Scientific American.

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Removal of the Scientific American Office.

The time is morning. A few rays of sunlight glide into our sanctum, and show it to be filled with clouds of dust; a noise of hammers, busy feet and bustling packers disturbs our quiet; and the fact is forced upon our attention that we are really *removing.*

"Farewell, a long farewell,"

we are tempted to say to the old walls and familiar floors, but not to those kind friends whose presence has made our office a pleasant place, and whose support and encouragement have attended us so far along the journey of life. Throughout *fourteen years* our business has been steadily increasing; but we have always "hailed" from the same old spot. Now, however, the SCIENTIFIC AMERICAN is changing its location.

We must confess it, we like the very office in which we sit, and regard with some amount of veneration the furniture and fittings, for they are the SCIENTIFIC AMERICAN'S *Lares* and *Penates*—its household gods. That feeling which is formed in every human being—the love of home—is in us broadened into the love of our office, for it has been the scene of all our professional labors, anxieties, and triumphs.

But we find that our old location is not large enough to accommodate our increasing business. We have endured the difficulties of insufficient space as long as we could—now compromising this little thing and then that—now cramping this person, then the other—until, at last, we have been compelled to take a decisive step, and *remove.*

Good fortune attending us, we have found a commodious suite of rooms, light and airy, near to our present quarters, but in a more central position. Where the Old Brick Church once stood, there stand we. Our offices w l be found in the block known as the "Park Building," our new address being Nos. 37 Park-row and 145 Nassau-street, having an entrance on each street.

This removal will be for the good of the clients of our Patent Agency, as well as all our other friends. In our new offices they will find, when they call upon us, (as we hope they soon will do,) everything they can require to aid them in securing the productions of their ingenuity to themselves or assignees by Letters Patent in this or any other country. Extensive and growing as our business now is we expect, and are prepared to see it augment every day with increased speed; and although we have done much where we are, yet in our new offices we shall be able, without difficulty, to perform the whole patent business of the United States, should it be required of us.

To return to ourselves—that is, "ourselves" editorially—the only change that we ever intend to experience is improvement. The only way that we ever intend to look is "upward and onward;" and as we have always fearlessly spoken our honest opinions, so we shall always continue to do. Our constant aim and endeavor shall be to lay before our readers, weekly, a mass of information of real value, told as pleasantly as we can. In removing, we hope to carry with us all our old friends, and trust that they will bring with them many new ones.

The present number of the SCIENTIFIC AMERICAN issues from our new offices, Nos. 37 Park-row and 145 Nassau-street. Let all our friends remember where we are to be found.

AFRICAN WOOL.—Five million pounds of wool were shipped last year to England from Algoa Bay, South Africa. Its value amounted to $1,400,000.

Meteorology.—No. 2.

The aerial ocean which surrounds the earth consists of atoms of matter which are self-repellant; and in proportion as the pressure upon them is diminished, they constantly tend to separate from each other, and produce an expansion of the whole mass. When the pressure upon them is increased, the mass is diminished in volume, but the force of their repulsion is increased. From the constitution of the air, it follows that the density of the atmosphere at the earth's surface is much greater than at a higher altitude. At the level of the sea it is 1, at 3·4 miles it is only $\frac{1}{2}$; therefore one-half of the whole weight of the atmosphere is found within the limit of three and two-fifth miles; and one-third of the whole quantity is beneath the level of the Rocky Mountains. This fact has an important bearing on the influence of mountain ranges in modifying the direction of the winds.

The question has oftentimes has asked, "Why does the air grow colder as we ascend?" The answer is easily given. A pound of air at all distances above the earth contains an equal amount of heat with the same weight taken at the surface, but as the pressure decreases upward, the air is expanded, and occupies more space, consequently its heat is more diffused, and therefore less intense, hence it must be lower in temperature as we ascend. A large sponge containing a small quantity of moisture seems almost dry, but by squeezing it within the hand we condense the moisture, and extract the water. This comparison may be applied to the heat in the air. The exact diminution of temperature in the air as we ascend is not actually known. Celestial space (that void, as some call it, outside of our atmosphere) has a temperature of its own, which is supposed to be about —60°. In temperate latitudes it is usual to allow a fall of one degree for every 333 feet of elevation, or three degrees in 1,000 feet.

The repulsion of the atoms of air is increased by heat as well as pressure. The air expands 1-491 part of its bulk at the freezing point by the addition of each degree of heat, and thereby becomes lighter, and ascends. The heat of the sun thus acting upon the atmosphere is the great motive power which causes all the winds and breezes in the aerial ocean above us. As the air at the equator is 82° in temperature, zero at the poles, and 60° below zero in space, the air at the equator ascends, then flows over at the top along an inclined plane to the poles, where it sinks, and then flows back again below to the tropics, thence up again to the poles, and so produces a constant circulation. But these currents are not regular along the meridians; various causes prevent their regularity. The earth itself revolving on its axis is the cause of the trade winds, which blow constantly within the parallel of 30°. There are three distinct belts of wind in each hemisphere, as calculated by Professor Coffin, namely, a belt of easterly winds within the tropics; a belt of westerly in the temperate zone; and a north-westerly belt at the north. These belts are not stationary, but move laterally towards the south or north, according to the positions of the sun at various seasons of the year. Their breadths also vary; they are crowded into a smaller space towards the pole in the winter, and expand into a wider space in the summer. The condensation of vapor which arises from the surface of the ocean and is carried to different parts of the earth, disturbs the regularity of the atmospheric currents. The heated air which ascends at the equator is saturated with moisture, which it has absorbed in passing over the northern and southern oceans. As it ascends, it continually meets with a diminished temperature, and as the sun declines to the west, a considerable portion of it is converted into water, which descends to the earth in the form of rain. The greatest amount of this action is at the tropics, and there is a belt of intertropical rains which oscillate with the course of the sun in its annual changes of declination. A portion, however, of this vapor is probably carried on the upper current of air even to the polar circles, and there deposited in fertilizing rains.

The condensation of the vapor which is evaporized from the ocean at the equator, evolves a great power in the form of heat, which has a very great effect on the motions of the atmosphere. It is calculated that by every cubic foot of rain which falls on the face of the earth, sufficient heat is liberated in the atmosphere to produce 6,000 cubic feet of expansion of the surrounding atmosphere beyond the space which the vapor itself occupied. This accounts for the moisture being condensed into a space much less than that which it formerly occupied, and that air has more than five times less capacity for heat than water. The ascensional force evolved by the condensation of vapor must, therefore, be immense. This accounts for violent and irregular gusts of wind (according to Mr. Espy) during thunderstorms, &c. If the wind blows over a surface only a little above the earth, the vapors in it will not be sufficiently cooled to condense into rain; but if it meets with a mountain in its course, so as to make it ascend, the vapor will be condensed on the windward side by the cold due to the increased vertical hight. The moist air which ascends the windward sides of the mountains in South America and Mexico is so cooled as to deposit its moisture in rains, and when the elevations are very great, the air passes over them to the other side, robbed of its entire moisture, and never drops a shower to fertilize the fields. The general idea that mountains attract vapor, is not founded on any established principle of science.

Silicates Applied to Cements and Paints.

A very interesting report addressed to the French Minister of Agriculture, Commerce, and Public Works, has recently been published in the Paris *Moniteur*, by a commission appointed to examine into the methods discovered by M. Kuhlmann, professor of chemistry, for hardening cements, porous stones, and paints with silicate of soda. As this has been a somewhat controverted subject in our columns, information regarding it from a disinterested source is of importance.

This report states that if eleven parts of the silicate of soda in powder is mixed with eighty-nine of common lime, it makes a good hydraulic cement which will harden under water. This fact proves the great affinity between lime and silex; and M. Kuhlmann has found that a solution of the silicate, when mixed with common chalk, becomes carbono-silicate of lime, which strongly adheres as a paste to the surface of wood and stone, and in the course of time becomes very hard, and thus forms a very durable mastic cement. The sculptured part of the new Louvre, in Paris, has been treated by the silicatizing process. A solution of the silicate of potash, in strength 35° Beaumé, was diluted with twice its volume of water, and was applied to the front of the building in jets, by means of force pumps; the result has been that the porous surface of the stonework has been rendered very hard and durable. By mixing the sulphate of copper with the silicate, it imparts a green color to it, which, when applied to a bust of plaster of Paris, gives it an antique bronze appearance; the sulphate of manganese gives it a brown color; the oxyd of zinc makes it a beautiful white. These colors are more applicable to stone than wooden surfaces, as the latter contain resin which prevents a uniform shade being secured. India ink ground with the silicate makes an indestructible ink for writing. In calico-printing the silicate has been employed in place of albumen, to fix the colors. The report, as a whole, endorses silicates of soda and potash as applicable to a great number of new and useful purposes.

Ice Phenomena.

A recent number of the *Canadian Journal of Industry and Science* contains some exceedingly interesting information regarding the expansion and contraction of ice on Rice Lake, C. W., by J. H. Dumble, C. E. A bridge of the Cobourg and Peterborough railway runs through this lake, and in our southern States, or in a mild climate, it would have answered every purpose; but with the expansion of the ice on this lake in such a cold climate it has become a complete wreck. The ice after it is formed is subject to great expansion and some contraction by changes of atmospheric temperature—a fact which has not before, we believe, been recognized. *Glare ice* is that which is smooth on the surface; it has been found that such ice, when acted on by the mid-day sun, is immediately set in motion by expansion, and it generally sets in towards the shore. Sometimes this movement is very gradual, and accompanied with a slight crackling noise; sometimes it is rapid and violent, and accompanied by a succession of vigorous jerks, and a hollow rumbling sound, seemingly from under the ice, while at intervals there occur loud and sharp reports, like those of cannon.

Sometimes the ice expands several feet on the shore without any fissures being created in the lake; this is caused by a temperature of the atmosphere higher than that which previously existed. If the thermometer indicates a temperature of 30° below zero, and then suddenly rises to zero, expansion of the ice results. When the thermometer indicates 30° above zero, and then falls to zero, contraction of the ice is the result. The force with which ice expands depends entirely on the *extent* of the *change* of temperature.

The most forcible movements of ice occur previous to rain storms. A sudden rise of 20° in temperature produces violent expansion. Strong oak piles in the bridge, which would not bend, were cracked and splintered by the ice expansion; heavy cap timbers of pine were snapped like reeds, and heavy iron rails were curved and doubled up, as if put into a huge press. Trees growing on the shore have been torn up by the roots by the ice expansion, and boulders weighing several tuns have been lifted from the shore, and forced into the bridge timbers. On one occasion the ice expanded no less than six feet along the whole shore. A uniform temperature of the atmosphere neither causes expansion nor contraction of ice; it matters not whether the temperature is high or low, no movement of any kind takes place. A coating of snow six inches deep effectually prevents any motion in the ice, as it is a most effectual non-conductor, and protects it from the influence of the atmosphere.

Ice does no possess the power of contraction to the same extent as that of expansion. It has been noticed that when it expands some feet, it does not recede when the temperature falls to its former situation, it only contracts by inches for its expansion in feet.

McCormick's Patent Extension Rejected.

Just as we were going to press we received a telegram from Washington, announcing the refusal, by the Hon. Commissioner of Patents, of the above important case. Our despatch states, as the reason for refusal: "The invention was a small one, and the patentee had been fully remunerated." We shall endeavor to give the decision at length in our next issue.

NUMBER OF HUMAN BONES.—It is a fact, which, apparently, is not generally known, that there are thirty-two bones, neither more nor less, in all the divisions of the human body. Thus, there are thirty-two teeth, thirty-two spinal junctions, and so on.—*The Builder.*

COAL OILS.—In our next number we shall publish some useful practical information regarding the history and manufacture of coal oils.