of the unsatisfactory oil lamps a quantity of brilliant incandescent lamps illuminate every corner of the car, so that it is as easy to read by night as by day. The light in its satisfactory qualities compares with gas. The element of safety is also of importance. The danger of fire is the greatest dread attaching to a collision or upset of a train. This danger is greatly increased by kerosene lamps, and it is far from certain that a high pressure gas reservoir may not be an element of risk in a disaster of this class. The electric light would seem the safest of all. The danger of the production of an arc is certainly quite remote. The first action of a collision would be to break some of the electric light leads and cut off the current entirely. It would be very exceptional for the conditions for an incendiary arc to be brought about. At the same time, this is among the possibilities.

The electric light leads are connected between the cars by an extremely simple arrangement. Two half cylinders, whose faces form the contact plates, are held together in a spiral spring socket. This secures them so that no shaking can detach them; while a direct pull, as by the cars uncoupling, will draw them apart without injury. For the steam coupling a species of union or faced joint is employed, held together by a screw and yoke. The joint is a metal to metal one, packing being dispensed with. It is so well made that the faces can be turned or twisted upon each other while the steam pressure is on without an escape. A self-acting plate or valve drops over and above the opening when the line is uncoupled, to exclude sand and dirt. This coupling is of the simplest description, and does away with one of the difficulties of the problem.

The plant we have illustrated is now at work on one of the trains of the Connecticut River Railroad. It forms at least an interesting study of the subject of car lighting, and in its combination of storage batteries and dynamo indicates a distinct step in advance. Sooner or later the electric lighting of cars, like the block system of running trains and safe car heating, must be introduced on our leading roads. Once introduced, they will have come to stay.

A New Heat Measurer.

Mr. C. Vernon Boys exhibited an instrument which he terms the radiomicrometer to the Royal Society, March 24. The instrument is a modification of one invented by M. D'Arsonval, and consists of a minute thermal junction forming one side of a parallelogram of which the other three sides are of copper. This thermo-electric circuit is suspended between the poles of a magnet. It is evident that when radiant heat falls upon the thermo-electric junction forming one side of the parallelogram, an electrical current is formed which turns in the magnetic field, where it is placed so as to include the greatest number of lines of force. The parallelogram made by Mr. Boys embraced one square centimeter. The thermo-electric junction consisted of a bar of antimony and of bismuth, each piece being $5 \times 5 \times \frac{1}{6}$ mm., soldered edge to edge. The circuit was supported by a torsion fiber and provided with a little mirror. With a magnetic field of only 100 units the instrument showed the heat which would be cast on a halfpenny by a candle flame at a distance of 1,168 feet. With a stronger magnetic field the instrument is capable of a much greater sensitiveness. The author calculates that an instrument can be made which would show a change of temperature at the junction of $\frac{1}{10000000}$ of a degree of heat. Mr. Boys also showed a motor which consisted of a cross, the center being antimony and the arms bismuth. To the ends of the arms are soldered four copper wires, the three ends of which are joined by a ring of copper. When the spark from a blown-out match is held near this arrangement, it rotates rapidly. If the spark is held on the right-hand side of the north pole, the motor revolves indifferently in either direction. If the spark is held on the left-hand side, the motor stops. "We have, therefore, an electro-magnetic motor which goes having neither sliding nor liquid contacts."—*Nature.*

The First Lightning Rod.

If we are to believe an Austrian paper, says *La Lumiere Electrique*, the first lightning rod was not constructed by Franklin, but by a monk of Seuftenberg, in Bohemia, named Prohop Diwisch, who installed an apparatus the 15th of June, 1754, in the garden of the curate of Prenditz (Moravia). The apparatus was composed of a pole surmounted by an iron rod supporting twelve curved up branches, and terminating in as many metallic boxes, filled with iron ore and closed by a boxwood cover, traversed by 27 sharp iron points, which plunged at their base in the ore. All the system was united to the earth by a large chain. The enemies of Diwisch, jealous of his success at the court of Vienna, excited the peasants of the locality against him, and under the pretext that his lightning rod was the cause of the great drought, they made him take down the lightning rod which he had utilized for six years. What is most curious is the form of this first lightning rod, which was of multiple points like the one which M. Melseu afterward invented.

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NEW YORK, SATURDAY, SEPTEMBER 10, 1887.

Contents.

(Illustrated articles are marked with an asterisk.)

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 610,

For the Week Ending September 10, 1887.

Price 10 cents. For sale by all newsdealers.

RESTRICTED IMMIGRATION.

It is agreed all around that unrestricted immigration is becoming too much of a good thing for this country, and that the immigration laws should be thoroughly revised, with the view of regulating the coming of foreigners to our shores. The reasons urged against unrestricted immigration are, first, the great increase of crime which is directly traceable to that element in our population proved to be alien to our institutions and unused to our atmosphere of liberty. The statistics collated by Rev. Frederick H. Wines indicate an alarming increase of crime ever since immigrants began to come from Europe in great numbers. This authority has made it pretty evident that in seven States, containing nearly 15,000,000 of the population of the United States, there has been a proportional increase of commitments to State prisons and penitentiaries, from 1820 to 1880, vastly greater than the growth in population.

In New York City, where immigrants delight to herd together, instead of going westward, the police last year made 74,035 arrests, which gives 1 arrest for every 20 persons. Making allowance for those who were arrested more than once, we can still assume that 1 out of every 25 was arrested last year; while the number of persons who had committed crimes but have escaped the clutches of the law is not known. This is a record that should move the serious attention of every patriot to a consideration of an efficient and speedy remedy.

Secondly, the increase of the death rate in the United States, and especially in New York, is said to be largely due to unrestricted immigration. Dr. Eklund, of Stockholm, makes the startling statement that the infants dying under one year of age in the United States average fifty per cent of the number born, while in Europe the death rate of infants under one year of age is twenty-five per cent of all deaths. He attributes this high death rate in America to the fact that "the European defective classes, whose natality and infantile death rates are enormous, are forcibly exported in great numbers to this country."

The *Medical Record* virtually indorses his statement by acknowledging that "it is very true that the numbers of our sick and defective classes are enormously swollen by the immense tide of immigration. It is safe to say that four-fifths of the infant mortality is among the children of the immigrants."

Thirdly, it is said in favor of restricted immigration that the immigrants' opportunity for getting employment is now less than it was fifteen years ago, when there was much railroad building and great industrial expansion. This is not so easily proved as the first two statements. For it is absurd to say that a man's opportunity to obtain work is less now because fewer railroads are in process of construction, when there is plenty of capital lying idle waiting for good investments, and an immense tract of country ready to receive the plow of the sober and industrious husbandman. The reason why a laboring man has not the same chance to make a living now as he did fifteen years ago is because of the disturbances in the labor market—the strikes, the boycottings, and the attacks on others' right to work, of which labor organizations have been guilty. The fault, then, lies in the *character* of workingmen themselves, and *not* in the supposed industrial decline of this growing country. But, as the lately arrived immigrant is generally the most discontented of laborers, the conclusion is easily reached that unrestricted immigration is chargeable with most of the labor troubles, which have resulted disastrously for laborer and capitalist alike, although the latter can stand it much longer than the former.

In view of these facts, there can be hardly any difference of opinion concerning the *necessity* of building a breakwater to resist the tide of immigration by legislative enactments and rigorous execution of the same. But in regard to the minor details, the *modus operandi*, there is likely to be much diversity of opinion. We do not wish to exclude those industrious and sober people whose intention is to seek honest work in America. On the other hand, Uncle Sam decidedly objects to having his substance eaten up, and the safety of his house threatened by organ grinders, beggars, tramps, socialists, anarchists, and other parasites of society. We must draw the line somewhere. It is not hard to determine where we ought to draw it, but how to make the rule work is another matter. It would be the wiser part to leave the details to those who have given the subject the most careful consideration. We would simply and humbly suggest that our consular service can be expanded so as to include among its duties that of ascertaining and certifying to the condition, character, and intentions of all who desire to come to America in the quality of immigrants.

BRITISH NAVAL MANEUVERS.

The recent maneuvers of the British fleet did little to encourage those who pin their faith to monster ships and heavy armor. Indeed, even the unbelievers in this type were scarcely prepared for the sorry spectacle presented by the mightiest fleet afloat, for in the Irish Channel, where Admiral Baird essayed to defend the shore line against the assault of Fitzroy, and again in the English Channel and North Sea, when Hewitt

sought to pierce the line of Freemantle, the big ships proved at best both awkward and uncertain.

There were several collisions and many breakdowns; in all a dozen ships out of two score were disabled by their own exertions, or gave out from lack of coal during the fortnight of evolution. The great ships Ajax and Devastation crashed into each other early in the day, and it was only by quick work, and what must be regarded as good luck, that the latter did not go down. As it was, she was badly listed over on to her side, with her guards under; something heavy in the way of machinery having been sent adrift below. The Ajax was disabled and lay like a dead whale in everybody's way, and a constant menace to all. The new steel cruiser Curfew, from which so much was expected, was so awkward to handle and so slovenly in minding her helm that, when the report came, she had broken down, and powerful tugs were sent by Admiral Hewitt to tow her into port, a sigh of relief must have gone up among the fleet, for, from the descriptions given of her movements, she seems to have been as deadly as an iceberg, quite as dangerous to friend as enemy, and required a whole ocean to herself. Then there was the Colossus, of which so much has been written—the floating fortress, carrying enough power to cripple a fleet! Unless she can do better than her recent performance promises, no fleet need fear her, for, in order to sustain injury, it would have to come up and considerately lie to, possessing itself in patience while the really formidable battery was trained; for it is said to have taken an hour and thirty minutes to work the Colossus into position and load, train, and fire the after guns on the port side. After firing one round, the big ship fell back disabled, and lay helpless in the tideway.

The Terror might not inappropriately be renamed the False Alarm, and the Imperieuse, the Impotent; for the former on two occasions thundered down upon the enemy, and, when at point blank range, was unable to train her battery till she had passed the target, having then to run over a circle of a mile's diameter to get around again into position, while the Imperieuse fell out of line because running short of coal—bless the mark! And when again her bunkers were full, she was so slovenly in a cross sea as to be well nigh unmanageable.

When we remember that the rate of speed at which the ships were working was only *seven knots an hour*, and that, notwithstanding they were within easy reach of a great coaling station, several of them ran short of coal while maneuvering, we cannot help wondering what would happen such a fleet fighting in mid-ocean! It may safely be said that if the result of the fortnight's maneuvers is a fair exponent of what a fleet of monster ships are capable of, we need have little fear of attack by such vessels on this side the water. Few of these large ships could carry anything like enough coal to bring her across, and those so capable would be compelled to coal at some station here before ready for aggression or, barring that supply, be unable to get home again. Hence, blockade or capture of the coaling stations would render such a fleet harmless.

It ought to be said for the officers in command of this great fleet that they are as capable a lot of men and as able seamen as can be picked up on the ocean. Experienced, too, they are in all manner of novel machinery and war material, used to working modern ships, and, quite as important, familiar with the waters they sail in. It was no fault of theirs that some of the monsters they commanded carried weather helms with wheels hard over, or, as was the case with another, parted the shaft while trying to work head up to wind with engines of 8,000 horse power. All attempts to form line of battle, whether in the form of column, crescent, or wedge, were fairly unavailing from a naval standpoint, because the time occupied was so prolonged as to give a quick-witted enemy opportunity to anticipate the maneuvers and evade the shock. The big ships on several occasions rammed one another while getting into line, and breakdowns and demands for assistance marked the most important maneuvers. This was no fault of the commanders, but of the ships; being built to carry great batteries and bear ponderous armor rather than for seaworthiness and rapid movement.

History tells us that when that hardy old landsman-sailor Blake came up with the Dutch Admiral Van Tromp, off the Hague, he set his signal for close order for a hand to hand encounter, and we are told that not a captain failed to bring up his ship clear; and the great Nelson, in the Victory, which, by the way, still lies in Portsmouth harbor, and was a witness of part of the recent maneuvers, saw every ship run free of its neighbor when at Trafalgar he gave his order to "Advance the line!"

It is not difficult to guess what would happen should such a fleet as that recently maneuvered in British waters suddenly get an order to form line say in crescent, as was Van Tromp's when protecting the Dutch East Indian fleet, or in double column, as was the British when bearing down upon the Spanish Armada. There would, like enough, be some sharp and destructive internecine work before the enemy was reached. The work of the torpedo and torpedo boat, from which so much is—not unreasonably—expected in future naval wars, seems to have been purposely underestimated at the maneuvers this year, as it was in the French maneuvers last year, for fear of shaking the sailor's faith in the impregnability of the ships he sails in. A splendid fleet of torpedo boats lay fairly inactive in the Irish Channel while Fitzroy thundered away at Baird's retreating ships, while, had they really meant business, a serious torpedo boat attack, if it did not blow up or beat off his ships, would, at least, have served to dampen his ardor and disturb his aim.

The Kindling Wood Industry, New York.

At the corner of Eighteenth Street and Avenue B is located one of the largest kindling wood factories in the world. The factory can turn out seventy cords of wood per day, sawed, split, and ready for the burning. Oak, pine, and hemlock are fed to singing buzz saws and insatiable chopping knives. The hickory is brought from the northern part of this State and from Connecticut and Pennsylvania. It is mostly burned in open fires, and is cut in pieces from eight to forty-eight inches in length. Hickory is worth $18 per cord piled in the cellar. Five vessels, with a combined capacity of 1,275 tons, are constantly employed bringing pine from Virginia to the factory. These vessels make twenty trips each during the year.

The oak is grown in this State and Connecticut, and the hemlock comes from the lumber districts of New York State. Hemlock is brought to this city in strips about four feet long and one and one-half inches square. These strips are put into a machine run by steam, which, at one revolution of sixteen saws, cuts them into pieces three inches in length. These pieces are then dumped into a big wooden hopper around the edges of which are ranged benches. Into these benches are set oval iron machines operated by steam by means of a treadle.

Men are paid at the rate of 25 cents a hundred bundles for forming the wood into bundles and tying it with tarred rope. The machine presses the pieces of wood so closely together that the rope often cuts into the wood. Six hundred bundles a day is considered a fair days' work for a man, although an exceptionally quick workman has been known to put 800 bundles together. Over one of the machines hangs this legend:

We work for cash,
And not for fun;
And want our pay
When the work is done.

Upon a rail hangs a dilapidated tin pail, which hides this warning:

This can is not to be lent outside of this shop. The can is never rusty inside.

The wood in the bundles sold in the grocery stores containing pieces nine inches in length is cut with a buzz saw and fed into a machine which carries the sawed pieces under a knife like the letter X. This knife cuts as much wood in fifteen minutes as a darky could chop in a day.

From May till October very little business is done at the factory. The sale of oak wood has fallen off greatly during the past few years. Cut oak wood is worth $14.50 a cord. Pine brings the same price. There are about 128 cubic feet of wood in an ordinary stick of pine timber.—*New York Sun.*

Soiree of the Royal Society.

The recent ladies' *soiree* at the Royal Society, London, was largely attended. Careful preparations had been made for it, and it was a great success. At intervals, in the principal library, a cornet solo was telephoned from Brighton. A large number of objects of great scientific interest were exhibited. Photographs of clouds and photographs of the Firth of Forth Bridge were shown with the lime light; the former with demonstrations by the Hon. Ralph Abercromby, the latter with demonstrations by Mr. Baker. The microscopic structure of pearls was also shown with the lime light, by Dr. George Harley. The Zoological Society of London exhibited a fine living specimen of the electric eel, from which shocks were taken. Professor A. W. Rucker exhibited—1. Colors of soap films rotating under the influence of an air current. A jet of air is directed on to the film so as to form a vortex, the colors of which change as the film becomes thinner. This experiment is due to Sir David Brewster. Attention has been recently called to it by Lord Rayleigh. 2. Artificial imitation of the colors of the setting sun. Light is passed through a glass cell containing a solution of sodium hyposulphite. If a little hydrochloric acid is added, the sulphur is deposited in fine particles which scatter the blue end of the spectrum. The transmitted light becomes redder, and colors like those of sunset are produced. This experiment is due to Captain Abney. 3. Apparatus to illustrate the passage of light through lenses. An application on a large scale of the method of tracing the rays by passing them through air in a closed space charged with a small quantity of smoke. Chrysalides and living larvæ showing the influence of surroundings upon their colors were exhibited by Mr. E. B. Poulton; and Dr. E. Klein exhibited the following specimens of microbes under the microscope and in cultivation: *Bacillus anthracis; Bacillus tuberculosis;* bacillus of leprosy; bacillus of swine fever; bacillus of septicæmia; bacillus found in typhoid fever; spirillum found in Asiatic cholera; several other species of spirilla; several species of *Bacterium termo;* micrococcus of foot and mouth disease; micrococcus of scarlet fever; micrococcus of vaccine; different species of colored microbes. Mr. Chichester A. Bell showed apparatus for reproducing audibly the vibrations of liquid jets. Vibratory motions of the orifice from which a liquid jet escapes give rise to slight swellings and constrictions of the liquid column. The swellings increase and the constrictions diminish as the jet travels downward, finally causing it to break into drops. When the jet strikes upon a flat surface, the swellings are continued as waves in the thin sheet of liquid, which spreads out from the point of impact. The jet liquid being a conductor of electricity (acidulated water), and two platinum electrodes in circuit with a battery, and a telephone being immersed in the liquid sheet or nappe, the jet vibrations are reproduced as sound in the telephone.—*Nature.*

Mountant for Photographs.

A really good medium for mounting photographs is a thing still to be desired, for although there are many in the market, each has some drawbacks. Most of them cockle the print, and one or two smell most abominably. Some time since, Mr. John Spiller recommended a mixture of gum water and glue, for which he claims several advantages. The interval which elapses before the mixture sets is much longer than with plain glue, and the compound is so pale in color that any excess can be wiped from the edge of the mounted print by moistened cotton wool, without leaving a stain on the mounting card. Here is the method of compounding this mountant:

Equal weights of best glue—we presume that a good, hard gelatine would answer the same purpose—and gum arabic are separately soaked in cold water. The gum will dissolve altogether, but the glue will swell up by absorption of water. The latter is then transferred to a water bath or glue pot, and when it is perfectly liquefied, the solution of gum is added to it. Thoroughly stir, strain through muslin, and bottle off for use. The compound must be warmed before application to the print, and a stiff brush should be used, so as to insure a thin, even coat upon the paper.—*The Camera.*

The Great Southern Comet (1887 a).

Dr. J. M. Thome, of the Cordoba Observatory, has published in the *Astronomical Journal*, No. 156, some interesting particulars as to the appearance and observed positions of the great comet which he discovered on January 18. On the 21st it became evident that the comet was, in effect, all tail, the head being much the fainter part of the object, and being at least 15′ in diameter, very thin, and without nucleus or condensation of any kind. After various attempts at determining its co-ordinates, Dr. Thome adopted the plan of moving the telescope along the axis of the tail until reaching a point beyond which nothing of a nebulous character could be distinguished, and determining its position. These points were approximately half a degree in advance of the true center of the nebulosity and nearly in its axis. The observations of position extend from January 21 to January 27. With regard to the appearance of the comet to the naked eye, Dr. Thome remarks that it was a beautiful sight—a narrow, straight, sharply defined graceful tail, over 40° long, shining with a soft, starry light against the dark sky, beginning apparently without a head, and gradually widening and fading as it extended upward.

Friction on Railways.

The Brake Committee of the Master Car Builders' Association (Burlington tests) says:

Your committee believe from these experiments that the following figures represent the frictional resistance of long trains of freight cars, in good repair, running over a track in good condition, the weather being fine and warm, and the wind light. The resistance appears to be constant at speeds of from 12 to 25 miles per hour, and does not appreciably increase with an increase of speed within these limits.

Frictional Resistance, pounds per ton of 2,000 *pounds.—Speed* 12 *to* 25 *miles per hour.*

	New cars.	Old cars.
	lb.	lb.
On tangent	8·00	6·00
On 3° curve	10·50	8·30

Good lubrication and carefully fitted boxes and journals may, with cars that have been running some time, decrease this resistance to a minimum of 4 lb. per ton on the tangent, while brake shoes rubbing against the wheels, and other unfavorable conditions, may increase the friction on the tangent to 12 lb. per ton, and to considerably more on curves. The use of outside-hung shoes seems to increase the resistance on curves when the shoes are very near the wheels.

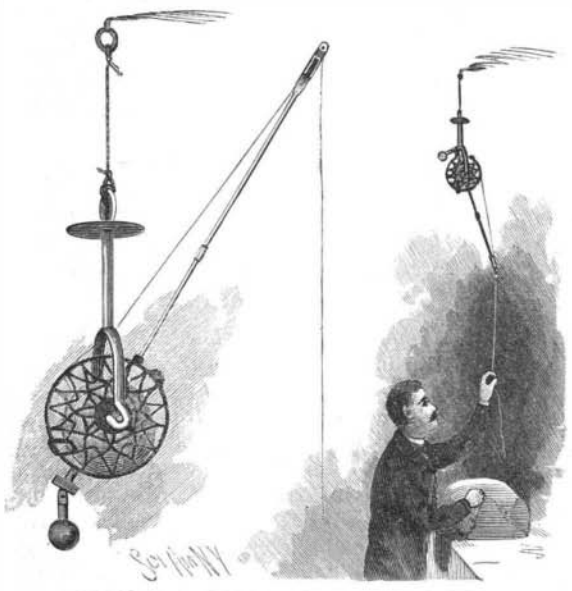
Lunar Eclipse.

The eclipse of the moon on August 3 was visible in England. In London the night was clear, and the middle and subsequent stages of the eclipse were very plainly perceptible. The middle stage occurred at 8 h. 49 m., rather more than one-third of the moon being hidden. The time of last contact with the shadow and penumbra were 10 h. 2 m. and 11 h. 26 m., respectively.

"Except for brief intervals the sky was clouded in the Berlin district at the time of the partial eclipse of the moon this evening. The eclipse began at 8 h. 29 m., and the maximum stage was reached at 9 h. 42 m., when five-twelfths of the moon's surface was obscured; the eclipse being over at 10 h. 56 m."

AN IMPROVED OVERHEAD TWINE HOLDER.

A revolving twine holder that is adapted to lift the loose hanging end up out of the way is shown in the accompanying illustration, and has been patented by Mr. Thomas Porter, of No. 1229 Cherry Street, Philadelphia, Pa. The cage or holder is hung by gudgeons in a stirrup-like hanger, so that the holder may be readily rotated. A short arm, weighted, projects from one side of the cage, and opposite thereto projects a



PORTER'S TWINE HOLDER AND LIFTER.

rod which lifts the slack of the twine, and operates to make some tension thereon as the twine is drawn out. When drawing on the pendent portion of the twine, as for use in tying a parcel, the lifting rod is drawn down and the short, weighted arm carried around to the top of the cage, as shown in one of the views, the other figure showing the normal position of the holder, with the end of the cord drawn up out of the way when not in use. The disk above the holder forms a guard for the lifting arm or rod to strike against when the twine is severed after tying the parcel, to keep the rod at a good working angle to lower when pulled down upon by the free end of the twine.

THE BRUSH TURKEY (*Talegallus lathami*).

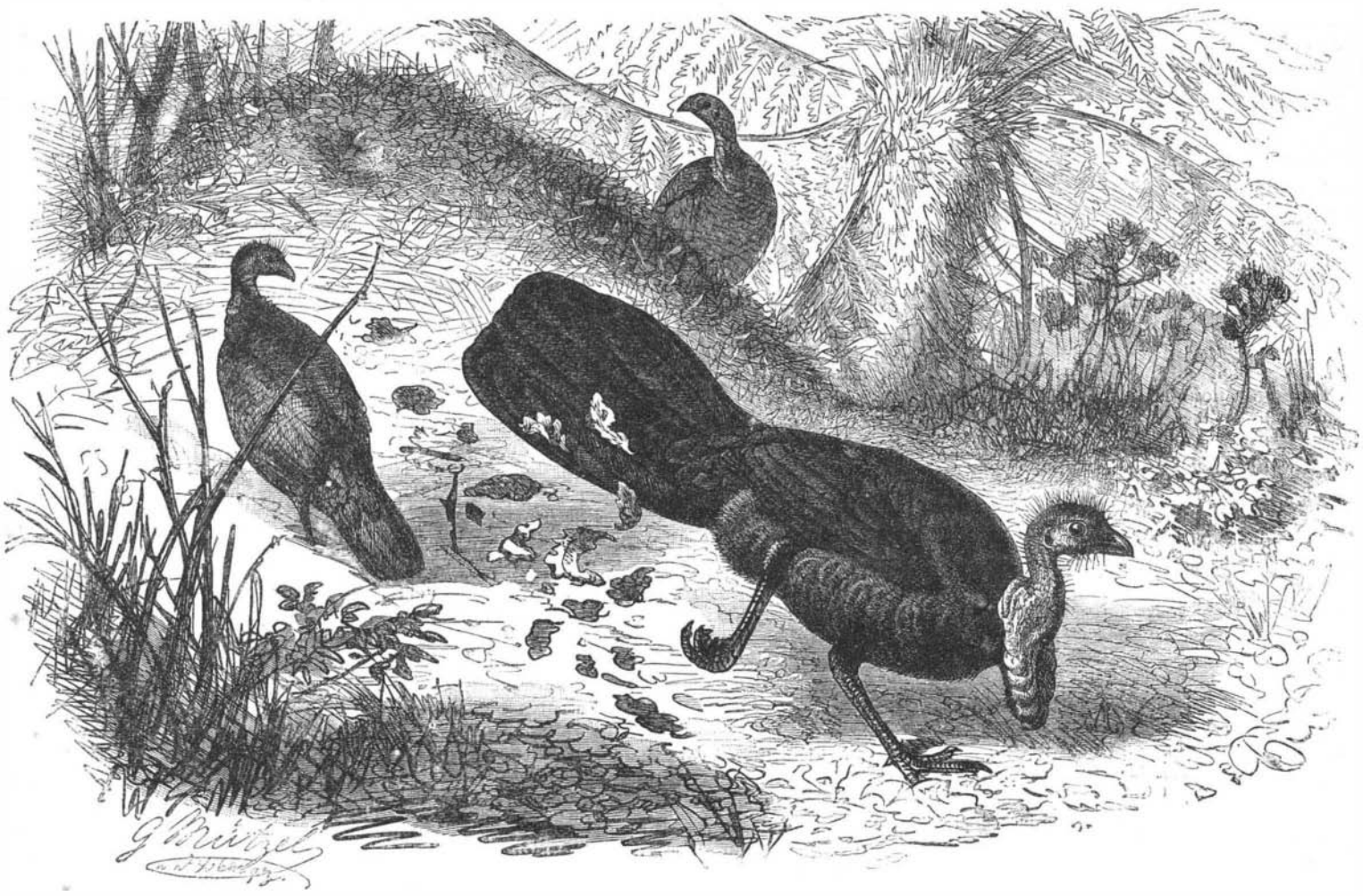
"All birds hatch their eggs." Zoology knows very few exceptions to this rule, and although old works on natural history state that the sun relieves the ostrich of this duty, it is now known that she attends to the work most conscientiously. Only the cuckoo succeeds in shirking this business entirely, leaving her little ones to the mercy of kind-hearted little singers. Besides this bird, we may mention the brush turkey as one which does not hatch its eggs, but it is more conscientious about the matter than the cuckoo.

The brush turkey (*Talegallus lathami*) is a powerful bird, attaining a size of about 31 inches, and can be recognized by its powerful build, rather long neck, large head, sharp bent beak, strong feet, and short, rounded wings. The scarlet of the featherless neck and the yellow pouch dependent therefrom stand out in decided contrast to the brown plumage. The home of the brush turkey is in the thick forests of Australia (New South Wales), where they live in flocks. Their flesh is very excellent, and they are hunted to such an extent that their extermination is only a question of time.

Judging from the size of their brains, one would not expect these turkeys to be very intelligent, but the way in which they hatch their eggs is so peculiar as to give a favorable impression of their capacity for thought. At mating time (in the spring) the male develops a surprising amount of activity and industry. He picks out a sheltered spot for a nest, and then goes to work to build a mount. With his strong feet he throws a quantity of leaves, fibers of wood, small twigs, dry grass, etc., into a heap behind him, and this forms the center of a large circle, the periphery of which soon appears perfectly clean; and a mound about a yard and a half high is built. While other birds go at once to their newly prepared homes and begin to lay their eggs, the brush turkey pursues an entirely different course. The wise creature waits several weeks until the fermentation and decomposition of the vegetable matter in the heap has generated a heat of about 104° F., the temperature required for either natural or artificial hatching of eggs.

It is wonderful to see with what certainty the birds determine upon the proper time. The male often mounts the nest to examine it, scrapes off a little here and a little there, and then covers the places over again carefully. When he finds that the temperature of the mass is what it should be, he digs numerous holes about the axis of the mound, and in each one of these holes the female drops an egg with the blunt end up. After the male has closed these holes both birds go away, the male only returning from time to time to regulate the heat, covering the eggs more or less, according to the moisture and temperature of the atmosphere. After about three weeks, the young are hatched. They are entirely covered with feathers, their wings are well developed, and they seem as strong as our domestic chickens. The whole process reminds one of the development of the butterfly, which is able to fly soon after leaving the chrysalis.

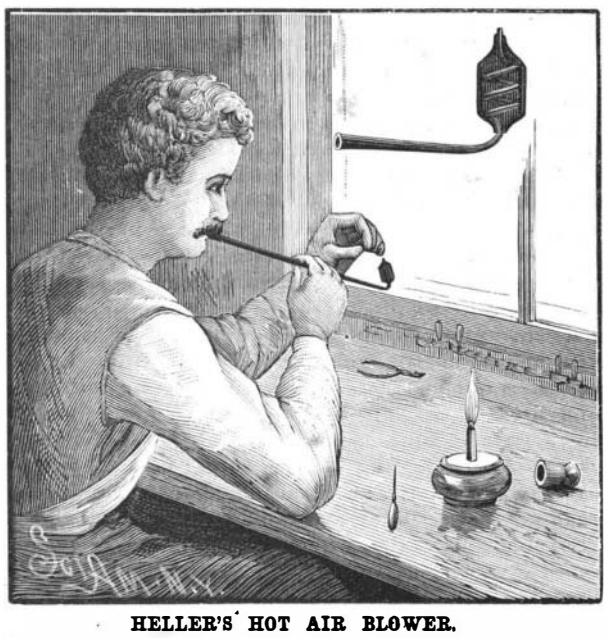
After about twelve hours the young brush turkeys appear merry and active, wandering about with their parents, but in the afternoon they are buried in the nest again by their careful father. On the third day they are able to fly, and after that are perfectly independent. Their process of hatching has been repeatedly carried out by brush turkeys in captivity, as, for instance, in the Berlin Zoological Garden, when they formed the center of attraction for friends and students of zoology.—*Deutsche Illustrirte Zeitung.*



THE BRUSH TURKEY (TALEGALLUS LATHAMI).

A DEVICE FOR HEATING A JET OF AIR.

A tool to be used for the heating of shellac, etc., as employed in the setting of jewels, pallet stones, and similar work, is shown in the accompanying illustration, and has been patented by Mr. Frank Heller, of Oakland City, Ind. It is made by forming twists or coils in the discharge end of a blowpipe, and surrounding these twists or coils by a ball or jacket of metal, the nozzle projecting outward through a proper opening. This ball or jacket of metal having been previously heated, the air forced through a tortuous course within such body of heated metal affords a hot blast, which may be delivered against the shellac without subjecting the surrounding parts to the action of the flame by which the heat is produced.



HELLER'S HOT AIR BLOWER.

STENCIL INK.—A good basis for stencil ink is made with shellac 2 ounces, borax 2 ounces, water 25 ounces, and gum arabic 2 ounces. Boil the borax, shellac, and some water until they are dissolved, add the gum arabic, and withdraw from the fire. When the solution has become cold, complete 25 ounces with water. For black ink use fine lampblack, for red Venetian red, and for blue ultramarine and chalk. Add these to the basis in sufficient quantity to make the mixture of proper consistency.