressing the hair, the common hand glass being inconvenient and requiring one hand to hold it. The device seen in the engraving is convenient and elegant. It is a box designed for holding brushes, combs, and the other paraphernalia of the toilet, having attached a mirror of convenient size and a hinged frame that, when elevated, sustains at its end a smaller glass, which, with the back of the head is reflected in the larger mirror. The jointed frame will permit the adjustment of the small mirror at any angle desired,

and will fold upon itself and on the box, making the whole contrivance, when not in use, portable and convenient. The jointed frame and small mirror may be attached to any ordinary mirror frame. In the form represented in the engraving it is especially adapted to the requirements of travelers, and in any form it is useful in all places.

It was patented through the Scientific American Patent Agency June 25, 1867, by Albert Ober. Further information may be obtained by addressing Ober Brothers, Beverly, Mass.

The Antiquity of Man.

The following paper by Mr. J. Crawford, F. R. S. was read in the Ethnological department of the British Association at the late meeting at Dundee:—Man, when he first appeared on earth, was without articulate speech, and, like the lower animals, must have expressed himself by what was little better than mere interjection. He had, therefore, to frame a language—a seemingly difficult achievement, yet one which every savage tribe had been able to achieve, and that not in one place only, but in several thousand separate and independent localities. It followed, then, that as every tongue was regularly constructed and perfect for its own purposes, many ages must have passed before language could have reached its present maturity. Even the languages of a people so low in the scale of humanity as the Australians, incapable of reckoning beyond duality, were found to be not only skillfully, but even completely constructed. It must be evident, then, what ages must have transpired from the first attempts to give names to a few visible objects to the completion even of such rude languages as those of the Australians, Feejeans, and Esquimaux, and how many more must have passed before the discovery of the art of writing. Like languages, the ordinary arts bore abundants proofs of man's antiquity. They were not the results of instinct; but, on the contrary, bore indications of man's brain and hands. The distaff and the loom were as much inventions as the steam engine and the telegraph. They had been invented in many independent localities, and at so early a time that in no instance had there been any record of the discovery. The discovery of metals, without a knowledge of which man must have ever remained a feeble savage, attested man's antiquity. The difficult art of making malleable iron seemed to have been immemorially known and practised even by the rudest people of the Old World, but it might be fairly conjectured that the first discovery must have been made by natives who had previously made considerable advances in civilization, and that from them the art came to be disseminated among ruder tribes. Were the languages of the negroes of Africa investigated—the rudest of which are known to practise the art of fabricating malleable iron—it would probably be found that it was acquired from the Mauritanians, Carthaginians, and Egyptians on the western, and from the Hindoos on the eastern side of the continent. Cultivated plants and domesticated animals also yielded proofs of the antiquity of man. The countries in which—through the auspicious character of the physical geography and the intellectual quality of the races inhabiting them—the earliest civilization sprang up, were Egypt, Syria, the valleys of the Tigris and Euphrates, India, and China; and, in a minor degree, Persia, the region lying between India and China, Japan, and one or two islands of the Malayan Archipelago. In all these writing had been early discovered and a calendar formed—arts indispensable to the rudest record of human events. But it was not necessary alone that the capacity for framing a record should exist, it was not less necessary that the monument containing it should be of durable materials, and be under conditions favorable to its preservation. In regions subject to violent alternations of heat and cold, drought and moisture, the most lasting materials were in time decomposed, while in tropical climates the same destruction was produced by a rank vegetation. Hume made true history begin with the first page of Thucydides, but man's story went back far beyond the time of either Thucydides or Herodotus. Egypt was, far beyond all other countries, that in which the chronicle of civilized man could be carried to the highest antiquity. After many dynasties of gods and demigods, the earliest date which, with any show of antiquity, could be ascribed to the history of Egypt began with the first dynasty of civil writers, and the learned made that correspond with the year before Christ 8986, which would make the first dawn of reliable history 10,833 years old, reckoning to our own time. The pyramids of the first dynasty were built, according to the same authority, Lesueur, B.C. 3460; the great Pyramid, B.C. 3280—respectively 5327 and 5127 years ago. At the earliest of these dates the Egyptians were already a civilized people, in possession of a high scale of numbers, of a calendar, and of the art of writing; while at the latest of them they were certainly a numerous people, skilled in architecture, and equal to the construction of gigantic monuments. This history of the Jews could pretend to no such antiquity as that of the Egyptians, or even as that of the Chinese. There was a general assent among critics in fixing the building of the temple to the year before Christ, 1015—a date which would make it 2446 years later than the construction of the oldest of the pyramids. Reckoning backwards, the exodus proceeded the building of the Temple by 480 years, and the bondage in Egypt was given as having lasted 430 years. There were other races of man which, from their conspicuous position, must have made a very early advancement, although probably not equaling that of the Egyptians. The valleys of the Tigris and Euphrates, from the climate, fertility of soil, and facility of investigation, with the genius of their inhabitants, were formed by nature to be the seat of a very early civilization, and we have abundant evidence of such a civilization having sprung up, rivalling that of Egypt in extent and greatly surpassing it in power. Its perishable monuments, however, do not furnish us with the same satisfactory evidence of antiquity as do the enduring monuments of Egypt. After a reference to the civilization of Assyria and India, the paper concluded as follows:—I may conclude this paper with a recapitulation of the conclusions which may, I think, be legitimately deduced from the facts stated in it. Man, although the latest creation of the class of beings to which he is most nearly allied, is yet of vast antiquity, although that portion of his history which has transpired since he acquired the art of making a durable and authentic record of his own existence, forms but a very small fraction of it. From the time in which he acquired the skill to frame this record, we have to trace him back over the many stages he had to pass through up to the discovery of his remains in caves, and those of his handiwork in the most recent geological formation, "the drift." We must, indeed, go beyond this, and up to his first appearance, when he was without speech, ignorant of every art, and, like the lower animals, chiefly guided by instinct. This is to be inferred from the fact that, where material evidence of man's presence exists, where in caves or "drifts," he is already found in possession of implements of stone, implying a considerable step in advance. But the localities in which the physical geography of the land and the genius of its people combined to effect such an early social advancement as was necessary to be attainment of the skill indispensable to the production of a reliable and enduring record of human events, however rude and imperfect, have been few in numbers, and confined to such as I have endeavored briefly to enumerate. Over the greater part of the earth's surface, auspicious locality and genius of race were not so combined as to have enabled mankind to reach that point. The red man of America, the shepherds of Tartary, the black races of Africa never even approached it. The most highly endowed and the most happily situated of the nations of Europe had reached it only in comparatively modern times, and might not, indeed, have reached it at all had they not borrowed largely from their more precocious neighbors of Asia. The physical geography of the wild region of Tartary, independent of the quality of race, has ever made it impossible that man should have advanced beyond the condition of migrating shepherds, who have now and then united in formidable hosts, and proved the scourges of civilized man. The peculiar privations, both as to locality and race, which characterize some regions of the earth have made all advance in arts beyond what was indispensable to a bare preservation of existence impossible, and of this we have examples in the land of the Esquimaux and of the Australians. In a few localities even this amount of skill had not been attained. Thus Spitzbergen, Nova Zembla, and even Iceland, when first seen by civilized man, were uninhabited; and when we see the Esquimaux living and multiplying and spreading in equally rigorous or even more rigorous climates, it is hard to believe but that they must once have had an aboriginal population, seeing that at least animal food is abundant in them. If they had they must have perished for want of skill to maintain existence. New Zealand would seem to have had no native inhabitants until it came to be colonized by savages and cannibals from the tropical islands of the Pacific. It is difficult in this case, too, to believe that prolific nature should have left so large a country without aboriginal inhabitants, yet it is more probable that the aborigines were either extirpated or absorbed by the more powerful invaders, than that they perished from want of skill in the arts.