

POSITION OF THE PLANETS IN FEBRUARY.

JUPITER.

is evening star. He is still the brightest star in the heavens, though closely approaching the sun, and soon to be eclipsed in his rays. He makes his transit, on the 1st, at 4 h. 21 m. P. M., is well down in the west when it is dark enough for the stars to come out, and disappears from view about an hour before midnight. His course during the month is uneventful. He is moving eastward or in direct motion, his path lies in a portion of the heavens singularly destitute of bright stars, and he therefore has the field to himself. He is more impressive for this reason, as there are no rivals with whom he must share the honors of the portion of the celestial abode he now occupies.

The moon, when four days old, is in conjunction with Jupiter, on the 20th, at 9 h. 48 m. A. M., being 29' north. The conjunction is a close one, but as it occurs in the daytime is invisible. The moon occults Jupiter at the same time for observers who see her under the right conditions. The limiting parallels are 73° north and 17° south.

The right ascension of Jupiter on the 1st is 1 h. 14 m., his declination is 6° 37' north, his diameter is 36", and he is in the constellation Pisces.

Jupiter sets on the 1st at 10 h. 44 m. P. M. On the 28th he sets at 9 h. 23 m. P. M.

MARS

is evening star. He is moving eastward, or in direct motion, and his distance from Jupiter is increasing. On the 1st they are 3° apart, and on the 28th they are 15° apart. The diameter of Mars, when in opposition on August 4 of last year, was 39". It will be 5".8 at the end of the month, showing how greatly Mars has decreased in dimensions as he recedes from the earth.

The moon is in conjunction with Mars, when five days old, on the 21st, at 8 h. 52 m. A. M., being 5' south. There will be an appulse, the ruddy planet touching the northern horn of the crescent, but the conjunction cannot be seen, for moon and planet are below the horizon.

The moon will be near and approaching Mars on the evening of the 20th, when the finest celestial picture of the month will be on exhibition. The four days' old crescent is then in line with, and midway between, Mars and Jupiter, with Mars on her left and Jupiter on her right, each planet being about 7° distant. The trio, consisting of the moon with a bright planet on each side, remains visible in the west for about five hours, and then disappears below the horizon. Jupiter breaks up the party, setting at 9 h. 44 m. P. M., the moon follows at 10 h. 17 m. P. M., and last of the trio, Mars is seen no more, setting at 10 h. 49 m. P. M.

The right ascension of Mars, on the 1st, is 1 h. 27 m., his declination is 9° 33' north, his diameter is 6".7, and he is in the constellation Pisces.

Mars sets on the 1st at 11 h. 8 m. P. M. On the 28th he sets at 10 h. 54 m. P. M.

SATURN

is morning star. This means that he is on the western side of the sun, though he is above the horizon early enough to be considered an evening star. Saturn continues to retrograde or move westward. He is the only one of the large planets that is approaching the earth, as Jupiter, Venus and Mars are all approaching the sun. He rises at 9 o'clock on the middle of the month, and may then be looked for in the southeast, about ten o'clock, between Regulus and Spica and a little distance east of Gamma Virginis. He presents an interesting appearance in the telescope, for the ansae or handles of his rings are clearly defined, and the rings are separating from the body of the planet. He is not specially brilliant in the heavens at this time to the unaided eye of the observer, on account of the proximity of his rings, his increasing southern declination, and his slow advance toward aphelion, which he will not reach until 1900.

The moon five days after the full is in conjunction with Saturn, on the 5th, at 0 h. 16 m. P. M., being 1° 2' south. Moon and planet are below the horizon when the conjunction takes place, but will not be far apart when they rise about 10 o'clock in the evening. The moon will occult Saturn for observers who see her in her geocentric position and are between the limiting parallels of 18° and 90° south.

The right ascension of Saturn on the 1st is 12 h. 51 m., his declination is 2° 40' south, his diameter is 17".3, and he is in the constellation Virgo.

Saturn rises on the 1st at 10 h. 4 m. P. M. On the 28th he rises at 8 h. 12 m. P. M.

MERCURY

is morning star until the 16th, and then evening star. He is in superior conjunction with the sun on the 16th at 2 h. 55 m. P. M., changing his position from the sun's western to his eastern side, and ranking with the evening stars.

The moon on the day of her change is in conjunction with Mercury on the 16th at 9 h. 3 m. A. M., being 2' 4" south. The conjunction of the moon and Mercury, the new moon, and the superior conjunction of Mercury and the sun occur within a few hours of each other.

NEPTUNE

is evening star. He is in quadrature on the 26th at 3 h. 42 m. P. M., when he is 90° east of the sun, and is on the meridian at midnight.

The moon is in conjunction with Neptune on the 23d at 4 h. 5 m. P. M., being 4° 50' north.

The right ascension of Neptune on the 1st is 4 h. 28 m., his declination is 20° 12' north, his diameter is 2".6, and he is in the constellation Taurus.

Neptune sets on the 1st at 2 h. 53 m. A. M. On the 28th he sets at 1 h. 6 m. A. M.

VENUS

is morning star. There is little to say of her, excepting that she is near the sun, rising an hour before him on the first part of the month and half an hour before him on the last part of the month.

The moon, two days before her change, is in conjunction with Venus on the 14th at 7 h. 42 m. P. M., being 4° 31' south.

The right ascension of Venus on the 1st is 19 h. 30 m., her declination is 21° 58' south, her diameter is 11".2, and she is in the constellation Sagittarius.

Venus rises on the 1st at 5 h. 58 m. A. M. On the 28th she rises at 6 h. 1 m. A. M.

URANUS

is morning star. He will soon be near enough to the earth to be visible to the unaided eye.

The moon is in conjunction with Uranus one day after her last quarter, on the 9th, at 8 h. 29 m. P. M., being 1° 22' south.

The right ascension of Uranus on the 1st is 14 h. 34 m., his declination is 14° 36' south, his diameter is 3".6, and he is in the constellation Libra.

Uranus rises on the 1st at 0 h. 34 m. A. M. On the 28th he rises at 10 h. 44 m. P. M.

Mercury, Jupiter, Mars, and Neptune are evening stars at the close of the month. Saturn, Venus, and Uranus are morning stars.

Honor to M. Pasteur.

On Dec. 27, 1892, all that is famous in French science, diplomacy, and politics assembled at the new Sorbonne, Paris, to celebrate the seventieth birthday of the great chemist and scientist, M. Louis Pasteur. The audience was a particularly distinguished and cosmopolitan one. It included the President of the Republic, his Excellency the Marquis of Dufferin and Ava, and other leading ambassadors accredited to France. English science was represented by Sir Joseph Lister, Sir Henry Roscoe, and Professor Ray Lankester. In opening the proceedings, M. Charles Dupuy, the Minister of Public Instruction, referred to the gathering as a scientific solemnity and a red letter day alike for France and humanity. Addressing M. Pasteur, he referred to him as follows:

"Victorious to-day over hydrophobia; to-morrow, perhaps, over cholera! Henceforth the formula is definite and complete, your disciples give it in two words: Fermentation and virus are living beings, vaccine is an attenuated virus, medicine has for its basis the artificial attenuation of virus. Thus obtaining the remedy from the evil itself, the microbial medicine has been founded!" The Secretary of the Academy of Sciences, M. Bertrand, who is also a member of the Pasteur Institute Council, referred to Pasteur's numerous successful researches, and M. Daubie, also of the Institute, reminded the audience that it was as a mineralogist that M. Pasteur first attracted public attention. Sir Joseph Lister spoke on behalf of the English deputation, and many other addresses were delivered. On rising to reply, M. Pasteur was much affected by the emotion he evidently felt. He merely uttered a few words of thanks and then handed his son a written reply to read. In it reference was made to the advantages now enjoyed by those wishing to pursue scientific studies, as compared to when he was a young man. He spoke very appreciatively of the arrangements made for the ceremony, which tended to remind him of his past life. The deepest joy a man can feel, he said, was brought to him by the cosmopolitan nature of the audience. It taught him to believe that science and peace can triumph over ignorance and war. M. Pasteur was loudly cheered when his reply had been read, and as he left the Sorbonne he was the object of a popular manifestation. He afterward held a reception at his own house.

Photo Plates of Wonderful Sensitiveness.

At a meeting of the Mathematical and Natural Science Section of the Imperial Academy of Sciences of Vienna, on November 10, Professor V. von Lange presented the following communication from the engineer Victor Schumann, of Leipzig:

The photographic energy of the ultra-violet rays on collodion and gelatin plates decreases strikingly at the wave length 200 μ , and falls off to a similar extent toward the more refrangible side. The cause of this decline in energy lies in the fact which I have established spectrographically: 1. In the impermeability to light of the collodion and gelatin, in which the sensitive ingredient of the coating of the plate, *i. e.*, the silver haloid, is embedded; and (2) in the impermeability

of the air which the rays have to traverse on their way to the plate. If we remove these two absorbents the silver haloid shows itself many times more sensitive for the rays beyond 200 μ than it was in presence of the collodion and gelatin, and the photographic efficacy extends far beyond the previous limit of the ultra-violet light (wave length 185.2 μ). The production of a film of pure silver haloid on the plate offers great difficulties. A method for this purpose washitherto not known. After numerous experiments I found a process by which I have now for two years prepared all the plates which I have required for observing the rays beyond the wave length 185.2 μ . The air could only be removed from the rays by exhausting the spectrograph. In this manner I have hitherto been able to follow about twenty different spectra far beyond 185.2 μ . All of them develop here an unexpected wealth of rays, but none to so high a degree as the hydrogen light of the Geissler tube. I estimate the number of the hydrogen lines which I have isolated at 600, and the shortest of their wave lengths at 100 μ . I have not as yet effected the measurements, for which, however, I have already made preparations. For illustration the speaker exhibited a tableau composed of H. V. Schumann's original plates, showing the portion of the ultra-violet hydrogen spectrum first photographed by the latter.—*Chem. News.*

ARMADILLOS AND AARD-VARKS.

BY R. LYDEKKEK, B.A. CANTAB.

Of the three animals represented in the figures accompanying the present article, two are sufficiently alike to suggest to the ordinary observer their relationship to one another, but the third is so utterly different that it is difficult to point out any important character it has in common with the two others; nevertheless, naturalists generally regard all these three strange creatures as belonging to a single order of mammals, for which the name of Edentata is adopted. The signification of the term Edentata being toothless, the unsophisticated student would naturally be led to suppose that all the animals so named were utterly devoid of those useful but troublesome appendages. This, however, is far from being the case, the majority of the members of the group (among which are those figured here) having a considerable number of teeth. Still there is one feature in connection with the dentition exhibited by the whole of these so-called edentates, and this is that teeth in the front of the jaws, corresponding to the incisors of other mammals, are totally absent.

The mammals thus associated by these negative characteristics are now chiefly confined to the southern hemisphere, and include the sloths, anteaters, and armadillos of South America, the pangolins or scaly anteaters of Southeastern Asia and Africa, and the aard-varks of Africa, the true anteaters and pangolins being those in which teeth are wanting. In past times they were also represented by the gigantic megathere, and a number of other allied extinct forms ranging throughout America, which in some respects serve to connect the sloths with the anteaters. This marked restriction of the existing edentates to the southern hemisphere, and their special abundance in South America, at once stamps them as a very lowly group of animals, there being a well marked tendency for the preservation of the humbler forms of life in the southern continents and islands of the globe.

Of the three groups of termite-eating edentates, two—namely, the pangolins and the anteaters—are those which have entirely lost their teeth, while in the aard-varks those organs are retained. As teeth are obviously of no sort of use to animals subsisting on such a diet, we may regard the two former groups as those most specially modified for their particular mode of existence, and it may thus be suggested that they have taken to termite eating for a longer period than the aard-varks.

The armadillos, as their name (a Spanish one) implies, are distinguished by the solid armor with which their heads and backs are protected, and it is doubtless the peculiar appearance presented by these animals to which we owe the expression "hog-in-armor." In all the armadillo family the armor takes the form of a series of thicker or thinner bony plates embedded in the skin covering the head and back, and overlain by horny scales, while the under parts of the body and limbs are hairy, and in many species a larger or smaller number of stiff hairs protrude from between the joints of the armor. This bony armor is a perfectly unique feature among existing mammals, and since each plate is ornamented with a more or less elaborate sculptured pattern, such armor when cleaned by maceration forms a most beautiful object. In the true armadillos, as the one represented in Fig. 1, the shield of armor covering the head is quite distinct from that of the body, while the latter is divided into three distinct portions, namely, a large solid shield covering the forequarters, and separated by a larger or smaller number of free movable bands occupying the middle of the body from a nearly similar shield protecting the hinder portion of the animal. In our figured example the number of the movable bands is only three, but they may vary from six to

nine up to as many as twelve or thirteen in other species. In one extinct armadillo there were, however, no solid shields, the whole body being covered by a series of thirty-two movable bands. The latter species evidently, therefore, leads on to the rare and beautiful little creature represented in our second illustration, which rejoices in the name of pichiciago. In this tiny animal, which is only about five inches in length, and has a pink colored armor above, and long silky white hair below, the armor of the head and body forms a continuous shield of horny plates underlain by very thin plates of bone, and is attached only to the middle line of the back, so that the lateral portions form a kind of cloak loosely overhanging the hairy sides of the body. The hinder end of this cloak is abruptly truncated, and beneath it the hind quarters of the animal are protected by a solid bony shield, through a hole in the center of which protrudes the small cylindrical tail. When the animal creeps beneath a crevice in rocks, as shown in the right hand corner of our illustration, which is not sufficient to conceal its whole body, the strong shield on the quarters affords an ample protection against all attacks. The pichiciago is found on sandy plains only in the western portions of the Argentine pampas. It will be seen from our illustrations that this creature also differs from the true armadillos in the absence of the large external ears which form such a characteristic feature in the physiognomy of the latter.

Reverting to the true armadillos, we find that the majority of the species protect themselves from attack by squatting on the ground, and tucking their limbs within the shelter of the edges of the armor of the body, while the plated head is drawn as close as possible to the front shield. On the other hand, the species represented in our illustration has the power of rolling itself up into a complete ball, like the pill-millipedes of our own country, the wedge-shaped head and tail fitting most perfectly side by side into the deep notches of the front and hind shields. Thus coiled up, the three-banded armadillo is safe from most animals except man. Trusting in this immunity from attack, this armadillo, together with two other species inhabiting the Argentine, has become almost exclusively diurnal in its habits. These diurnal habits, as Mr. W. H. Hudson, in his charming work, "The Naturalist in La Plata," suggests, may also have had the advantage of avoiding any encounters with the larger animals of prey, which are mostly nocturnal, and some of which may have been able to break through the protecting armor, more especially in the species which lack the power of rolling themselves up. Whatever advantage may have formerly accrued from these diurnal habits before the appearance of man on the scene is, however, now completely lost in cultivated districts, where these species stand a good chance of being completely exterminated by the hand of man.

On the other hand, the six-banded pelado, or hairy armadillo, of the Argentine, which differs from its cousins in preferring an omnivorous diet to one of insects, is a far wiser beast in its generation. This creature, according to Mr. Hudson, adapts itself to the conditions under which it exists, and thus stands a good chance of surviving when its fully armored relatives perish. "Where nocturnal carnivores are its enemies," writes the observer mentioned, "it is diurnal; but where man appears as a chief persecutor, it becomes nocturnal. It is much hunted for its flesh, dogs being trained for the purpose; yet it actually becomes more abundant as population increases in any district." Another writer says that beneath any decomposing carcass lying in the Argentine pampas, the burrow of a pelado is almost sure to be found; and it is not a little remarkable that the flesh of a creature which has such unpleasant tastes in the matter of diet should be so eagerly sought after as an article of human consumption.

Before taking leave of the pelado we must not omit to mention two other peculiar habits which are recorded of it by Mr. Hudson, since these also mark it as a creature far above the generality of its kind in point of intelligence. The first of these peculiarities is the ingenious way the creature catches mice, by approaching them with extreme caution, raising itself on its

hind quarters, and then suddenly proceeding to "sit down" on the unfortunate rodents, which become entrapped under the projecting edges of its armor. The sharp edges of the armor are also brought into requisition when this armadillo attacks a snake preparatory to devouring it; the snake being pressed close to the ground beneath the edges of the bony plates, and lite-

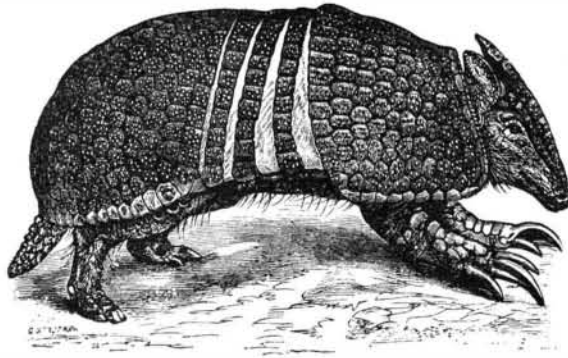


Fig. 1.—THREE-BANDED ARMADILLO.

rally sawn to death by means of a backward and forward motion of the body of its assailant.

The largest of living armadillos is one which inhabits the moist forests of Brazil and Surinam, and has a length of about 36 inches, exclusive of the unusually long tail, which is some 20 inches in length. These dimensions were, however, vastly exceeded by some extinct armadillo-like animals, of which the remains are found in the caverns of Brazil. The most

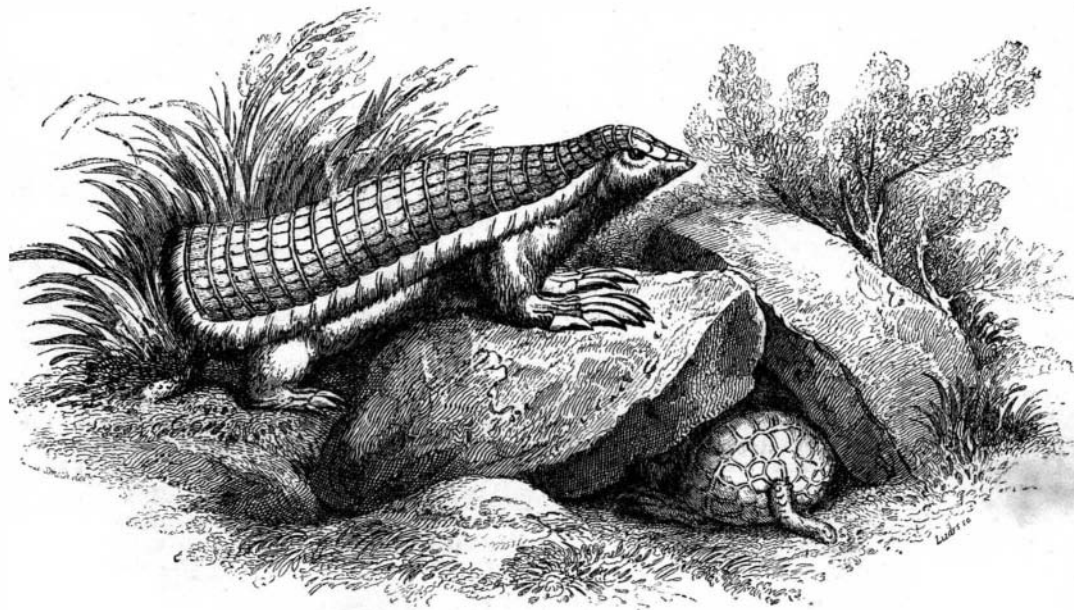


Fig. 2.—THE PICHICIAGO. (From Jardine.)

gigantic of these creatures, which flourished during the Pleistocene epoch—the period *par excellence* of giant mammals—is estimated to have been nearly equal in size to a rhinoceros, and has been named the chlamydothere. The armor appears to have been very like that of the true armadillos, but the bony plates measured as much as five and six inches in length, in place of little more than an inch. The teeth differed, however, from the simple conical ones of the modern armadillos, and more nearly resembled the vertically fluted ones characteristic of the extinct glyptodonts. Unfor-

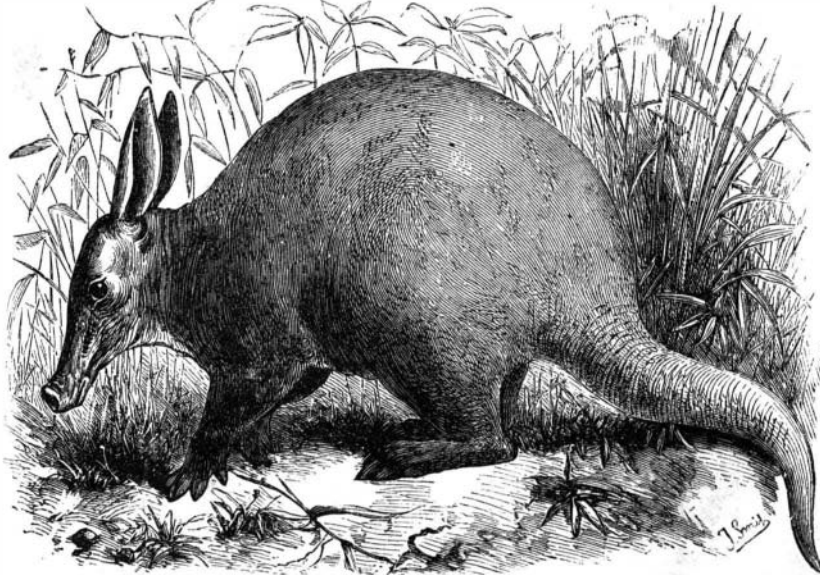


Fig. 3.—THE ETHIOPIAN AARD-VARK. (From Sclater, Proc. Zool. Soc.)

tunately, space does not admit of further reference to the gigantic creatures from the Pleistocene of South America, to which the latter name has been applied, all of which are distinguished from the armadillos by the armor of the body being welded into a single solid dome-like shell, of which a specimen is figured in the article on "Mail-Clad Animals."

Passing on to the animals whose name comes second in the title of this article, we have first of all to mention that the designations by which these creatures are commonly known exhibit that remarkable want of originality in nomenclature which appears to be characteristic of Europeans when they are brought for the first time into contact with hitherto unknown animals. Thus, whereas the Dutch Boers of South Africa applied to the creatures in question the title of "aard-vark" (meaning "earth pig"), the English colonists of the Cape commonly speak of them as the ant bear. Now, if there is any one particular animal which the aard-vark (as we must perforce term the creature) is unlike, it is a bear; while its resemblance to a pig is only of the most distant kind. Still, however, as in the case of the order to which it belongs, we must be content to designate the animal by the name by which it is most commonly known.

In appearance, aard-varks, of which there are two species, are decidedly ugly creatures, having thick, ungainly bodies, a long pointed snout, enormous erect ears, and a thick cylindrical and tapering tail, nearly as long as the body. The skin is either almost naked or thinly covered with bristle-like hairs. The fore feet have but five toes, which are armed with broad and strong nails, as are the five toes of the hind limb. As we have already mentioned, almost the only feature which the aard-vark has in common with the armadillos is the absence of front teeth, and its cheek teeth are quite unlike the simple ones of the latter, as, indeed, they are dissimilar to those of any other mammals.

Of the two living species of aard-vark, one is confined to South Africa, while the other (represented in our figure) inhabits part of Egypt and other districts in the northwestern portion of the same continent. A third species occurs fossil in the Pliocene deposits of the isle of Samos.

Aard-varks lead what would seem to us a very dull and monotonous kind of life, passing the whole of the day curled up in their deep burrows, which are generally excavated hard by the tall pyramidal hills made by the termites, and only issuing forth at night to dig in the mounds for their favorite insect food. Not a great many years ago it used to be said at the Cape that wherever a clump of termite hills was to be seen, there an aard-vark's burrow might be pretty confidently expected. Unfor-

tunately, however, as we learn from a recent report of the agricultural department of the Cape Colony, this is no longer the case, and the aard-vark of that district runs a good chance of being exterminated at no very distant date.

This deplorable result is being brought about by the incessant pursuit of these animals by the natives for the sake of their hides and flesh, and also to their being dug out by Europeans for so-called sport. Their flesh is said to be excellent, and is compared to superior pork; while the value of each hide is about fifteen shillings. This threatened extermination is a very shortsighted policy on the part of the South African farmers, to whom the aard-vark (as the report before us points out) is a valuable ally, not only on account of the enormous number of termites it consumes, but likewise from the circumstance that while it is engaged in digging for these insect pests it covers with loose earth a quantity of the seeds of grass and other pastoral herbage which would otherwise perish during the hot season. Although there is no likelihood at present of the Ethiopian aard-vark sharing the threatened fate of its southern cousin, yet the extermination of the latter would be a sad loss to zoological science, and we therefore wish every success to a movement which we hear has been set going by the Cape Farmers' Association for the protection of this most strange and curious creature ere it be too late.—*Knowledge*.

In the way of belting, leather is not going to have everything its way as formerly. The substitution of camel's hair, cotton, paint and chemicals for leather belting is said to be meeting with some success in this country. It was first invented in England, and it is claimed for the new material that it is stronger than other belting, more durable, more efficient and as low priced.

RECENTLY PATENTED INVENTIONS.

Engineering. BOILER.—William Mooney, Atlantic Highlands, N. J. This invention relates especially to improvements in locomotive boilers, providing means whereby the steam taken from the dome will be very dry.

Gauge Cock.—James D. Mitchell, Marquette City, Mich. This is a device which can be readily applied to any boiler, but is more especially designed for use on boilers in which a high steam pressure is carried.

Railway Appliances.

CAR COUPLING.—John L. Smith, Ogden, Utah Ter. This is a simple and efficient automatic car coupling, the device permitting easy uncoupling from either the top or sides of the car.

CAR COUPLING.—Patrick Lee and John A. O'Farrell, Boise City, Idaho. This is an improvement on a formerly patented invention of one of these inventors, the coupling thus improved being simple and durable in construction, very effective in operation, and arranged to be readily taken apart when desired.

Mechanical.

SCREW CLAMP.—Joseph Frank and Frank H. Frankenberg, Pueblo, Col. The base of the body of this clamp is rabbeted, to slide in a guideway formed in a detachable base plate, through which projects a fastening screw, to facilitate securing the clamp in position for use.

NUT AND BOLT LOCK.—Charles M. Stetson, Rosario, Argentine Republic. This is an improvement in nut locks in which a key and a concave washer are employed in connection with a slotted bolt.

Agricultural.

CULTIVATOR.—Thurston Lull, Ainsworth, Neb. This cultivator is adapted to cultivate listed corn and other crops, the knives and shovels being adjustable and so constructed as to completely cultivate all the ground between the rows, throwing up the dirt as much as necessary to each row without covering up the growing corn.

ASPARAGUS BUNDLER AND CUTTER.—John S. Van Mater, Hazlet, N. J. In a suitable frame are oppositely arranged stationary and swinging curved jaws, the swinging jaws having their lower ends formed into racks to which is geared an oscillating crank shaft moved by a lever.

HAY LOADER AND CARRIER.—Denise McCarthy, Columbus, Ohio. A framework on suitable supporting wheels has at its rear end a mechanism for raking, elevating, and discharging the hay into a storage box in which the hay is to be carried to the stack.

Miscellaneous.

BLANK FORM FOR KEEPING ACCOUNTS.—Theodore M. Brown, Cazenovia, Minn. This invention provides a form of account designed to effect a great saving of labor and time in keeping daily debits and credits and ascertaining and recording daily balances.

so as to be ascertainable at a glance, and the total debits and credits accrued and given each day, as well as during the whole period business has been carried on.

COIN OPERATED PHOTOGRAPH MACHINE.—Pierre V. W. Welsh, New York City. This machine has an exposure opening in the front side of the main case, beneath which is a delivery tray, while above is a coin chute, the deposit of a coin in which sets in motion a main shaft whereby all the operations of taking and finishing a picture are effected.

STORE SERVICE APPARATUS.—Abram J. Slonecker, Farmersville, Mo. This is a simple and efficient apparatus for carrying money and merchandise from one part of a building to another. It has two parallel wires, a lever mechanism for moving them and changing their inclinations, and a carrying on the upper wire has catches to engage balls on the lower wire.

DRIER AND CARBONIZER.—Michael J. Spencer, Lawrence, Mass. This is a machine for drying and carbonizing wool or other fibrous material, there being arranged within a casing provided with a fan or blower a series of belt carriers, by which the material fed into the casing will be continuously moved until it is thoroughly dried, thus enabling the material to be dried at a comparatively low temperature, the carbonizing to be effected at a higher temperature.

SELF HOISTING FLOOD GATE.—Herbert A. Corlies, St. Helen, Oregon. This gate moves upward on a roller journaled in the sluiceway, being forced up by the water pressure, and locked in place by a ratchet mechanism. The improvement is intended for use in flumes through which logs are floated, where the water reservoir is small and it is necessary to save the water to flush the flume, to float the logs quickly through it and then shut off the water.

BOTTLE FILLING APPARATUS.—Amalia M. Donally, New York City. Combined with a flexible filling tube is a compressing device for compressing the tube to cut off the flow of the liquid, with mechanism for raising and lowering the compressing device, and to lower and raise the tube in and out of the bottle, a number of tubes being operated simultaneously, and each one regulated independently as desired.

FENCE.—James F. Ogletree, Stinson, Ga. A fence to be constructed in panels, readily disconnected for transportation, and easily set up on uneven as well as on even ground, is provided by this invention. Each panel has two end posts, with a central post also for long panels, and the construction is such that the panels have an interlocking connection, the top and bottom rails bearing on opposing end posts in opposite directions, thus forming an effective tie between the panels, while links connect the top and bottom portions of the end posts.

TRAWL ROLLER.—John B. J. D'Entremont, East Pubnico, Canada. This is a grooved roller mounted in a yoke and has its sides recessed and ratchet wheels mounted therein, there being boxes in which are gravity pawls on the inner sides of the upper ends of the members of the yoke. A brake mechanism is thus provided, whereby the rollers may be readily turned in a direction to admit of the trawl lines being drawn in readily, the mechanism automatically preventing the roller from turning outward.

PHOTO PRINTING INDICATING TABLET.—John Ready, Boonville, N. Y. A simple device for indicating the number of prints taken from a negative, and showing the condition of the print when last inspected, is the object sought by this inventor. A frame is provided with two openings and a recessed back in which is inserted a celluloid or other tablet for marking on with a pencil, while there is also a slide in the recess showing through one of the openings of the frame, the slide being suitably colored, and indicating the condition at the last inspection of the print being made.

CLOTHES HANGER.—Theodore M. Garrison, Hazleton, Pa. This is a simple and inexpensive device which can be readily opened out for use and readily folded in compact space when not needed. The frame or support proper is formed of sections having sliding connections, whereby the hanger body can be readily extended or folded in, the lower end of such body being placed against a wall and its upper portion held tilted forward by means of a supporting cord passing through a sheave hanger.

BELT SUPPORT.—Louis Sanders, Brooklyn, N. Y. This is a device which may be moved freely on the belt, and has a jaw or clamp to engage a button of the trousers in connection with which the belt is used. It is made of a loop of flexible material, on the rear face of which is a stiffening plate carrying a clamp. The device prevents the belt from slipping, is inexpensive, and may be highly ornamented.

SHIRT ADJUSTER.—John H. Billings, New York City. An elastic band, whose length is adjustable by a buckle, has at its lower end a fastener adapted to engage a button of the drawers, and is connected at its upper end with the base plate of a stud or button, for buttoning on the shirt tab below the bosom. The device is very simple, and designed to hold the shirt bosom down tightly and yet permit the necessary freedom of movement to the wearer.

EGG CUTTER.—Ernest Berrini, Tacoma, Washington. This is a device for cutting off one end of an egg, by parties at a table or by a waiter, without any liability of soiling or burning the fingers. It consists of a knife having a socket to fit over the upper end of the egg, as it is held in the egg cup, a spring-con-

trolled and latch-governed plate being then locked in open position and tripped, when the blade cuts through that portion of the shell beneath the socket of the knife.

DESIGN FOR SPOON HANDLE.—Austin F. Jackson, Taunton, Mass. This handle has at its larger end a special arrangement of the leaves, fruit, and blossoms of the orange tree, with a cluster of three oranges, the outer edges giving an irregular outline to the margin of the handle.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

ICE MAKING MACHINES. The theory of the action of the various forms of cold-producing or so-called ice machines. Translated from the French of M. Ledoux. By J. E. Denton, D. S. Jacobus & A. Riesenberger. New York: D. Van Nostrand Company. 1892. Pp. lviii, 190. Price 50 cents.

Mathematics of ice-making machines are somewhat elaborately treated of in this work, which is one that no advanced engineer in this department of work should be without. The technical nature of the book rather prohibits an effective review within the space at our command.

PRACTICAL ELECTRIC LIGHT FITTING. By F. C. Allsop. With 224 illustrations. London: Whittaker & Co. Pp. xv, 275. Price \$1.50.

The subject of wiring buildings for the production of the electric light in all its details of practical work is here given in considerable detail. Not only is the subject of buildings treated, but something of the theory of the subject and of the different systems of central station supply are also given.

THE ICE CROP. By Theon L. Hiles. New York: Orange Judd Co. 1893. Pp. 122. Price \$1.

The cutting and housing of ice, the construction of ice houses, the legal and sanitary aspect of the subject, the marketing of the product, artificial ice and cold air machines, and retarding houses without ice, are suggestive topics treated by our author.

ENGINEERS' SURVEYING INSTRUMENTS, THEIR CONSTRUCTION, ADJUSTMENT, AND USE. By Ira O. Baker, C.E. Second edition. New York: John Wiley & Sons. 1892. Pp. ix, 391. Price \$3.

Professor Baker in this work does something which has really been a desideratum. He treats of modern surveying instruments very fully, giving the most modern practice in their use. We note special sections devoted to the plane table and to telemeters, especially the stadia—subjects sometimes neglected by writers on surveying.

MAGNETISM AND ELECTRICITY. A manual for students in advanced classes. By Arthur William Poyser, M.A. London: Longmans, Green & Co. 1892. Pp. xi, 382. Price \$1.50.

This book is written for the English examination—something which usually casts a shadow of limitation of scope over the works designed for such uses. The book is intended as a student's manual, and certainly does not go beyond that point.

FIGURE SKATING, SIMPLE AND COMBINED. By Montague S. Monier-Williams, Winter Randell Pidgeon, and Arthur Dryden. With illustrations by Ronald Gray. New York: Macmillan & Co. 1892. Pp. xvi, 322. Price \$2.25.

It seems impossible that so large a book could be devoted to the art of skating, but, with its diagrams and text, the book seems very fully provided with matter. It is written from an English standpoint, the writer throwing out of consideration any other skate than the permanent fixed one, the recognized favorite in England.

OLD AND NEW ASTRONOMY. By Richard A. Proctor. New York: Longmans, Green & Co. 1893. 4to. Pp. 824, 31 plates, 472 wood cuts. Price \$12. Also in 12 parts at 90 cents each and 1 at 35 cents.

The publication of the "Old and New Astronomy" was announced in 1887, and the first part was published in March, 1888. At the date of Mr. Proctor's death, in September, 1888, Part VI. had been issued and Part VII. was in type.

SOUND AND MUSIC. By Rev. J. A. Zahm, C.S.C., Professor of Physics in the University of Notre Dame. Chicago: A. C. McClurg & Company. Pp. 452. 8vo. Price \$3.50.

This is the title of an extraordinary book by one of our foremost workers in science. The writer, in the outset, makes acknowledgment to two eminent workers in the same line, Professor A. M. Mayer and Dr. Koenig. The volume is one which on a cursory glance appears like a popular work on the subject, but a more intimate acquaintance with its contents reveals the fact that it is a thoroughly scientific treatise, one which will give to the student a practical and theoretical knowledge of the subject.

SINAI. By the Rev. Professor Sayce. London: Society for Promoting Christian Knowledge. New York: E. & J. B. Young & Co. 1892. Pp. 224. Price \$1.

This little book is one of the series entitled "Ancient History from the Monuments." The history of the biblical region is very fully treated here, considering the limited size of the work, and the little book will be found, from its systematic arrangement, a most excellent and valuable contribution to biblical history.

Any of the above books may be purchased through this office. Send for new book catalogue just published. MUNN & Co., 361 Broadway, New York.

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2. Plate in colors showing a residence at Bridgeport, Conn. Two perspective views, one interior view and floor plans. Messrs. Longstaff & Hurd, architects, Bridgeport, Conn. An excellent design.
3. A model dwelling at Holyoke, Mass., erected at a cost of \$6,000 complete. Perspective views and floor plans. H. W. Coolidge, architect, Holyoke. A pleasing design.
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