A BALL OF BIRDS.

It may perhaps be adduced as one of the most remarkable of the many curious and often inexplicable habits common to the lower animals of widely differing classes, the practice of forming themselves into balls or clusters, as is the case with bees, starfish, some kinds of bats, and at least two species of birds. One of these species is a swallow, found in Van Dieman's Land, the other, the subject of our present illustration, the mouse bird (*Colius Senegalensis*) of Central and Southern Africa. These strange little creatures, according to Le Vaillant, who describes them, generally live in small companies of five or six individuals, and generally select a densely foliaged tree, or thick mass of bushes for their gathering place. "Only those who have visited Africa," says Brehm, "and become acquainted with the remarkable characteristics of its luxuriant vegetation, can realize the actual appearance of the haunts thus selected as cities of refuge by these most strange and mouse-like creatures." Our readers must therefore try to picture to themselves a gigantic tree, with dense and usually thorny foliage, so interwoven with and embedded in the parasitical plants that grow around it as to be nearly concealed from view. In this green mass, which is impenetrable to man and beast, and even impervious to the attacks of the sportsman, the mouse birds make their home, creeping, like the animal whose name they bear, through such tiny and invisible crevices as to lead the spectator to imagine they have actually vanished from his sight, when suddenly a little head appears, and the bird makes its exit from the hole by which it entered. How they manage to creep in and out such of small apertures seems quite inexplicable. Le Vaillant describes their motions, while accomplishing this curious performance as being extraordinarily rapid. Their flight is performed with wings and tail outspread. While in the air, the whole party constantly utter their shrill cries, which are accompanied by a peculiar chirping sound. They but seldom rise to any great height while on the wing, and still more seldom settle on the ground. But the most extraordinary circumstance connected with these birds is the fact illustrated in the accompanying drawing of the habit they have of hanging on the branches in clumps like bees when swarming.

Peneaux, who verifies this statement of Le Vaillant, also mentions having seen them clinging to each other while asleep, the first bird holding on to the branch with one foot, while it supports a second bird by entwining one of the latter's legs with its own free limb; this second bird, in a like manner, supporting a third, and so on until they form a chain that often contains as many as six or seven of these living links.

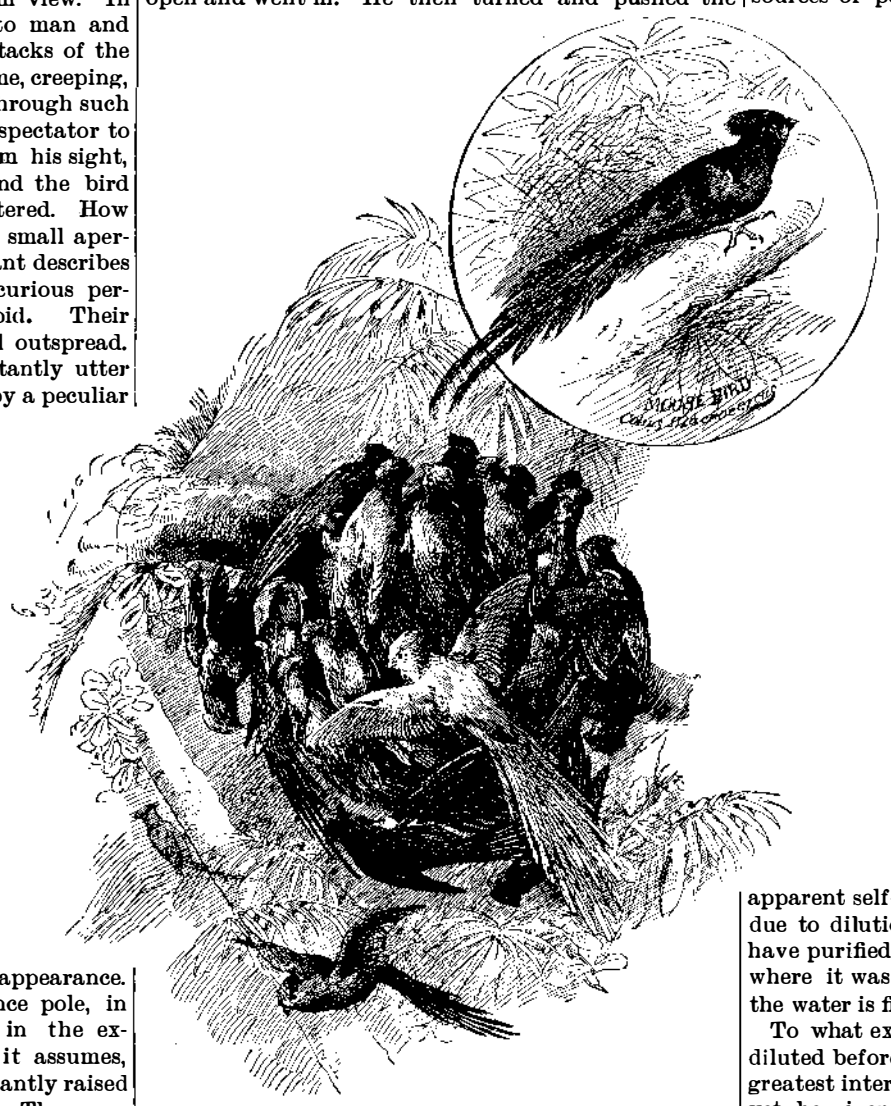
It is a very handsome bird, and, as it plays about the branches, has an elegant appearance. Its long tail seeming to act as the balance pole, in the hands of a tight rope performer, in the extraordinary and varied attitudes which it assumes, and its highly movable crest being incessantly raised or depressed, gives it a very spirited aspect. The grasp of its feet is, of course, very powerful; but owing to their formation, which is entirely or almost wholly formed for grasping, it is in its way nearly as awkward as a sloth, whose feet are also made only for grasping. When upon the ground, among the boughs, however, it is as far from being slothful as it is possible to conceive, leaping about, all life and energy, with the quick vivacity that reminds the observer of the common long tailed titmouse. In lowering themselves from one branch to another, and in climbing, the mouse bird uses his beak to aid him, after the well known practice of the parrots.

The mouse bird is far from shy, and is easily captured.

Le Vaillant says that in common with other members of the same family, that are fond of sleeping in the singular fashion adopted by these birds, they can often be found in the early morning so benumbed and drowsy that they can be taken with the hand before aroused sufficiently to loosen their hold from the bough they grasp so firmly. Their food appears to be limited to vegetable diet. The fruit of the plant called Christ's thorn affords them their principal subsistence, says Bichur; but they will also devour grapes, limes, and cactus figs, getting at them after the manner of a titmouse, by climbing over their surface.

At the Cape of Good Hope these birds are looked upon as formidable depredators. They occur at that locality in great numbers, and what renders it extremely difficult to guard against their attacks upon the ripening fruit and corn is that nets or similar precautions found effectual with other members of the feathered tribes are absolutely useless to prevent their incursions, if they have cast their eyes upon a tempting-looking supply of food, for they are perfectly fearless of scarecrows or such matters, and if an aperture exists, however small, their lithe, elastic bodies can penetrate it with the utmost ease.

The nests of the mouse birds are large and rounded, and are generally placed close together, five or six being found on the same branch. They are formed of roots of various kinds, cotton, wool, grass, and leaves. The brood consists of from three to seven eggs. The flesh of these birds, when fat and in good condition, is said to be excellent, and large numbers of them are shot at the Cape for the table. In size, the mouse bird is about equal to our common blackbird.



A living ball of birds

Canine Reason.

S. N. Maxcy, of Gardiner, Me., has a black and tan dog which is very intelligent. He has all the accomplishments a common dog has, and knows several besides. The screen door of the house opens outward, and Dick can open it from the outside, pulling it with his teeth. The other day he approached the door with a bone in his mouth. He couldn't open the door while he held the bone, and if he couldn't have the bone he didn't care to open it. He looked at it a minute, then laying the bone down near the door, pulled the door open and went in. He then turned and pushed the door wide open, and before it could swing to again, had grabbed up his bone and got inside.—*Exchange.*

A bird dog owned in this town, though we doubt much if he has been shot over, is in the habit of making furious dashes at the doves feeding in the streets, and of course the birds are too quick for him. The other day he watched his opportunity in this wise: The dog saw the doves, and also saw a team approaching; he waited until the team was between himself and the birds, then he made a tremendous rush between the wheels, and the birds, not seeing his first leap, were taken in a heap of surprise, and one dove was nearly captured.

Both these cases look a trifle like an exercise of the reasoning power.

Dr. C. A. Packard, of Bath, owns a setter of very fine blood, when young a capital bird dog, but too old now to hunt. He runs with the carrriage for short drives occasionally. One day, when on the road, poor Flash had the misfortune to nearly tear out one of his nails, and the doctor was obliged to use the bone forceps to remove the nail. Flash stood the operation "like a major," never wincing. Not long after this the doctor heard the well-recognized rap of Flash on the office door for admission. It was opened, and in came Flash, accompanied by a small dog with a bad wound upon one leg, and Flash brought the dog up before his master. The doctor attended to the binding up of the leg, and then Flash went out with his little friend, probably seeing him home.—*Brunswick Telegraph.*

[Flash, whom we have known for years, is a well-trained Irish setter, and is a dog of unusual docility and intelligence.—ED.]—*Amer. Naturalist.*

Dangers of Polluted Water.

Dr. Willis G. Tucker, in a paper read before the Albany Institute, says: As regards the natural purification of polluted waters, while the tendency of all organic matter, animal or vegetable, is toward ultimate death and final destruction by oxidation, it is as yet impossible to say how rapidly such a destruction goes on in many cases. The Rivers Pollution Commission mixed urine with water, in the proportion of one part of urine to 3,077 of water, agitated the mixture from time to time, and analyzed samples. At the end of the eleventh day the improvement in the water was so inconsiderable that other experiments were made in which a stream of impure water was allowed to flow from one vessel to another, and was thus freely exposed to the air, and as a result of these experiments the commissioners concluded that purification by natural oxidation had been greatly overrated, and that "there is no river in the United Kingdom long enough to secure the oxidation and destruction of any sewage which may be discharged into it, even at its source." They also conclude that "rivers which have received sewage, even if that sewage has been purified before its discharge, are not safe sources of potable water." (Rivers Pollution Commissioners' 6th Report, pp. 134–8.) Upon this point Frankland says: "Twelve years ago there was a general impression among chemists and others that polluted water quickly regained its original purity by spontaneous oxidation. The opinion had no foundation in quantitative observations; indeed, there was not a single experimental fact to prove it. . . . The impression had gained currency from the improved appearance of a polluted river after a flow of a few miles. . . . Two classes of persons strongly interested in its acceptance were chiefly instrumental in the origination and diffusion of this opinion. These were, first, the polluters of running water, and, secondly, water companies drawing their supplies from below the sewer outfalls of towns." (*Journal Chemical Society*, May and July, 1880.) Such improvement as does take place in running streams probably depends more upon the part played by fresh water plants and micro-organisms than upon direct chemical oxidation, and of course no accurate conclusions can be reached as to the effect of these varying and little understood agencies. Mere dilution also doubtless accounts for the apparent disappearance of much noxious matter. Professor William Ripley Nichols, in his Water Supply, italicizes the following statement: "The apparent self-purification of running streams is largely due to dilution, and the fact that a river seems to have purified itself at a certain distance below a point where it was certainly polluted is no guarantee that the water is fit for domestic use."

To what extent, therefore, must a polluted water be diluted before it is safe to use, is a question of the greatest interest, but one to which no answer can as yet be given. Nor can we prove that the specific poisons of certain diseases—admitting their existence—may not contain living organisms capable of rapid multiplication, nor can we tell for how long a period or under what conditions these organisms may retain their vitality. In this absence of positive knowledge, but in the light of countless facts which all but prove our suppositions true, we had best err, if err we must, on the safe side, avoiding the use of polluted waters and recognizing the fact that, although chemical analysis may detect no impurities in a water, it is not, therefore, necessarily safe to drink.

Influence of Magnetism on Chemical Reaction.

Mr. E. L. Nichols, in the *Journal of the Chemical Society*, describes a set of experiments with aqua regia, nitric acid, hydrochloric acid, and sulphuric acid to illustrate the phenomenon that when finely divided iron is placed in a magnetic field of considerable intensity and exposed to the action of the acid, the chemical reaction differs in several respects from that which occurs under ordinary circumstances. With aqua regia, it was found that the speed of reaction is greater in the magnetic field than without, and that the heat of chemical union is much greater. With nitric acid, the effect of the magnet was to greatly increase the speed, reducing the average time from eight minutes to less than one minute. With sulphuric acid, the reaction was uniform and complete, and apparently of the same chemical character within and without the fluid. The magnet was found, however, to increase the speed of reaction, and to decrease the amount of heat produced. A series of measurements was made with nitric acid, in which powdered copper was substituted for iron. The reaction in the field was found to be identical with that which occurred when the magnet was not in action.

Natural History Notes.

Action of Light upon Eyeless Animals.—In the Proceedings of the Vienna Academy, Mr. Graber describes some experiments that prove that animals deprived of eyes are sensitive to light. He took a box divided into three compartments by parallel partitions, each of which was provided with two neighboring apertures. One of these latter he covered with a piece of wood, and exposed the box to the light. In this way, half of each compartment was lighted, while the other was dark. Then he put a number of earthworms into each compartment, and distributed them as equally as possible. From time to time, he removed the cover of the box and counted the worms that were opposite the open aperture and those that were opposite the closed one. Then he distributed them equally to the right and left, and put in more every four hours. The results of several experiments were that there was a total of 210 worms in the dark parts and 40 in the lighted ones. As, at the beginning of the experiment, the worms were distributed equally over the surface of the box, Mr. Graber concluded that 85 (that is, two-fifths) had shunned the light. He likewise studied the action of different rays upon these animals, and, by employing red and blue glass, for example, found that the worms manifested a marked preference for red light.—*La Nature.*

The Development of Club Mosses.—The important investigation of Dr. Treub on the development of the *Lycopodiaceæ* is continued in the "Ann. du Jardin Botanique de Buitenzorg," vol. v., part ii., and in this part the sexual organs of *L. phlegmaria*, L., are described. They are produced invariably on the upper surface of the prothallus, and are always accompanied with paraphyses. The position of the antheridia is variable, being sometimes scattered on the branches and sometimes associated in groups, and borne on the thickened extremities of the branches. The antherozoids have two cilia and resemble those of *Selaginella.* The archegonia appear subsequently to the antheridia and occur on the thickened branches which have already borne antheridia. They project from the prothallus and have three to five canal cells. In the fact of having more than three canal cells, and in the presence of paraphyses, *L. phlegmaria* approaches the Muscineæ. The prothallus also possesses two modes of vegetative propagation, in which it bears some resemblance to the genus *Blasia* in the Hepaticæ. This adds to our knowledge of the connecting links between the Pteridophyta and Muscineæ.

Preservation of Flowers.—The *Chronique Industrielle* says that flowers may be preserved with all their brilliancy and freshness in the following way: In a well corked bottle, dissolve 6 drachms of coarsely cracked, clear gum copal, mixed with the same weight of broken glass, in 15½ ounces (by weight) of pure rectified sulphuric ether.

Soak the flowers in this mixture, take them out slowly, and expose them to the air for ten minutes; and then immerse them anew, and again expose them to the action of the air. Repeat this operation four or five times. The flowers thus treated will keep for a long time if care be taken not to handle them too much.

Curious Mimicry by a Spider.—A curious case of mimicry by a spider has been recorded by Mr. H. O. Forbes. The spider in question is found in Sumatra, and has been named *Thomisus decipiens.* On June 25, 1885, in a forest of Sumatra, Mr. Forbes' attention was excited by his "eyes resting on a bird-excreta marked leaf." On examination it was found that the appearance was deceptive, and had been produced by a spider which had so closely copied nature that the imitation would readily deceive the uncritical observer. "The spider is in general color white, spotted here and there with black; on the under side its rather irregularly shaped and prominent abdomen is almost all white—of a pure chalk white; the angles of the legs are, however, shining jet black. The spider does not make an ordinary web, but only the thinnest film on the surface of the leaf. The appearance of the excreta rather recently left by a bird on a leaf is well known. There is a pure white deposit in the center, thinning out round the margin, while in the central mass are dark portions variously disposed; as the leaf is rarely horizontal, the more liquid portions run for some distance. Now, this spider one might almost imagine to have in its rambles marked and inwardly discerned what it had observed, and had set about practicing the wrinkles gained; for it first weaves a small irregular patch of white web on some prominent leaf, then a narrow streak laid down toward its sloping margin, ending in a small knob. It then takes its place on the center of the irregular spot on its back, crosses its black angled legs over its thorax, and waits. Its pure white abdomen represents the central mass of the bird's excreta, the black legs the dark portion of the slime, while the web above described represents the more watery marginal part (become dry), even to the run-off portion with the thickened knob (which was not accidental, as it occurred in both cases), like the residue which semi-fluid substances, ending in a drop, leave on evaporation. It keeps itself in position on its back by thrusting under the web below it the spines with which the anterior upper surface of the legs is furnished."

The most interesting fact of all, in the opinion of Mr. Forbes, is "not so much that of the spider having gained, which it can, of course, have no consciousness of, by natural selection, the color and form of an excretum, but that it has acquired the habit of supplementing its own color and form by an addition in such absolute harmony with that of which itself is the similitude."

First Appearance of the Grasses.—At a meeting of the Geologists' Association, held at London, April 2, J. Starkie Gardner discussed the points bearing on the geological period at which grasses first began to assume a preponderating position in vegetation. Their value and importance at the present day were first sketched, and it was remarked that they occupy, under cultivation, one-third of the entire area of Europe, inclusive of lakes and mountains. . . . There are over 3,000 species fitted to occupy most diverse stations and to overcome nearly every kind of competition, under no matter what conditions, with the result that about 95 per cent of the plants growing in ordinary meadow land are grasses.

The conclusion arrived at was that there was no great development of grasses until toward the close of the Eocene, no definite remains being associated with any of the older Eocene floras of temperate latitudes. A number of facts were brought forth to show that grasses could by no possibility have failed to become associated with the remains of other plants in beds deposited under such conditions as those of the Eocene, had they existed in any profusion then, while, further to support this argument, it was stated that the very similar Oligocene and Miocene beds all over Europe are crowded with them. Further, it was shown that the dentition of all the early Eocene herbivora was adapted for crushing fruits, snapping twigs, and grubbing roots, rather than for browsing on such food as grass, so that the evolution of true graminivora . . . must be post-dated to the appearance of the grass itself. The geological history of the whole class of insects was reviewed, with the object of supporting the conclusion arrived at as to the *post* mid-Eocene date of grass. Older remains of grass may, however, occur in the last series of Tertiary deposits in Spitzbergen, but as yet their age has not been accurately correlated. Finally, it was shown that the introduction of an aggressive type in vast numbers, of different habits, to pre existing vegetation, exerted an influence upon terrestrial life altogether without parallel, and for the first time rendered possible the development of a meadow and prairie vegetation distinct from that of marsh, scrub, and forest, with all the attendant forms of animal and vegetable life to which such vegetation is indispensable.—*Amer. Naturalist.*

The Flukes of Whales.—What are the flukes of whales? This, it appears, is a question that cannot be satisfactorily answered at the present time, and at least there is a diversity of opinions in respect to their homologies. Do they simply represent a laterally expanded tail, or are they the remnants of the posterior feet of quadruped ancestors? A difference in interpretation has long prevailed, and the subject has been made prominent recently by some memoirs or addresses of Prof. W. H. Flower. By some old naturalists, and even by Linnæus, the flukes were regarded as tantamount to the entire hind limbs. Not long ago, Gill suggested that the flukes represent the hypertrophied integuments of the hind limbs, while the osseous portions partially persist in the rudimentary bones located far in front of them. Lastly, Prof. Flower has again taken up the question. "One of the methods," says he, "by which a land mammal may have been changed into an aquatic one is clearly shown in the stages which still survive among the carnivora. The seals are obviously modifications of the land carnivora, the Otaria, or sea lions and sea bears, being curiously intermediate. Many naturalists have been tempted to think that the whales represent a still further stage of the same kind of modifications. But there is to my mind a fatal objection to this view. The seal, of course, has much in common with the whale, inasmuch as it is a mammal adapted for an aquatic life, but it has been converted to its general fish-like form by the peculiar development of its hind limbs into instruments of propulsion through the water, for, though the thighs and legs are small, the feet are large, and are the special organs of locomotion in the water, the tail being quite rudimentary. In the whales the hind limbs are aborted and the tail developed into a powerful swimming organ. Now, it is very difficult to suppose that when the hind limbs had once become so well adapted to a function so essential to the welfare of the animal as that of swimming, they could ever have become reduced and their action transferred to the tail. It is far more reasonable to suppose that whales were derived from animals with large tails, which were used in swimming, eventually with such effect that the hind limbs became no longer necessary, and so gradually disappeared. The powerful tail, with lateral cutaneous flanges, of an American species of otter (*Pteronura sandbachii*), or the still more familiar tail of the beaver, may give some idea of this member in the primitive cetacea."

A New Species of Fungus has been discovered by M. Galippe, which was developed in human saliva. It has been referred to the genus *Monilia*, and it is proposed to call it *M. sputicola* (*Comptes Rendus*, cii., p. 1186). It does not appear as yet whether the saliva which gave rise to the mycelium and spores was derived from a healthy person or otherwise.

The Blue Color of Animals.—Prof. F. Leydig says that a blue granular pigment is rarely found in animals; in the crayfish, for example, there are blue crystals. The blue color is oftener due to interference, owing to the presence of lamellæ or to the fibrils of connective tissue, as in the *tapetum fibrosum* of the eye of ruminants; the *corium* of the living larva of *Pelobates fuscus* is similarly blue. A dull material overlying black pigment produces blue, as in the case of blue eyes, which are due to the urea shining through the non-pigmented iris, and in some frogs. Dark chromatophores have a like effect, as has too the swelling of the corium consequent on the filling of the lymph spaces. In conclusion, the author discusses the tegumentary secretions, which are of various colors, and which can be washed away; an example is to be seen in the celestial blue color of the abdomen of *Libellula depressa* and, perhaps, the "bloom" of the pupa of the Apollo butterfly. On the other hand, the coloring matter may be in the cells of the epidermis, as is the case with the rosy color of *Tetrao urogallus*, and can then, of course, be removed only after the destruction of the tissue which contains it.—*Jour. Roy. Microscop. Soc.*

Give the Boys a Chance.

In July there was a convention of glass blowers at Atlantic City, N. J., and during the session a resolution was adopted abolishing the apprentice system in glass factories. The matter, of itself, has perhaps small importance, but it is significant of the tendency of the labor movement, and it has an interest beyond the narrow boundaries of the glass industry, because similar action has already been taken by other trades. The point involved is just this: Men who are earning their bread at skilled labor formally declare that no American boy shall be allowed to acquire the skill required to perform that labor. They turn their backs on the five or six million young men and boys in this country, and deny their right to become expert mechanics. The purpose, of course, is to make skilled labor scarce and so to keep up wages. The result is to exclude the young from the chance to earn good wages, to force many of them into idleness and to tempt others into crime. Against such a system the people of the country have a right to make vigorous protest. It is a matter that affects society at large. It touches directly every man who has children, and indirectly every human being, from the lowest to the highest. The right of a boy to learn any honest trade that he wants to learn is positively indisputable; and to this is joined the clear right of every employer to take a boy into his shop to help him to acquire knowledge and skill. The denial of these rights by a trade union is tyranny, and it ought to be resisted to the last extremity. We assert that the solitary chance of the success of the labor movement, so called, lies in its obedience to the requirements of justice. When it sets justice at defiance, it is doomed. The people of this country are not going to permit any body of men to trample the most ordinary human rights under their feet.—*Textile Record.*

Rubber Milk.

The method of treatment for congealing the rubber milk in the Para district, which equally applies to the milk of the *Hevea braziliensis* and *Mangaleira*, is as follows:

Small cups are attached to the trees, and, when filled with juice, are emptied into tin pails of a certain size, having close fitting lids, the cups being again attached to the trees. After going the round of the trees, the contents of this pail are emptied into another a size larger, and so on, till the covered pail of largest size is filled and ready to be strapped on to the saddle of a mule for removal. By this plan the natives are saved the trouble of condensing and preparing the milk for market, by smoking. The large can of rubber milk, on arriving at the *magasin*, is emptied into a bath of water, the temperature best suited to the rubber being a matter of experience. The lumps of rubber that form in the bath are immediately pressed into thin, flat sheets, and carefully wiped. By this means the acid is forced out of the cells or pores in the lump, thus preventing the so-called "rotten" appearance. The author is of opinion that the African rubbers yielded by the Landolphias, prepared in this manner, will produce a strong rubber. The African rubbers now sent here do not yield, when strained and cleaned, more than 30 per cent to 55 per cent of pure rubber gum, owing to the natives adulterating with sawdust, bark dust, etc., to overcome the inconveniences of the stickiness of the juice. The amount of resin in milk varies largely.

ENGINEERING INVENTIONS.

A steam governor has been patented by Mr. John Gerhardt, of Montreal, Quebec, Canada. The governor valve is operated by pivoted vanes arranged to be acted upon by centrifugal force and the resistance of the air for opening the vanes against the tension of a main spring arranged to normally hold the vanes closed or drawn inward toward the axis of the governor.

A check valve has been patented by Mr. Adam D. Glace, of Rocklin, Cal. This invention covers certain novel features in the making of a simple and inexpensive valve, intended to close positively to cut off a back pressure, thereby promoting durability and avoiding an overheating of an injector or inspirator, and preventing waste of any fluid passed through the valve.

A method of and apparatus for cooling furnace bosh jackets has been patented by Mr. James L. McMichael, of Glen Wilton, Va. This invention covers new means of applying and controlling the water, the construction being such that the water sprayed against the bosh from perforated tubes flows rapidly down to several troughs so arranged as to allow currents of air to act on the water and keep it cool.

A gas engine has been patented by Mr. Johannes Spiel, of Berlin, Germany. It has novel devices, whereby, with the first stroke of the piston, an explosive mixture of air and benzine, or naphtha, etc., is sucked up, while with the second stroke the mixture is compressed, and during the third stroke ignition at the dead point takes place, with explosion and expansion, the ignited gases being expelled with the fourth stroke.

A jointed link for engines has been patented by Mr. Edson Doe, of South Newbury, Vt. Combined with the crank shaft of an engine, the eccentric attached thereto, and the eccentric rods, and the crank shaft connected with the valve stem, is a jointed link and its holding bar, intended to give a perfect lead and cut off on both forward and back motion, each eccentric working independently, and one part of the link not affecting the movement of the other part.

MECHANICAL INVENTION.

A pivot cutting implement has been patented by Mr. Amos A. Wolcott, of Tom's River, N. J. It has a slotted spindle and slotted collar, with adadjustable and removable cutters, springs, and adjusting rod, making a device for cutting pivots or bearings adapted to be used in ordinary lathes or by hand.

AGRICULTURAL INVENTIONS.

A corn planter has been patented by Mr. Frank H. Rybacek, of Riverside, Iowa. It has seed droppers operated by sliding clips, which are actuated by levers carrying daggers, the invention being an improvement on a former patented invention of the same inventor, relating to improved device for operating the daggers.

A check row corn planter has been patented by Mr. Silvanus F. Enos, of Etna, Ill. It is so made that the seed will be dropped at uniform distances apart, the lines of the cross rows be marked, and that it can be readily operated to retard or hasten the dropping of the seed, while the dropping mechanism can be thrown out of gear by raising the forward part of the machine from the ground.

MISCELLANEOUS INVENTIONS.

A brush has been patented by Mr. William F. Howard, of Claremont, N. H. It has a U-shaped core, with tongues bent back as a fastening piece for bristles or other brush material, with other novel features, whereby a substantial article is produced in a simple and cheap way.

A steam clothes washer has been patented by Mr. Charles Boaz, of Utica, Ill. It consists of a clothes box made to be inserted in a boiler in such way as to leave a steam space under it, a vacant space at the sides, and a condensing chamber at the top, whereby the clothes will be washed exclusively by steam, and do not come directly in contact with the water.

A station indicator has been patented by Mr. Charles E. A. Brandes, of Brooklyn, N. Y. The invention consists of signs attached to bent rods hung on a cylinder having a transverse slot, a box being secured to the car and forming a bearing for the cylinder, making a simple and easily operated device for indicating any desired station at any desired time.

A flying target has been patented by Mr. Joseph H. Jacobs, of Atchison, Kan. It is made with sheet metal body, and has at its center an opening fitted to contain an image, instead of which a live bird may be used, making the target also a trap, the bird or image being released when the target is struck, and the target being one which can be repeatedly used.

A buggy iron has been patented by Mr. D'Alton Topliff, of Franklin, Ill. It is an angled iron, to be attached to the sills near their ends, and extended under the edges of the panels of the body to sustain the ends of the panels, the buggy body being of the usual description, with side panels and end boards, and having sills extending along the inner side of the panels at the bottom of the body.

A photographic camera has been patented by Messrs. Richard A. Anthony and William H. Lewis, of New York city. It is in the form of a hand bag or satchel, containing and concealing the camera, with apertures for the finder and camera tube, having doors which form, when closed, parts of the walls of the case, so that the user may carry and use the camera without being noticed.

A fence post has been patented by Messrs. William H. H. and Solomon Yount, of Troy, O. The post is preferably made of angle iron, with its lower end shaped to have attached thereto a base or point to go beneath the ground, and provided with flanges of sheet metal, the forward face of the post being perforated to receive staples by which fence wires are fastened in place.

Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

For Sale.

The powerful hydraulic dredge boat G. W. R. Bayley, now lying at Port Eads, La. Capacity, 2,000 cubic yards of sand or 4,000 of mud in 10 hours. Also two powerful tug boats. All in perfect order. Inquire at Room 709 Mutual Life Building, No. 34 Nassau St., New York.

Woodworking Machinery of all kinds. The Bentel & Margedant Co., 116 Fourth St., Hamilton, O.

Belting, Hose, and Packing of all kinds. Manufacturers' supplies generally. Greene, Tweed & Co., 83 Chambers St., N. Y.

Foreman for machine tool department of a large stationary and portable engine works. Must be a draughtsman and familiar with valve movements and high speed automatic engine work; must understand handlingmen. To the right person there is an opportunity to secure the position of superintendent of the establishment. Address, stating age, T. E. J., P. O. box 773, New York

Builders of tools or interchangable articles, or those who otherwise have use for a mech. engineer of unquestionable reputation. Address B. F. B., 115 B'way, room 111, N. Y.

To Stove Manufacturers—Two valuable patents covering tailors' stoves, fully tested (will take place of all others), can be purchased on favorable terms; or patentee would make arrangements for their manufacture with a practical stove man. Address Patentee, 330 Broadway, N. Y.

Second-hand Tools For Sale by Poole & Hunt, Baltimore, Md.—One planing machine, will plane 35" wide, 27" high, and 16' 6" long; one planing machine, will plane 30" wide, 26" high, and 5' 6" long; one planing machine, will plane 24" wide, 22" high, and 5 long; one double geared chasing lathe, will swing 24" dia., 8' 6" long; one drill grinding machine; one small punching and shearing machine, with fly wheel and clutch starting arrangement.

If anything clogs the waste pipes in the house, we become alarmed, for sewer gas is apt to generate disease. The children, then, are removed to their grandparents', or kept out of doors as much as possible, until the defect is remedied. But the waste pipes of the human system are often allowed to clog, and the sufferer, who cannot get away from the poison, becomes unfit for work or pleasure. In such cases, Dr. Pierce's "Pleasant Purgative Pellets" will gently remove the cause, and the effect will vanish of itself. By druggists.

Eureka scroll sawing machine for sale; been run for 15 days; taken for debt; good as new. Price, $62, spot cash. Address "Eureka," Worcester, Mass.

Blake's Improved Belt Studs are the strongest and best fastening for Leather and Rubber Belts. Greene, Tweed & Co., 83 Chambers St., New York.

Engines and boilers, ½ to 4 H. P. Washburn Engine Co., Medina, O.

For Sale—The machinery, tools, plating apparatus, and raw material of a manufacturing establishment, now working on orders in brass and other metals. Very low rent, including steam power. Address Manufacturer, P. O. box 285, New Brunswick, N. J.

A Catechism on the Locomotive. By M. N. Forney. With 19 plates, 227 engravings, and 600 pages. $2.50. Sent on receipt of the price by Munn & Co., 361 Broadway, New York.

Concrete Apparatus, etc. Ernest Ransome, S. F., Cal.

The Knowles Steam Pump Works, 44 Washington St., Boston, and 93 Liberty St., New York, have just issued a new catalogue, in which are many new and improved forms of Pumping Machinery of the single and duplex, steam and power type. This catalogue will be mailed free of charge on application.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Pumps for liquids, air, and gases. New catalogue now ready.

All books cheap. School of Electricity, N. Y.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. $100 "*Little Wonder.*" A perfect Electro Plating Machine. Sole manufacturers of the new Dip Lacquer Kristaline. Complete outfit for plating, etc. Hanson, Van Winkle & Co., Newark, N. J., and 92 and 94 Liberty St., New York.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn.

Best Automatic Planer Knife Grinders. Pat. Face Plate Chuck Jaws. Am. Twist Drill Co., Meredith, N. H.

See Burnham's turbine ad. to mill owners next week.

Chucks—over 100 different kinds and sizes in stock. Specials made to order. Cushman Chuck Co., Hartford, Ct.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., 112 Liberty St., New York.

Curtis Pressure Regulator and Steam Trap. See p. 142.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N.Y. See illus. adv., p. 28.

Catarrh Cured.

A clergyman, after years of suffering from that loathsome disease, catarrh, and vainly trying every known remedy, at last found a prescription which completely cured and saved him from death. Any sufferer from this dreadful disease sending a self-addressed stamped envelope to Dr. Lawrence, 212 East 9th St., New York, will receive the recipe free of charge.

Send for catalogue of Scientific Books for sale by Munn & Co., 361 Broadway, N. Y. Free on application.

Timber Gaining Machine. All kinds Wood Working Machinery. C. B. Rogers & Co., Norwich, Conn.

Iron and Steel Wire, Wire Rope, Wire Rope Tramways. Trenton Iron Company, Trenton, N. J.

Lick Telescope and all smaller sizes built by Warner & Swasey, Cleveland, Ohio.

Supplement Catalogue.—Persons in pursuit of information of any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

NEW BOOKS AND PUBLICATIONS.

THE MANUFACTURE OF PAPER. By Charles Thomas Davis. Philadelphia: Henry Carey Baird & Co.

This book fills a place, hitherto vacant, in the very considerable library of industrial publications issued by Messrs. Baird & Co. It is a comprehensive treatise on the fabrication, coloring, and finishing of every kind of paper, explaining the differences in the wide variety of raw materials used, and describing the tools, machines, and practical details of the business. As in former books of which Mr. Davis is the author, the reader is referred to long lists of patents taken out on machines and processes employed in the industry treated of.

THE LIFE OF ROBERT FULTON. By Thomas W. Knox. New York: G. P. Putnam's Sons.

A popular newspaper correspondent, and the writer of numerous entertaining books for young people, has here thrown together a sketchy account of the early American promoter of steamboat navigation and what he did, embracing many particulars germane to the matter which would be likely to interest a youthful reader.

THE BATTLE OF GETTYSBURG. By the Comte de Paris. Philadelphia: Porter & Coates.

This is a detached portion of the author's history of the Civil War in America, the importance of the battle of Gettysburg as a decisive turning point in the four years' conflict rendering its full treatment in a special volume a work of independent value. It is evident that great pains have been taken to render the account as accurate as thorough subsequent investigation could make it, and that the opinions expressed are entirely without partisan bias. The author's distinguished position, the facilities for observation afforded him as a staff officer, and the care which has been taken in collating information from the official records of both armies, all tend to make this one of the most generally satisfactory accounts of the battle that has yet appeared.

REPORT OF THE NEW YORK FOREST COMMISSION, 1885. Albany: The "Argus" Company, State Printers.

This volume is a most welcome indication that something substantial is at last being done toward the preservation of a portion of the virgin forests of the State, particularly in the Adirondack region, of which a most excellent map is given, showing the woods that are left. The dissemination of such information cannot but have a useful effect in securing the proper legislation for the preservation of the woods of these northern regions.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(1) A. E. M. asks for any practical and simple way of keeping furniture free from wood borers, in a house infested with them, and if anything besides arsenic will kill these—for example, carbolic acid. A. You might try painting the wood with a solution of corrosive sublimate in alcohol. Carbolic acid in sufficient quantity would dispose of them. Both these are violent poisons.

(2) E. B. asks: 1. At what temperature does oxygen unite with carbon, that is, how high does the temperature of a mass of coal have to be before combustion takes place? A. At a low red heat; about 1,000° F. 2. Will oxygen unite with zinc or any other substance as readily when combined with hydrogen, and being in the form of water, as it will when uncombined, or as common air? A. It will not. 3. Is a loud sound heard any further than a light sound in an acoustic telephone? A. It is.

(3) B. F. W. writes: Have plate and other glass splashed with lime by plasterer. How can it be removed without injuring glass? A. Dilute muriatic acid will remove the stain, after you have scraped off the bulk of the lime. You will not injure the glass, but the acid will spoil the frame if allowed to act upon it. Apply with a sponge.

(4) C. G. B. writes: 1. I have a cane that I prize highly, with a tortoise shell handle, which I wish to bend to an opposite shape. Can it be softened without injury, and so bent? A. We should not advise you to attempt it yourself. It can be done by softening in steam, bending, and polishing. 2. At certain seasons, lemons are scarce and dear. Can the juice be preserved by bottling or canning for future use, and how? A. *a.* Keep the filtered juice, before it has passed into fermentation, without adding alcohol, in a bottle hermetically sealed. *b.* Heat the fresh juice not compounded with alcohol in a vessel to the boiling point, and close while boiling. *c.* Compound the unfermented juice with 10 per cent of alcohol and heat as in *b*. *d.* Fill the fermented juice in bottles without an addition of alcohol and without heating. *e.* Heat the fermented juice without an addition of alcohol in a closed vessel to the boiling point, and close while boiling. *f.* Compound the fermented juice with 10 per cent of alcohol, and heat as in *e*.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

September 21, 1886,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Acid, pan for concentrating sulphuric, K. J. Sundstrom 349,414
Adding machine, Shattuck & Thorn, Jr. 349,459
Air compressor, hydraulic, W. S. Johnson 349,594
Air from liquid-receiving vessels or casings, exhausting, W. D. Andrews 349,420
Alarm for poison receptacles, O. F. Frost 349,641
Amalgamator and separator, dry ore, O. Matzke 349,442
Annunciator, electric, J. Geary 349,579, 349,580
Axle washer, carriage, D. A. Johnson 349,593
Bag tie, A. H. Brown 349,300
Bale tie, L. Cook 349,569
Baluster and spindle, ornamental, S. Strahan 349,669
Banjo tail piece, F. H. Hodges 349,308
Bar. See Eye bar. Grate bar.
Bathing tub for horses, waterproof cloth, A. Purson 349,357
Battery. See Electric battery. Galvanic battery.
Bed bottom, spring, C. Carleton 349,478
Bed, bureau, J. K. Stockton 349,467
Bed, spring, A. F. Keene 349,310
Bedstead, folding, Gould & Cook 349,643
Bell, door, C. L. Livingston 349,437
Bell, door, H. J. P. Whipple 349,553
Bench plate, Thompson & Stedman 349,619
Bicycle, J. T. Slocomb 349,532
Blacking box holder, F. Wellington 349,328
Blind slats, device for adjusting, E. P. Tucke 349,416
Boat. See Hunting and fishing boat. Life boat.
Boiler. See Steam boiler.
Bookholder, L. W. Noyes 349,660
Box. See Journal box.
Box fastener, J. J. Monahan 349,514
Box for letters and other articles, M. Bragaldi 349,382
Box strap, C. S. Hall 349,495
Brake. See Car brake.
Brick machine, J. W. Brown 349,477
Brick machine, W. Hilton 349,500
Brick machine, C. N. Horton 349,395
Brick of irregular form for facing walls, J. C. Anderson 349,471
Bridge, S. H. Godman 349,345
Bridge, J. Tomlinson 349,468
Brush, J. Ames, Jr. 349,296
Brush, W. F. Howard 349,649
Brush, H. Rosenthal 349,407
Brush, M. Thompson 349,673
Bucket fixture, well, Atkin & Steele 349,526
Buggy bed, J. C. Figg 349,577
Bung bush wrench, A. G. Anderson 349,556
Bung, vent, J. Meyer 349,354
Burner. See Electric gas burner.
Butter worker, W. F. & S. H. Waters 349,326
Button, P. A. Raymond 349,453
Buttonhole barring machine, J. Reece 349,358
Buttoner, C. A. Taylor 349,415
Can. See Oil can. Sheet metal can.
Cane, machine for breaking and cutting, T. F. Krajewski 349,503
Car brake, E. G. Reilly 349,508
Car coupling, C. M. Ferrell 349,488
Car coupling, H. W. Johnstone 349,652
Car coupling, I. Kling 349,655
Car coupling, T. McGrath 349,443
Car coupling, I. Mitchell 349,400
Car coupling, G. J. Walton 349,543
Car coupling, W. T. Wilson 349,555
Car grip, cable, J. J. Endres 349,486
Car starter, O. P. Wivel 349,620
Cards, machine for trimming and beveling the edges of, Lorrillard, Jr., & Harmon 349,351
Carpet fastener, stair, R. H. Willet 349,329
Carriage, baby, G. D. Burton 349,629
Carriage spring, F. E. Bortree 349,298
Carriage windows, appliance for supporting, C. G. Gumpel 349,647
Carriages, reach coupling for, S. W. Cately 349,302
Carrier. See Endless carrier. Game carrier. Straw carrier.
Case. See Organ case.
Cash register, W. G. Schickner 349,522
Caster, furniture, J. R. Hargrove 349,588
Casting pipe, apparatus for, A. Kilpatrick 349,596
Ceiling, etc., adjustable decorated, J. Sutherland 349,375
Chair. See Reclining chair.
Check rower and marker, C. F. Neer 349,402
Chopper. See Cotton chopper.
Chuck, C. H. Reid (r) 10,766
Churn, B. P. White 349,376
Churn, rotary, G. A. Stafford 349,371
Cigar bunching machine, N. H. Borgfeldt 349,336
Cigar bunching machine, Borgfeldt & Schutz 349,335
Cleats, machine for making, C. J. Hager 349,587
Clock, electric programme, A. J. Reams 349,605
Clocks, electric synchronizer for, Hunter & Gerry 349,650
Clocks, electro mechanical synchronizer for, J. H. Gerry 349,493
Clocks, pneumatic mechanical synchronizer for, Gerry & Hunter 349,494
Closet. See Water closet.
Cloth pressing machine, F. Kuhne 349,436
Clothes drier, D. J. Smith 349,410
Coal conveying apparatus, C. W. Hunt 349,309
Coal separator, J. Woolley, Sr 349,675
Coffee pot, J. M. Lawrence 349,505
Coffin platform for graves, S. Baker 349,421
Cog wheels, housing for, F. M. Roots 349,364
Collar sweat pad, horse, J. H. Philpott 349,451
Colters and harrow disks, sharpener for, B. Stalcup 349,667
Compartment tank, B. C. Shaw 349,523
Compressor, F. Eibler 349,342
Compressor, C. Wakefield 349,542
Conduit, underground, J. C. Anderson 349,472
Cooking vessel, A. W. Obermann 349,317
Corn hulling and grinding machine, Aebi & Mublethaler 349,418
Corn sheller, C. A. Williams 349,553
Corn sheller, hand, T. Weaver 349,327
Cornstalk cutter attachment, G. B. Brown 349,566
Cotton chopper and cultivator, combined, R. S. Oliver 349,403
Countershaft frame and belt tightener, swinging, G. H. W. Simmon 349,462
Coupling. See Car coupling. Pipe coupling. Reach coupling. Shaft coupling. Thill coupling. Valve coupling.
Crimping machine, F. R. Packham 349,355