Correspondence.

Kansas Glaciers.

To the Editor of the Scientific American:

Geologists have generally agreed that the drift in the greater part of Nebraska and all of Kansas was not carried by glacial ice, as no glacial striæ had been found in these localities. The drift in these places was attributed to floating ice and the action of water currents. In Nemaha County, Kan., are undoubted evidences of glacial action. The striæ are in limestone, and have a course of about S. 24° W. Many bowlders are found here, showing plainly the peculiar markings due to glacial planing.

About twelve miles south of these striæ are many bowlders and other drift material. In digging wells in that vicinity logs, sticks, mussel shells, and black mud have been found at depths varying from 40 to 100 feet. This appears to me to indicate that a forest was buried by the moraine of this glacier.

W. J. McLAUGHLIN.

Polychromatic Photography.

To the Editor of the Scientific American:

M. Vidal, whose article on polychromatic projection you reproduce on p. 72, produces the impression that I carry out the method of Cros and Duhauron. Not only in justice to myself, but also in the interest of scientific progress, it should be understood that such is not the case, and that I have from the first repudiated that principle, which is inconsistent with the established facts which support the modern theory of color vision. It is absolutely impossible that photographs made through any three-color screens should reproduce the natural colors when superposed by projection with white light filtered through the same screens, and yet that is exactly what Cros and Duhauron proposed.

Von Bezold, Rood, Church and other writers of modern text books on color have taken particular pains to point out that the only three colors of light which can be made to reproduce all the color effects in nature are pure spectrum red, green and violet. It is evident, on the other hand, that, while only the pure red, green and violet rays can be used in synthesis, all the rays of the visible spectrum must act to produce the negatives, because all of those rays come from the objects to the eye and excite color vision. Each of my negatives is made by the joint action of various spectrum rays, in proportion to their power to excite the respective fundamental color sensation, as determined by the careful measurements of Maxwell and Abney, and is projected by rays of one color only—the rays which excite that fundamental sensation most exclusively. This principle, the application of which is essential to success, was never recognized by Cros or Duhauron, who both said that one picture should be made through an orange screen and projected through an orange screen, another made through a green screen and projected through a green screen, and another made through a violet screen and projected through a violet screen. References which prove my statement are given in my paper, which is reproduced in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 861, July 2.

M. Vidal also produces the impression that the process is still very complicated and difficult, by ignoring the original devices by which I have reduced it almost to the simplicity of stereoscopic photography. His disposition to unfairness is further illustrated by his failure to credit the original suggestion of composite heliochromy to Henry Collen, of England, four years before either Cros or Duhauron published their first ideas upon the subject. M. Vidal has been sufficiently informed of the facts, but chooses to ignore them, and to write false history. FRED. E. IVES.

2750 N. 11th Street, Philadelphia, Aug. 2, 1892.

A Rock City.

To the Editor of the Scientific American:

A good example of the conditions necessary for the formation of the stone cities occasionally met with exists at Rock City, near Olean, N. Y. This is in a typical outcrop of the Olean conglomerate, which lies at the base of the Pottsville conglomerate. It is composed of layers of loosely cemented white or gray pebbles of prolate spheroidal shape, and ranging from the size of a pea to that of a goose egg, alternating with strata of coarse-grained sandstone.

Both the facts that the Olean rock is very uniform in thickness while the conglomerate proper occurs in varying and irregular beds, and that the sandstone layers are frequently false or current bedded, tend to the conclusion that the formation was deposited in shallow and shifting waters, probably at the edge of the carboniferous sea.

Some six miles south of Olean and 2,340 feet above sea level is Rock City, and at a little distance the cubical blocks of stone some thirty or forty feet high, with their street-like passages at the base, render the name more than excusably appropriate.

As in many similar cases, it has been for years a current popular belief that these rocks were rent asunder into their present condition by some remote earthquake. This theory ought to at once be seen to be incorrect from the remarkably even and unbroken condition of the rock below the conglomerate. Any severe internal convulsions, any force, in fact, acting from within, must have disarranged more than the mere surface rocks; but the regularity of the Bradford oil sand underlying this vicinity shows an unusual freedom from earth-crust movement. It is necessary, then, to refer the whole matter to surface action.

The list of surface forces to which we can reasonably look for a solution of the problem is also limited to physical agents, the rock being of a nature not easily affected by chemical action. First among the physical agents undoubtedly is water. There is no more sure eroding power than flowing water in which sand is held suspended, and for a direct fracture the power of freezing liquid can hardly be overestimated. Given, then, a fault or crevice in the rock made by the shrinkage of the earth's crust, or a mere surface fracture made by the water itself or by floating ice; allow this to become filled year after year with freezing water, and year by year that fracture will be extended. Right here another condition takes a part which, if the rule instead of the exception, would make rock cities much more common. If the rock on which the elements are at work rests on a rough, irregular layer for a base, or is intimately united to it in any way, the result of this freezing process is the breaking off and toppling over of rough, irregular pieces from the corners at the surface. This is the common process. Sometimes, however, as at Olean Rock City, the rock rests on a hard smooth base, between which and the surface rock there is much less tenacity than between the particles of the rock itself. The force of the sheet of ice is forward, and in this case the rock, instead of "cornering" off into irregular fragments, submits to the pressure in the direction of the original crevice and is simply pushed forward on its smoth base.

The fracture once completed, its widening into its present form of streets, varying from four inches to several feet in width, would only be a question of time and the eroding power of the elements. Water would continue to do its work and on a larger scale. The roots of plants and trees, insinuating themselves into little crevices and then expanding with growth, would loosen surprisingly large masses and leave them for the wind to hurl into the ever-widening cañon below. The wind itself, when charged with sand, represents on a large scale the powerful sand blasts so much resorted to artificially in our factories where some eroding power is necessary. While the running water would wear the rock walls smooth and wash the fallen debris from the floor below. So, from this stage the problem is no longer how, but how long?

The texture of the stone at Olean Rock City is coarse and loose, giving to the walls on close inspection a lack of that even, clean-cut appearance so familiar to any one who has ever followed up in the wake of Niagara Falls and studied the smooth, hard lime rock banks; but from a little distance the regularity of the stony channels, the cubical shape of the blocks above ground and the general contour give the place a legitimate and indisputable title to the name of Rock City.

WILDER GRAHAME.

A Noted Inventor, at the Age of 85.

While Mr. Gladstone is by common consent the "Grand Old Man" of English politics, says a correspondent of the New York *Tribune*, there is among his colleagues and supporters another gentleman who might well claim a share in the title.

Mr. Isaac Holden, the oldest and probably the richest member of the House of Commons, as well as physically the smallest, has been a more conspicuous figure in the manufacturing and commercial world than in the realm of politics. He was born in 1807. Like Mr. Gladstone, he is a Scotchman, though for most of his life he has been identified with Yorkshire. His origin was humble, and his early years spent in poverty, as an apprentice to a shawl weaver. For some time thereafter he was a schoolmaster; and it was while serving in that capacity that he bestowed upon the world a great benefit, which was, however, slight benefit to him. This was the invention of the lucifer match, which he came upon unexpectedly while making some chemical experiments for the instruction of his pupils. Other men took up the discovery, and he made nothing out of it.

Next he became a bookkeeper, and while thus employed he made his second great invention, from which he did derive much profit. While working at his ledgers and journals his mind went back to his shawl-weaving apprenticeship, and he became interested in the manufacture of woolen cloth, and sought to construct a machine for carding the wool. For years he studied the problem, making many apparently fruitless experiments. All his savings from his salary were given to the enterprise. The friends to whom he confided his scheme looked with little favor upon it. But his perseverance—and genius—finally triumphed, and he completed and perfected a carding machine which has revolutionized the wool industry of the world. Happily, he secured letters patent upon the invention, and as a result handsome profits soon came to him. He established mills in Yorkshire, literally creating large centers of industry. He also built several mills in France. For many years his income from them has been enormous, averaging probably $1,000,000 a year. Mr. Holden is two years older than Mr. Gladstone, but he acts as though he were much younger. He is as buoyant and energetic as a man of thirty-five.

Perhaps he owes this happy state largely to his habits of life; for his wealth has never led him into luxuriousness. He lives as simply now as he did when he was a poor schoolmaster. Never can he be tempted to eat meat oftener than once a day—at lunch. Breakfast and dinner are made of fruit and some little farinaceous food. In physical exercise he is an ardent believer. Eight miles a day is his "constitutional" walk, rain or shine, hot or cold. No matter how busy he may have been, or how many hours a day he had to work, he always took time for such a walk, as he does now at eighty-five. With good health he keeps a good and kindly temper.

Medical Notes.

Spray for Whooping Cough.—The *Journal de Medecine de Paris* recommends the following prescription for whooping cough:

℞ Carbolic acid (crystallized)..... gr. iii;
Borax,
Bicarbonate of sodium, of each.... ʒ i;
Glycerin.
Water, of each..... ʒi. M.
Sig.—This is to be used in a spray from an atomizer.

Powder for Neuralgia.—

℞ Exalgin,
Hydrobromate of quinine, of each.. gr. ii;
Hydrochlorate of morphine..... gr. ¼.
Sig.—Make into one powder, and give two or three a day.

—*Journal de Medecine de Paris.*

Prescription for Laryngismus Stridulus, or Croup.—

℞ Chloroform..... gtt. v or x;
Water..... ʒ vii;
Glycerin ..... ʒi. M.
Sig.—A teaspoonful of this every thirty minutes until the patient is relieved.

—*L'Union Médicale.*

A Gargle for Sore Throat.—The following gargle for sore throat is given in *Les Nouveaux Remédes:*

℞ Crystallized carbolic acid..... ʒ ss;
Absolute alcohol..... ʒ ii;
Oil of peppermint..... gtt. x. M.
Sig.—Add ten drops of this mixture to a glass of hot water, and gargle with it night and morning.

Huckleberries as a Remedy.—Dr. Winternitz (*Blatter f. klin. Hydrotherapie*) writes of his use of huckleberries in treating leucoplakia buccalis, and other diseases of the mouth, pharyngeal cavity, and tonsils. He treated cases successfully which had existed for weeks and months under other treatment. He uses them chiefly as a gargle, and prefers a concentrated decoction, as follows:

Tinct. vaccinii myrtilli..... f ʒ xvii;
Coque c. aq. font..... f ʒ xxxiv;
Usq. ad remanent..... f ʒ xvii. to f ʒ xviii;
Express.

For Chapped Hands.—

℞ Menthol..... gr. xx;
Salol..... gr. xxx;
Olive oil..... m. xxx;
Lanolin..... ʒ ii. M.
Sig.—Make into an ointment and apply twice a day.

Under this treatment the pain will disappear, the skin will soften, and the cracks in the skin will heal.—*L'Union Médicale; Therapeutic Gazette.*

Freezing of Textiles.

A current idea among bleachers and calico printers is that freezing has a tendering effect upon cloth, and most of them take care during the winter season to avoid this risk. However, a short communication of Mr. C. F. S. Rothwell, F.C.S., to the Society of Chemical Industry goes a long way to explode this old fashioned belief, by the evidence of precise dynametric tests on the strength of cotton both before and after freezing. Pieces of cloth were dipped in water and allowed to freeze by an exposure to the air even at a temperature of 3° below the freezing point. The ice which was first formed evaporated away; on testing the cloth the strength was then found to be the same as before freezing. These experiments were repeated on the same piece of cloth four times in succession without any appreciable influence on the breaking strength of the cotton. These results were found to be quite independent of the quality of the cloth. Probably the old idea of the tendering of cloth by freezing arises from the fact that actually frozen cloth will snap and break; this is due to the fact that the fibers are stiff and cannot bend readily. The same thing is brought about by stiffening well up with gum or some similar body, when the fiber becomes tender. Take away the frost in the one case or the stiffener in the other, and the fibers are found to be just as strong as they were before.

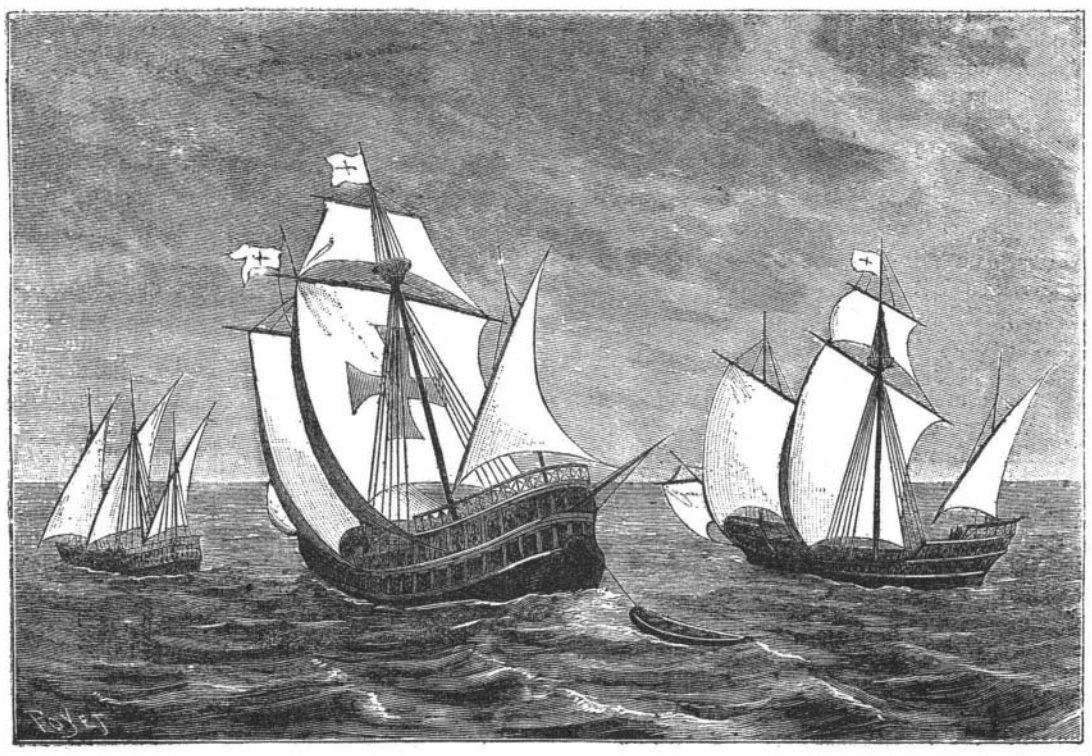
CHRISTOPHER COLUMBUS.

(*Continued from first page.*)

was such that for a long time it was difficult to get a third vessel for that purpose, and at length the King and Queen ordered that one called the Pinta, belonging at Palos, should be seized by force. Even this did not advance matters much, as there was a need of crews, but at last Martin Alonzo Pinzon, a sea captain and an influential man of Palos, offered his services to Columbus, and this proved the turning point in the preparations. When the three vessels were ready, Columbus hoisted his flag on the largest, the Gallego, having a deck with forecastle and cabin, and changed its name to the Santa Maria. The Pinta and Nina had only a small bridge fore and aft. The Santa Maria carried sixty-six persons, mostly from Seville or the province of Huelva, with two Genoese, one Englishman, one Irishman, two Portuguese, and one Majorcan. Palos itself did not furnish any men for this ship, but it and its neighborhood supplied all the officers and men for the Pinta and Nina. The former had a company of about thirty men, under Pinzon, and the latter a crew of twenty-four, under his brother, Vincente Yanez Pinzon. Palos, though a small port, furnished many hardy navigators to Spain's mercantile marine, but for a time the prospect of a quest so daring, under a captain till recently unknown to them, had naturally excited apprehension. Still, the support actually given to the illustrious voyager has immortalized the little town.

The squadron of Columbus, as pictured by Rafael Manleon, a marine painter, is shown in the accompanying view. The suit of sails of the Santa Maria was that of a small three-masted vessel, with five sails only: a jib, foresail, mainsail, topsail, and a lateen. The mainmast was provided with a top, which the sketch represents as round and basket-shaped, and which was capable of affording shelter to firers of grenades. The general form of the hull was that of the round ships of the period. There was a large poop and a small forecastle. The freeboard was very low amidships, and the deck was here open. The pinnace could not be taken aboard, so Mr. Manleon has represented it in tow of the ship under sail.

The nautical qualities of the Santa Maria were excellent, as the admiral's log proves: "This ship behaved very well in bad weather, and had the speed of a good sailer." The same was the case with the two other ships, and the log often mentions a speed of 15 Italian miles an hour, equivalent to 11 nautical miles—a very good speed for vessels sailing as consorts.



THE SQUADRON OF COLUMBUS—THE SANTA MARIA, NINA, AND PINTA.

The Nina resembled the Santa Maria. The Pinta carried lateen sails on her three masts, at least at the beginning of the voyage; but the admiral's log tells us that at the first stop (at the Canaries) this set of sails was replaced by square ones, in order that the ship might be placed in the same conditions as the two others.

These three ships, sailing as consorts, flew the flag of Castile at the mainmast and that of the admiral at the mizzen. The first was divided into four squares, two red and two white. The latter each bore a lion and the others a castle. These were the arms of Castile. Those of Aragon were excluded by the orders of Queen Isabella, the government of that country having refused to participate in the expenses of the expedition. The admiral's flag was a white pennant with a green cross between two crowned letters F and I—the initials of the names of Ferdinand and Isabella, who had given these arms to Columbus. A cross was painted on the sails of the ships, according to the custom adopted by the Spanish and Portuguese, in order to distinguish their vessels from those of the infidels.

Treatment of the Czar's Consumptive Son.

The Grand Duke George, the Czar's second son, who, ever since his enforced return, through illness, from his Indian tour, has been under medical treatment for pulmonary disease, has been passing the winter at Abbas-Tuman in the Caucasus. A private letter from that place states that his imperial highness is undergoing a most remarkable course of treatment. The walls in his apartments are bare and unpapered, the furniture is of plain wood or cane, without upholstering or stuff covering of any kind, and his bed consists only of the thinnest of mattresses. Throughout the winter only a very moderate fire has been kept up, while the windows of the grand duke's rooms have been continuously open. His attendants have suffered dreadfully from the cold; but his medical advisers hold that this low temperature is very beneficial to their imperial patient, as it tends to destroy the bacillus and prevent the formation of tubercle. They maintain that the progress of the disease has been arrested, and express hopes that, if the treatment which they prescribe is persevered with, the grand duke will in two years' time have completely recovered.—*Medical Record.*

A Series of Mistakes in a Boiler Room.

It is a wonder that more serious accidents do not occur when boys and inexperienced persons are set to repairing steam boilers, or superintending their operation. The *Locomotive* tells the following story, and the editor vouches for its accuracy:

A short time ago our attention was called to some most remarkable doings in a boiler room, which we proceed to relate. The boiler was originally built to furnish power, and was good for about 75 pounds steam pressure; but it is now used only for heating purposes. Some of the steam and return valves to the large coils leaked about the stems, and the owner of the boiler, instead of sending for a steam fitter to repack them, called in a plumber. The plumber, being busy, sent his boy helper. The boy began work on some of the valves that were within sight of the boiler front, but being troubled by the steam that escaped, he shut off the steam valves, leaving the return valves open. The coils were large, and when the steam in them had condensed, water began to back up from the boiler, for there was no check valve on the returns. As the boy worked away he noticed that the water in the gauge glass was going down somewhat rapidly and also that the steam pressure was rising. He did not know where the water was going to, nor did he know how to feed it more; but he thought that if he opened the furnace door and so checked the fires, the evaporation and the rise of pressure would proceed much more slowly. Jumping down into the pit in front of the boiler, he opened what he thought, in the darkness, were the fire doors, but it appeared subsequently that he did open the ash pit doors, this making matters worse instead of better. The fire brightened up, and the pressure began to rise rapidly, and the water level to go down. The boy was greatly troubled at this, and when the rubber diaphragm in the damper regulator burst from the increasing pressure, he "went all to pieces," as the saying is, and ran for his boss. The boiler being originally intended for furnishing power, the safety valve could not be set to blow at less than at about 20 pounds, while the damper regulator was designed to carry not more than six or seven pounds, so that its diaphragm burst, naturally enough, before the blowing-off point of the safety valve was reached. The plumber came in haste and found the people in the building overhead badly frightened, and the boiler room filled with steam, so that he could not make out precisely what had happened. He told the boy how to turn on the feed, however, and that well-meaning but badly "rattled" individual went to the back end of the setting, and, instead of opening the plug cock in the feed pipe, he opened the plug cock in the blow-off pipe, which only added to the noise and confusion. Meanwhile, the plumber hauled the fire out on to some pine boards that the regular attendant had laid in the damp pit. The boards took fire and smoke was soon added to the escaping steam, to the intense horror of the occupants of the building, who by this time were on the other side of the street. When the fire had been hauled and the danger averted, the plumber soon learned the cause of the disturbance, and quiet was speedily restored by shutting off the damper regulator and the blow-off, and throwing a few buckets of water on the burning boards.

It seems hardly possible that such a succession of mistakes could follow one after another in so orderly a manner, but we can testify, from personal observation, that they did. And we may add that not long afterward, when the boiler was out of use, a coal dealer put 100 tons or so of coal into the same boiler room, piling it up in such a manner that some of it ran down into the open manhole, and the rest of it covered up the blow-off pipe and the rear door of the setting, which were both open, so that there was plenty of trouble digging them out before the boiler could be started again.

Notes for Painters.

The campaign banner and transparency will soon bring plenty of work to the sign painter. Let us hope, however, that the efforts of these worthy gentlemen will be more successful than they sometimes are. In these days, when solar print photographs are so easily obtained of any given dimensions from a small picture, there seems to be no excuse for the impossible portraits we sometimes see. One of these solar prints can be readily used as a stencil for duplicating a picture any number of times, by means of pounce. Or if but one banner is wanted, the muslin can be laid down on a drawing board, with a sheet of carbon impression paper, face downward, on top of it. The solar print, which should be made on thin paper, should be placed on top of all, face upward, and secured by thumb tacks. With a hard agate point the lines of the face can then be carefully traced, when they will appear on the muslin or canvas below. The print, of course, can be used as a guide for the shading, in finishing the work. Of course, in this method of transferring a design, it is necessary that the material to which the pattern is to be transferred must be laid on a hard background.

In making a sketch for an ornamental design, a rapid method of duplicating the second half of a symmetrical pattern is often wanted. I have found it very convenient to make my sketch on a sheet of s m o o t h, hard-surfaced writing paper, first folding it lengthwise, and after opening it, making the drawing on the inside, the creased line being used for the center line of the figure. A soft lead pencil should be used—not harder than a number two. When the half ornament is drawn, the paper should then be folded again, laid upon a hard surface with the penciled half upward, and rubbed rapidly with the thumb nail, using considerable pressure. On opening the sheet again, the complete pattern will be found. This is an extremely rapid method, and I have found it a great help, as it enables me to judge of the finished effect of a symmetrical design without taking the time to use tracing paper for reversing the half already drawn.—*Painting and Decorating.*

Congress of German Naturalists and Physicians.

Its meeting, the 65th, will this year take place at Nurnberg, from the 12th to 16th of September. The congress differs in several important respects from its daughter the British Association. It includes not merely "natur-forscher," *i. e.*, men engaged in scientific persuits, but physicians, who of course are, or ought to be, men of science.

The number of sections is thirty-two: 1. Mathematics and astronomy. 2. Physics. 3. Chemistry. 4. Botany. 5. Zoology. 6. Entomology. 7. Mineralogy and geology. 8. Ethnology and anthropology. 9. Anatomy. 10. Physiology. 11. General pathology, pathological anatomy. 12. Pharmacology. 13. Pharmacy and pharmacognosis. 14. Internal medicine. 15 Surgery. 16. Obstetrics and gynæcology. 17. Pædiatry. 18. Neurology and psychiatry. 19. Ophthalmology. 20. Otriatics. 21. Laryngology and rhinology. 22. Dermatology and syphilis. 23. Hygiene and medicinal policy. 24. Forensic medicine. 25. Medical geography, climatology, hygiene of the tropics. 26. Military sanitation. 27. Dentistry. 28. Veterinary medicine. 29. Agricultural chemistry and agricultural experimentations. 30. Instruction in matnematics and natural science. 31. Geography. 32. The knowledge of instruments.