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## IMPROVED NAPPING MACHINE.

Our engravings illustrate an improved machine for raising the pile or nap on woolen and cotton fabrics. It appears to be well calculated for the intended purpose, and is undoubtedly a very ingenious invention.

In Fig. 1 is given a perspective view of the machine, which is intended to be run by steam or other power. It will be seen to consist essentially of a central cylinder and four systems of rollers, all of which are operated by the one driving shaft. The central, or napping cylinder, carries on its periphery the cards or teasles by means of which the pile is raised. Each system of rollers performs the duties of carrying in the cloth, presenting it to the operation of the napping cylinder, and carrying it away again to a fitting receptacle, as shown in the engraving. It follows, therefore, that as many pieces of cloth may be napped as there are systems of rollers; and their number may of course be increased or diminished according to convenience. As the operation of the machine is complete in each system, an explanation of one will explain the whole, and the reader will now, therefore, please refer

to Fig. 2, in which one system of rollers and the driving mechanism of the machine are shown in detail.

A is the driving shaft. To it is attached the eccentric shown, by means of which the four arms which operate the four systems of rollers are actuated and made to oscillate and to advance and recede alternately; their motion is circumscribed by a fifth arm, which slides on a fixed bearing at the lower part of the machine, as delineated. On the shaft, A, behind the eccentric shown is placed a second eccentric, by which the gear wheel, B, is worked. This wheel, B, is limited to an upward and downward and oscillating movement, by a contrivance similar to that by which the movement of the arms is circumscribed. To the napping cylinder, C, is attached the inner gear, D. They both run loose on the shaft, A, and an intermittent revolving movement is produced in them by the action of the gear, B. The roll, E, which is run by a hand and pulley on the further end of the shaft, A, is arranged for keeping the napping cards, etc., clear. We will now examine the system of rollers. The roller, F, is carried by the arm, G, the further end of which is slotted and engages with the shaft of the roller, H, in the manner indicated by the dotted lines. The driving arm of this system (which is broken off in the engraving) has a rod, as shown, which passes through the slot, I, in the arm, G. The outer end of this rod is provided with a pivoted arm, J, which is adjustably attached to a lever, the other end of which carries a spring pawl, which latter actuates

a ratchet wheel attached to the shaft of the roller, H. This ratchet actuating mechanism which is partly shown and indicated by dotted lines in Fig. 2, is so fully shown in Fig. 1 as to require no further explanation, and it will readily be seen, on inspection thereof, how the outward movement of the rod results in a partial revolution of the roller, H. The two rollers geared to H, of course, make corresponding movements in the opposite direction. At K is the cloth to be napped; it passes from the recess in which it lies round the

lower roller, between that and the roller, H, round the roller, F, and thence between the roller, H, and the one above it, whence it passes over a small outside guiding roller into a suitable receptacle.

In the operation of the machine, on each revolution of the driving shaft, the napping cylinder is moved forward slightly in its revolution and brought again to a stand, while the roller, F, which presents the cloth to the napping cards, is moved eccentrically away from and then towards the cards; at the same time the action of the ratchet device causes a partial revolution of the roller, H, and the cloth is conse-

quently carried through the machine by simply sewing the end of one piece to that of the next.

The device is patented, and further information in regard to it may be obtained by addressing the inventor, Mr. Calvin P. Ladd, of the Ridgewood Works, Bloomfield, N. J.

## A New Molding Material.

Colonel Muratori, an Italian inventor, has recently discovered a new composition corresponding to the *gesso duro*, *stucco duro* (hard plaster of Paris, hard stucco), which was used by the Cinque Centisti in the 16th century, and was subsequently unfortunately lost.

Like plaster of Paris, it may be used for casts. It hardens slowly, and the artist thereby has all the time he requires. Dry, it becomes very hard, and no longer receives stains. Even oil dropped on it then does not discolor it. And it can be cleaned and washed without in any way injuring the most minute and delicate details.

Its color is transparent snow white, dull, or lustrous, if so wanted; for any part of the surface is susceptible, by simple friction, of assuming a kind of crystalline enamel. Mixed with ordinary colors it retains all the properties above detailed, and most

beautiful imitations can thus be made. The price of this new material is not likely to surpass the price of fine plaster of Paris.

The process of manipulation remains the same; no novelty of apparatus or handling requires to be introduced, whether the material be worked by an artist, by a skilled or common workman, and it is all these qualities combined which render it of such very great importance as a substitute for plaster of Paris for all artistic works.

Another application of the same kind deserves mention, for it also possesses a high importance. Any object whatsoever of plaster of Paris dipped into a bath of the composition comes out covered with a kind of enamel, the most minute details remaining uninjured. The solution in the bath, which is called liquid enamel, has the following properties:

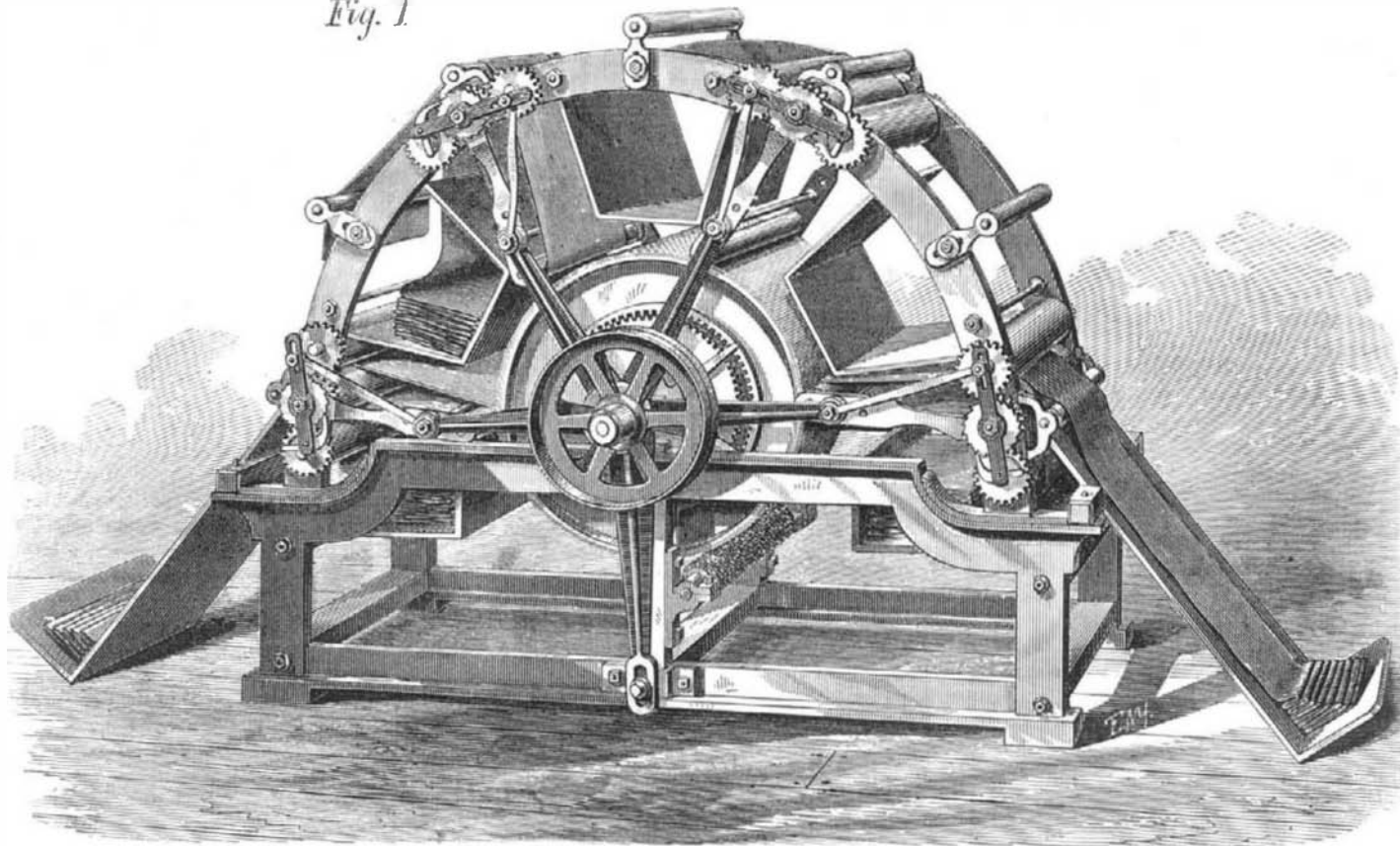
It preserves and cleans plaster of Paris objects without altering, affecting, or injuring their minutest details; it gives them a beautiful transparency, and they may be left dull or made lustrous at will. It has no smell, and is not affected by exposure to great heat.

## An Engineering Triumph.

There is a German printing office in this city where the employees have adopted an ingenious method to gratify their Teutonic proclivity for good lager. The composing room is situated a good way up in the skies, far above sublunary things, indicating a corresponding intellectual elevation. It might be supposed that under these circumstances

the love of lager might receive a check. The reverse is the case. The back door of a saloon and bar room opens into a yard near the printing office. A good stout telegraph wire has been stretched from a post in the yard to a window of the room where the intellectual "comps" perform their arduous labors. When a supply of the stimulant is required, the tinkling of a bell arrests the attention of the bar keeper, and a set of tins or buckets, filled with the sparkling beverage, are drawn along the wire, and safely landed at the window.

Fig. 1.



LADD'S IMPROVED NAPPING MACHINE.

quently fed in by the lower pair of rolls, and withdrawn by the upper to the same extent. In this way every portion of the surface of the cloth is presented to the nappers, and the operation is performed in a highly effective manner.

By adjusting the ratchet mechanism suitably, the roller, F, can be made to approach the napping cylinder more or less, as may be desired, and by this means the thickness of the layer of fabric raised into pile can be precisely determined, which makes the machine of peculiar value in the manufacture of canton flannels, where the strength of the flannel is frequently jeopardized by the depth of the nap.

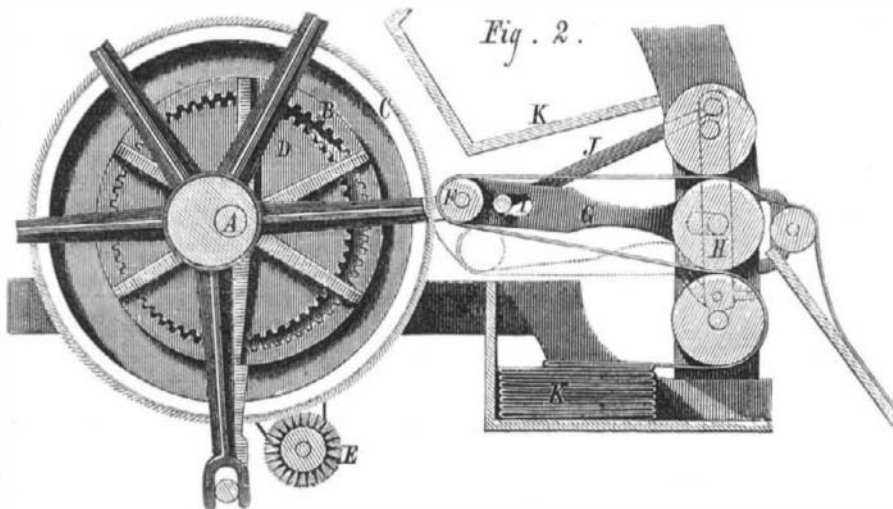


Fig. 2.

Among the advantages claimed for this machine are the small space it occupies, the non-liability to get out of order, and the facilities it gives for inspecting the work as it is performed. Should the fabric not be sufficiently napped on passing one set of rolls, it may readily be subjected to the action of another set before leaving the machine; and if it is designed to nap both sides of the cloth at one operation, the object is easily accomplished by passing it through a second set of rolls in reversed order. Piece after piece of

It has been well said that necessity is the mother of invention, and this is an apt illustration of the saying.—*St. Louis Republican.*

#### The Manufacture of Textile Fabrics at Pompeii.

Some interesting particulars of the ancient method of cleansing and finishing woven fabrics, as revealed by the ruins of Pompeii, are given by M. Beulé, who inspected the remains of a fulling and bleaching establishment in the buried city. The house in question was unearthed some time back, but the descriptions of its contents seem to have been confined to the pictures.

The largest and best executed paintings representative of the art were discovered in 1820, in the house of a fuller, opening on one side on the street of Mercury, and on the other on a street called after him, Fullonica. In the court, a pillar covered with pictures was standing alongside a fountain. This pillar has been removed and deposited in the Naples Museum. In the lowest division, a woman, sitting, hands a piece of cloth to a little female slave. A workman, whose tunic is closely tied around the body, is looking at them, while at the same time carding a white cloak with a purple border, suspended from a stick. Another workman is in the act of sitting down alongside a crate of wicker work on which the cloth is to be spread out; in one hand he holds a vase on which sulphur thrown on burning charcoal will develop a gas capable of bleaching the cloth. This is the same method, says M. Beulé, which is used to-day. On another face of the pillar, arched niches contain large vats where the goods are soaked. Slaves standing in those vats trample the fabric with their bare feet in the same manner as Arabian women wash their linen by trampling them against the rocky bed of a stream; this is what the ancients called "the fuller's dance" (*saltus fullonicus*). The artist has painted with the same care the press with its two uprights, its two enormous screws, which were turned by means of cranks in order to flatten the cloth beneath the planks which imparted the necessary finish. Finally, the drying chamber is shown by long sticks hanging on chains from the ceiling. The linen is spread out on them; a slave hands to a young woman an open fabric, while the wife of the fuller makes a note of it on her tablets. I have visited with particular curiosity the houses in Pompeii where these pictures had been gathered. I counted there in a court twenty-two tanks constructed of stone, and at different levels, so that the water could run from one into the other. Little benches in front of them served for the reception of the goods. At the other end of the court, seven smaller tanks served for fulling. The store room, with traces of the planks, which were laid like rays radiating from a center, the hearths, the drying chamber, may still be recognized. In other fullers' establishments, I have seen very thick sheet lead lining the interior of vats made of cement. Sometimes, also, we find jars full of greasy earth, which must be the fuller's earth of which Pliny speaks, and which contributed as much to the whiteness of the goods as the fumigation with sulphur or the urine which was collected in vases placed at the corners of the streets. Thus, despite the differences of time and processes, it has been established, to our surprise, that moderns are but little inventive, or, rather, that the ancients had already discovered all that was essential, rational, and suited to the requirements of the art.

#### Hints for the Country.

In preparing grounds, it should be remembered, says the *Gardener's Monthly*, that grass and trees are not only required to grow therein, but that they must grow well. The top soil of the lot is often covered by the soil from the excavations, trusting to heavy manuring to promote fertility. But this is a too slow and expensive process. The top surface soil should, in all cases, be saved, and replaced over the baser soil. Also, where it is necessary to lower a piece of ground, the top soil should be saved to place over again. The depth of the soil is an important matter, both for the trees and the lawn. It should be at least eighteen inches deep. In shallow soils, grass will burn out under a few days of hot sun. In a soil eighteen inches deep, a lawn will be green in the driest weather. For the sake of the trees, also, the ground should be not only deep, but rich. If from thirty to forty loads of stable manure to the acre could be appropriated, it would be money well spent. Life is too short for it to be an object to wait too long for trees to grow, and planting large ones is an expensive as well as unsatisfactory business. A tree in a rich and deep soil will grow as much in one year as in five in a poor one. So in preparing a lawn, it is fortunate that, while aiming at the best effects, we are helping our trees also. It is generally better to sow for a lawn than to seed, where much of it has to be done. The edges of the road must, of course, be sowed, and the balance neatly raked over and sown. The best kind of grass to be employed in seeding is a disputed point, and it will, no doubt, depend in a great measure on the locality. In Philadelphia and northward, the perennial rye grass is excellent. It commences to grow very early, and has a peculiar lively, shining green. South of Philadelphia, it is very liable to get burned out in summer, and the Kentucky blue grass would be much better. It is much the best to have but one kind of grass for a lawn, provided it is suited to the locality. A mixture of kinds is apt to give a spotted and variegated character, not at all pleasing. Some people like to see white clover growing thickly in a lawn and others object to anything but green. However, if a good grass rake is employed freely in summer time, the heads of these flowers may be kept from expanding. Where there is a prospect of a month of growing weather, lawns may still be sown with grass seed, the clover, where used, to be kept for sowing in April

or March next. A small quantity of rye should be thinly sown with the grass, which, by the shade it affords, will prevent the grass from being thrown out by the frost. The rye must, of course, be closely cut in the spring, to allow the grass to get ahead of it.

#### Hilgard's Magnetic Survey.

It is a fact well understood by the unlearned as well as the learned that, in determining the true north line, surveyors and civil engineers are accustomed to make certain allowances for what is called "the variation of the magnetic needle," or in other words, it is well known that the magnetic needle does not point due north. The extent of this variation differs with different periods of time, and also in different localities on the earth's surface.

Another well known fact connected with the operation of the magnetic needle is that, when suspended upon a pivot, instead of assuming an exact horizontal position, it has a slight dip toward the north, and that the extent of this dip likewise varies with the time and place. In view of these well known facts, it becomes a subject of great practical importance, as well as a matter of great interest to science, to determine the true north line of different points of the earth's surface, in order to know to what extent the needle varies from the true north course, and also to see to what extent the needle dips at different localities.

When the true north line is once established at different points, it will then be an easy matter to note, from time to time, the slightest difference, either by way of increase or diminution, of the variation of the needle from this true line from year to year. The true north line is found by an astronomical observation, and the process of ascertaining the true meridian line and measuring the intensity of the magnetic force which controls the variation and dip of the needle is called a magnetic survey.

Such a survey of the United States, says the *St. Louis Republican*, is now being made by Dr. I. C. Hilgard, under the auspices of the American Academy of Science. Dr. H. has established a station at Compton Hill, St. Louis, and is locating stations in other parts of the country. The variation as well as intensity of the magnetic force is determined by means of a tabular magnet, horizontally poised on a stirrup, which is suspended by a single cocoon fibre in line with the optic axis of the theodolite, to which a magnetometer box is clamped; the optic arrangement on a position sideways is perceived on the scale of the magnet. This is effected by having a microscopic scale at one end, placed in the focus of a lens at the other end of the magnet, causing all the rays of a mark to proceed parallel, but at an angle with the parallel rays of every one respectively. The angle or "dip" of inclination is found by placing the axes of a delicate magnetic needle upon polished agate supporters, approximately in the center of the graduated vertical or "dip" circle, and in the magnetic meridian. In order to remove eccentricities of axis, imperfections and irregularities in the distribution of magnetism, etc., two different needles are used, and both read with direct and reversed magnetism, and with reversed axes as well as reversed circle, making sixty-four readings on record in all. This gives a very precise means, by eliminating all the inevitable inequalities or instrumental imperfections. The Smithsonian Institute will publish the results of these surveys for the general benefit of the community.

#### Lima and Oroya Railway in Peru.

This road, which is to master the altitudes of the Andean chain, is building for 27,000,000 reals, by Henry L. Meiggs. Commencing at Callao, on the coast, it will cross an altitude of over 15,000 feet, and terminate at Oroya, 12,200 feet above the ocean. The center of supplies is at Yauli, at 14,000 feet altitude. Grading has been finished 18 miles, and the work of tunneling the crest of the Andes has begun from both ends, with 1,400 Inca Indians engaged on it. The tunnel will be 3,000 feet long, and elevated higher than the summit of Mont Blanc. It is distant from the western terminus on the Pacific only 60 miles. The gradient for the railroad is 211 feet per mile—called there a four per cent grade. Forty miles from Callao, it has been necessary to resort to a V—turntable and switch, where the railroad takes an up grade in reverse direction for several miles, and again returns, forming almost a figure 8. The mule trail, by which materials are carried over, passes an altitude of 16,500 feet, amid a cluster of peaks covered with perpetual snow. It is hoped by this road to develop the silver wealth of the Cordilleras. With the exception of some coal, rudely taken out and transported on the backs of llamas, at \$25 per ton, nothing can be obtained for fuel except dried turf, "buffalo chips," (25 cents a sack), and dried llama dung. Such items will enable those unacquainted with the country to appreciate the fact that this work is one of the greatest events of the age.

#### Nitro-Ethan—A New Substance.

By the action of ethylic iodide upon argentic nitrite, Meyer and Stuber have obtained a new substance isomeric with ethylic nitrite. When ethylic iodide is poured upon argentic nitrite, violent ebullition ensues. To complete the reaction, the mixture may be heated for some hours with a reversed condenser. On distillation, a mixture of ethylic iodide and nitrite passes over at first; afterward the new substance, which boils at 111° or 113° C. The authors give this body the name of nitro-ethan. It is a perfectly colorless clear liquid of a peculiar agreeable, ethereal odor. Its density at 13° C. is 1.0582 (taken with reference to water at the same temperature); it is insoluble in water, does not explode on heating, and burns with a pale flame. When nitro-ethan is heated with iron filings and acetic acid, a violent reaction ensues, which must be moderated by plunging the flask into

cold water so that the liquid does not boil. On subsequent distillation with caustic potash, ethylamin passes over, in large quantity and in a state of great purity. Hence it appears that nitro-ethan corresponds to the aromatic nitro-compounds. A solution of caustic potash dissolves nitro-ethan which appears to possess weak acid properties. Sodium attacks it with evolution of gas and formation of a white powder, which explodes on heating.

#### Intelligent Monkeys.

Professor Cope describes a monkey in his possession. He is an admirable catcher, seldom missing anything, from a large brush to a grain, using two hands or one. His cage door is fastened by two hooks, and these are kept in their places by nails driven in behind them. He generally finds means sooner or later to draw out the nails, unhook the hooks and get free. He then occupies himself in breaking up various objects and examining their interior appearances, no doubt in search of food. To prevent his escape, Professor Cope fastened him by a strap to the side of the cage, but he soon untied the knot, and then relieved himself of the strap by cutting and drawing out the threads that held the flap for the buckle. He then used the strap in a novel way. He was accustomed to catch his food (bread, potatoes, fruit, etc.) with his hands, when thrown to him. Sometimes the pieces fell short three or four feet. One day he seized his strap and began to throw it at the food, retaining his hold of one end. He took pretty correct aim, and finally drew the pieces to within reach of his hand. This performance he constantly repeats, hooking and pulling the articles to him in turns and loops of the strap. Sometimes he loses his hold of the strap. If the poker is handed him, he uses that with some skill, for the recovery of the strap. When this is drawn in, he secures his food as before. Here is an act of intelligence which must have been originated by some monkey, since no lower or ancestral type of mammals possess the hands necessary for its accomplishment. Whether originated by Jack, or by some ancestor of the forest who used vines for the same purpose, cannot be readily ascertained.

After a punishment, the animal would only exert himself in this way when not watched; as soon as a eye was directed to him, he would cease. In this he displayed distrust. He also usually exhibited the disposition to accumulate to be quite superior to hunger. Thus he always appropriated all the food within reach before beginning to eat. When different pieces were offered to him, he transferred the first to his hind feet to make room for more; then filled his mouth and hands, and concealed portions behind him. With a large piece in his hands, he would pick the hand of his master clean before using his own, which he was sure of.

#### Photographs of the Freckled.

Concerning the photographing of freckled or discolored faces, so as to hide such blemishes: while bromised collodion may be a very excellent thing, there is something else that ought to have a place in the dressing room attached to every studio. I allude not to the puff box, but to a kind of white liquid cosmetic much used by the fair sex when dressing for the opera, a ball, or an evening party. I was on one occasion asked by a lady friend to examine some of this cosmetic in order to say how it could be prepared. I made a mixture of a very similar kind by rubbing up a little oxide of zinc with glycerin, and thinning it with rose water until it was of a creamy consistency. I know of nothing better than this for applying to a lady's face previous to photographing her; for, when properly applied by means of a bit of sponge, it leaves the face of a delicate white color, and masks the freckles and other discolorations. Its value will be properly appreciated if a portrait of a lady with well developed freckles be taken first with the face in its natural state, and again after the sponge, moistened with the above cosmetic, has been passed all over it.—*British Journal of Photography.*

#### Snuff Dipping Factory Girls.

The Lowell (Mass.) *Courier* says: "There is a good deal of snuff dipping going on in Lowell, especially among one class of our mill operatives. A woman, who called at a house where several of these girls lived the other night, found the occupants sitting around the room with rags saturated with snuff, which were occasionally rubbed on the teeth and gums, and seemed to produce a kind of exhilaration or subdued intoxication. The visitor was socially offered a rag, but she declined. It is said that the 'dipping' may be seen at some places in the mills, and snuff selling is an important branch of business with some traders." This practice has long been known to exist in the large manufacturing cities in England, and in Lawrence, Lowell, and Fall River, it has been introduced principally by the foreign hands.

ALDOL.—Wurtz has obtained a new polymer of aldehyde having the formula  $C_4H_8O_2$ , to which he gives the name of aldol. It is a perfectly colorless liquid, which after cooling becomes thick like a pure solution of sugar. It is so viscid at 0° that the tube containing it may be inverted without any flow of liquid. When gently heated, it becomes as fluid as water, but it regains its viscid character only some hours after cooling. Its density at 0° is 1.1208: it has a strong aromatic and bitter taste, and mixes in all proportions with water and alcohol. When heated to 135°, aldol is resolved into crotonic aldehyde and water.

The *Panama Star and Herald* records the first arrival, on April 2, at Panama, on its annual eastern migration, of the beautiful sphinx moth (*Urania leilus*). The immense flights of this moth, and the extreme regularity of their recurrence year by year, have repeatedly been dwelt upon by the *Star*, and much interest has been excited as to its starting place and ultimate destination.