should you show a partial care for the back and outsides of the rearmost teeth, above and below. After each and every meal use a quill toothpick, waxed silk floss, and rinse the mouth with moderately cold water. The intention of these is simply to remove food from among the teeth. Decomposed acidified food, animal or vegetable, is the worst enemy your teeth have now to encounter. The enemy, the combat, and the prize are before you! Will you win or lose?

If I have learned how to place your teeth in their present condition of health, I have learned, also, how you may keep them so—as I, in my operations, have employed appropriate implements, so must you in yours.

These implements are always on hand for those who want them. I do not obtrude them upon any one: I merely state the fact that they are attainable. Employ other means—trust to other implements if you will—but in that case absolve me from all responsibility.

We are about to part. Come and see me at least once a year for inspection. This is important. Should you then exhibit evidences of having performed your part of the saving process, a mutual gladness will be ours—that we have not labored and suffered in vain.

Finally—be earnest. If I have been faithful, skillful, efficient, it is because I have been earnest. Earnest thought—earnest will—earnest action—never fail! They are the synonyms of success.

THE NEOMORPHA.

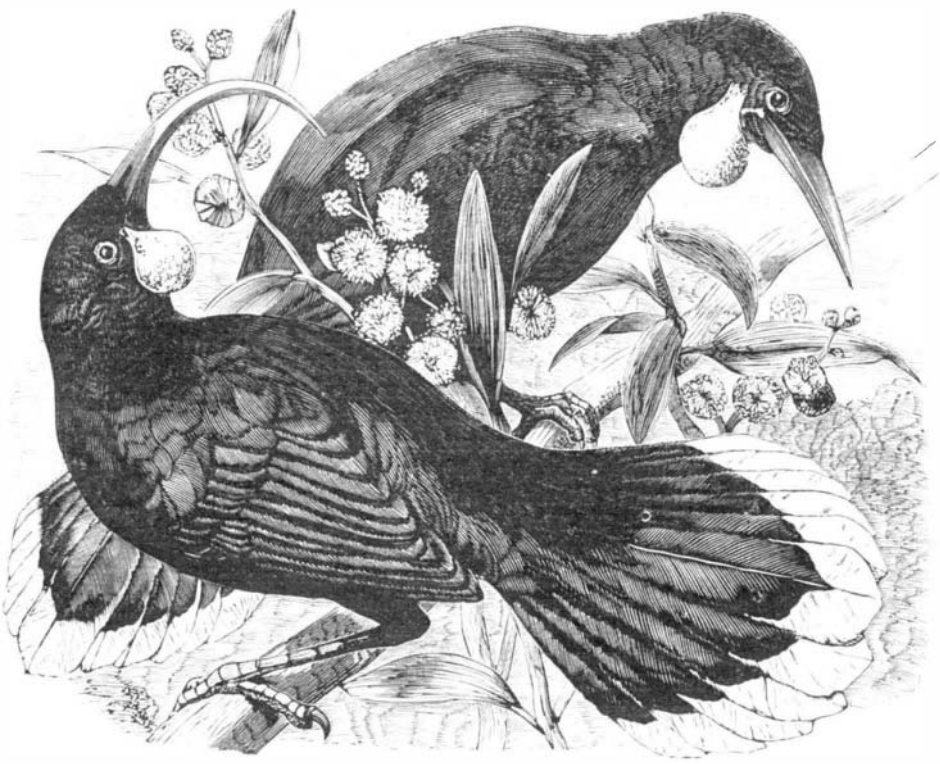
The very remarkable bird which is depicted in the accompanying engraving has been very appropriately named neomorpha, or new-form, as it exhibits a peculiarity of formation which, so far as at present known, is wholly unique.

The locality and habits of the neomorpha are briefly but graphically described by Mr. Gould in the following passage, which is taken from his "Birds of Australia:" "These birds, which the natives call *E Elia*, are confined to the hills in the neighborhood of Port Nicholson, whence the feathers of the tail, which are in great request among the natives, are sent to all parts of the island. The natives regard the bird with the straight and stout beak as the male, and the other as the female. In three specimens which I shot this was the case, and both birds are always together.

"These birds can only be obtained by the help of a native, who calls them with a shrill and long-continued whistle, resembling the sound of the native name of the species. After an extensive journey in search of them, I had the pleasure of seeing four of them alight on the lower branches of the tree near which the native accompanying me stood. Anxious to obtain them, I fired; but they generally come so near that the natives kill them with sticks."

In the coloring of its plumage it is, although rather dark, a really handsome bird when inspected in a good light. The general hue of the feathers is a very dark green, having a bright glossy surface. Upon each side of the neck is a fleshy protuberance or "wattle," analogous to the wattle of the common turkey, and of a rich orange color during life. The tail is of the same deep black-green as the rest of the body, but the uniform monotony of the tint is pleasingly interrupted by a broad band of pure white which is drawn around its edges. The bill is of a rather dark brown color, and is lighter toward the extremity than at the base.

We take our illustration from Wood's "Natural History."



GOULD'S NEOMORPHA.

Natural History Notes.

The Reproduction of Eels.—It has always been a mystery how and where eels are developed, and many fanciful and singular statements have been made regarding the method of reproduction of this very common fish. For instance, not long since we saw it stated that Seth Green believes eels to be merely hybrids between other species of fish, and consequently incapable of reproduction. Doubt on this subject, however, has finally been set at rest by the discovery of eels with eggs—a discovery due to Mr. V W. Edwards, of Wood's Hole. According to the proceedings of the Boston Society of Natural History, recently issued, Mr. F. W. Putnam, at a meeting of the society in January, exhibited one of the eight specimens procured from the market at New Bedford by Mr. Edwards, and by him sent to Professor Alexander Agassiz. The specimens were all of one species, the common fresh and salt water eel (*Anguilla bostoniensis*). In allusion to this subject, Mr. Putnam remarked that all that is known at present is that "this year, for a month past, the eels brought into New Bedford are with eggs in various stages of development. Where they spawn is as yet unknown." The eight specimens examined by Mr. Putnam had ovaries in various stages of development. In two the ovaries were very small, and the eggs exceedingly minute. From these the series showed a gradual increase in the size of the ovaries and the contained eggs. In the specimen exhibited, the eggs were still so small as only to be seen by a lens of considerable power, and not yet ready to be excluded, though the ovaries were large and full. These circumstances seem to point to the fact that, contrary to the usual slow development of eggs in fishes generally, eels rapidly attain their seasonal development; the ovaries, immediately after the eggs are laid, being reduced to a minute size. In the specimen exhibited the ovaries were white, slightly plicated, and of great length, extending from the base of the liver along each side of the intestines to and beyond the anal opening; the left ovary passing for some distance into a cavity of the muscles on the side of the anal fin, while the right ovary does not extend quite so far. When the eggs reach maturity they are dropped into the abdominal cavity, from which they must pass by two very small peritoneal outlets on each side the anal opening and just back of it. These female eels were all silvery on the under side, being the variety known as "silver bellies." It would be interesting to know whether the "golden bellies" variety are the males of the fish.

Habits and Intelligence of the Yellow Hornet.—Mr. Thomas Meehan exhibited, before the Philadelphia Academy of Natural Sciences, young branches of the European ash (*Fraxinus excelsior*), and of the common lilac, which had been stripped of their bark during the summer by the large yellow hornet (*Vespa maculata*). The insects had been carefully watched at the work. They visited these trees in large numbers, and carried the strips of bark away in their mouths. For what purpose they used the bark could not well be ascertained. It is usually supposed that they collect the matter from which their huge nests of paper-like material are made from fences and other dead woody matter. Mr. Meehan thought it remarkable that the insect should collect from plants of the same natural order only, as careful examination of other plants in the vicinity could decide. This hornet, he remarked, was gifted with great intelligence. On one occasion he had observed one with a summer locust, several times its own size, endeavoring to rise with it from the ground and fly away, but failed from the great weight of the locust. It then walked with its prey about thirty feet to a tall maple, which it ascended to the top, and then flew off with its burden in a horizontal direction. There was more than instinct in this act; there was reasoning on certain facts, and judgment accordingly, and the insect's judgment proved correct.

A Living Fish Line.—In the ocean, down among the sea weed stems and pointed rocks, we perceive a long, black, tangled string, like a giant's leather boot lace set to soak. Let us trace it in its various folds and twists, and disentangle some of it; we shall then have in hand a tough, slippery India-rubber-like substance, which might well be pronounced a sea string, and classed with the long trailing weeds among which we have found it. It is a sea string, but not a weed; in fact, a living lasso, capable of consuming the prey it incloses within its treacherous folds. From twenty to thirty feet is no uncommon length for this artful animated fishing line to reach, but its diameter rarely exceeds an eighth of an inch. It has a mouth, however, capable of considerable distention and holding power. Nothing can appear more innocent than this delicate-looking creeper, trailing here and there, as the water wells and flows with the incoming tide. Let an unwary tube dweller, lulled into a false security, stretch forth its tentacles to meet the welcome waves, and a pointed head is adroitly insinuated; the mouth effects a tenacious grasp on the yielding tissues, and the tenant of the tube becomes food for the "long sea worm" (*Nemertes borlassii*), for such is the name of the cord-like freebooter. This strange animal belongs to a group of worms closely allied to the entozoa (parasitic worms), having flat, soft, and often very contractile bodies, but their chief distinguishing characteristic being that they are entirely covered with cilia, by the movements of which they glide over any smooth surface. The length of this extraordinary production of nature is positively prodigious, and its whole history has more the appearance of fable than of sober truth. Charles Kingsley took more than ordinary interest in this creature. He inquires, "Is it alive? It hangs helpless and motionless, a mere velvet string, across the hand. Ask the neighboring annelids, and the fry of the rock fishes; or put it in a vase at home and see. It lies motionless, trailing itself among the gravel. You cannot tell where it begins or ends. It may be a strip of dead sea weed, or even a tarred string. So thinks the little fish, who plays over it and over it, till he touches at last what is too surely a head. In an instant a bell-shaped sucker mouth has fastened to its side; in another instant, from one lip, a concave double proboscis, just like a tapir's, has clasped him like a finger. And now begins the struggle, but in vain. He is being 'played' with such a fishing-rod as the skill of a Wilson or a Stoddart never could invent; a living line, with elasticity beyond that of the most delicate fly-rod, which follows every lunge, shortening and lengthening, slipping and twisting round every piece of gravel and stem of sea weed with a tiring drag, such as no Highland wrist or step could ever bring to bear on salmon or trout. The victim is tired now, and slowly yet dexterously his blind assailant is feeling and shifting along his side till he reaches one end of him; and then the black lips expand, and slowly and surely the curved finger begins packing him end foremost down into the gullet, where he sinks inch by inch, till the swelling which marks his place is lost among the coils, and he is probably macerated into a pulp long before he has reached the opposite extremity. Once safe down, the black murderer contracts again into a knotted heap, and lies like a boa with a stag inside him, motionless and blest."

The Toilet Habits of Ants.—The Rev. H. C. McCook, whose valuable observations on the habits of ants we have before had occasion to record, states that the agricultural ant (*Myrmica*)—and the remark applies to all other ants of which he has knowledge—is one of the neatest of creatures in her personal habits. He has never seen one of his imprisoned harvesters (either *M. barbatus* or *M. crudelis*) in an untidy condition. They issue from their burrows, after the most active digging, even when the earth is damp, without being perceptibly soiled. Such minute particles of dirt as cling to the body are carefully removed. Indeed, the whole body is frequently and thoroughly cleansed, a duty which is almost invariably attended to after eating and after sleep. In this process the ants assist one another; and it is an exceedingly interesting sight which is presented to the observer when this general "washing up" is in progress. They gather in groups upon the earth, cleanse themselves and each other, and sleep. The first operation was observed to be as follows: The ant to whom the friendly office is being administered is leaning over upon one side, as we begin the observation. The cleanser is in the act of lifting the foreleg, which is licked, the mouth passing steadily from the tarsus up to the body; next the neck is licked, then the prothorax, then the head. The attitude of the cleansed all this while is one of intense satisfaction, quite resembling that of a family dog when one is scratching the back of his neck. The insect stretches out her limbs, and, as her friend takes them successively into hand, yields them limp and supple to her manipulation. She rolls gently over upon her side, even quite over upon her back, and, with all her limbs relaxed, presents a perfect picture of muscular surrender and ease. If analogies in nature were not so apt to be misleading, we might venture to suggest that our insect friends are thus in possession of a modified sort of emmetonian Turkish bath. The ants engaged in cleansing their own bodies have various modes of operating. The forelegs are drawn between the mandibles, also through and along the lips, and then passed alternately back of the head, over and down the forehead and face, by a motion which closely resembles that of a cat when cleansing with her paw the corresponding part of the head. The hairs upon the tibia and tarsus seem to serve the purpose of a brush and comb, and Mr. McCook thinks that the object in drawing the leg between the mandibles or through the teeth is to straighten up the hairs, and thus increase their efficiency for service. Moisture from the mouth is evidently used for washing. He has seen one ant kneel before another, thrust forward the head under the face of the other, and lie motionless, expressing quite plainly the desire to be cleansed. The other ant understood this, and went to work. The amount of time devoted to these toilet duties is very great with im-

prisoned ants, but is probably not so great in a state of nature. Mr. McCook suggests that with ants, as with men, an artificial condition of society gives inducement to a larger devotion to personal appearance.

ASTRONOMICAL NOTES.

BY BERLIN H. WRIGHT.

PENN YAN, N. Y., Saturday, September 28, 1878.

The following calculations are adapted to the latitude of New York city, and are expressed in true or clock time, being for the date given in the caption when not otherwise stated.

PLANETS.

	H.M.		H.M.
Mercury rises	4 27 mo.	Saturn in meridian	11 29 eve.
Venus rises	4 29 mo.	Uranus rises	3 08 mo.
Mars rises	5 40 mo.	Neptune rises	7 13 eve.
Jupiter sets	0 15 mo.	Neptune in meridian	2 02 mo.

FIRST MAGNITUDE STARS, ETC.

	H.M.		H.M.
Alpheratz in meridian	11 31 eve.	Procyon rises	0 46 mo.
Mira (var.) rises	7 54 eve.	Regulus rises	2 50 mo.
Algol (var.) in meridian	2 32 mo.	Spica	invisible.
7 stars (Pleiades) rise	7 41 eve.	Arcturus sets	8 51 eve.
Aldebaran rises	9 00 eve.	Antares sets	8 11 eve.
Capella rises	6 27 eve.	Vega in meridian	6 02 eve.
Rigel rises	11 06 eve.	Altair in meridian	7 14 eve.
Betelgeuse rises	10 52 eve.	Deneb in meridian	8 07 eve.
Sirius rises	1 11 mo.	Fomalhaut in meridian	10 26 eve.

REMARKS.

Mercury rises 1h. 26m. before the Sun, and 6m. after the beginning of twilight. He is advancing among the small stars of the constellation *Leo*, being two thirds through the sign. There are no stars in his vicinity bright enough to be mistaken for him; the brightest being *β Virginis*, of the third magnitude. He will be in conjunction with Venus September 30. Their conjunction in right ascension occurs about 9 o'clock in the morning, and as Mercury has the greater apparent eastward motion in right ascension, he will, when first seen, be east of Venus. Venus will be the brighter and south of Mercury about ¼°. Mars is still too near the Sun to be seen. Jupiter will be near the moon October 4. Saturn is a trifle east of the equinoctial colure, and a line from Alpheratz through Algenib (the two eastern stars in the square of *Pegasus*) produced 30° southward will pass through him.

Astronomical Notes.

OBSERVATORY OF VASSAR COLLEGE.

The computations in the following notes are by students of Vassar College. The times given are merely approximations, but are sufficiently accurate for ordinary observers.

M. M.

Position of Planets for October, 1878.

Mercury.

On October 1 Mercury rises at 4h. 36m. A.M., and sets at 5h. 10m. P.M. It may be perhaps seen before sunrise. On October 31 Mercury rises at 6h. 59m. A.M., and sets at 5h. 2m. P.M.

Its path is so nearly that of the sun that it cannot be seen. Mercury, which is near Venus early in the month, passes south of it before the middle of the month.

Venus.

On October 1 Venus rises at 4h. 36m. A.M., and sets at 5h. 8m. P.M. It will be seen that at this time Mercury and Venus rise and set nearly together. On October 31 Venus rises at 5h. 49m. A.M., and sets at 4h. 35m. P.M.

Mars.

Mars is not likely to be noticed by the casual observer. It rises on October 1 at 5h. 38m. A.M., and sets at 5h. 32m. P.M., being a little south of the equator. On the 31st Mars rises at 5h. 20m. A.M., and sets at 4h. 18m. P.M.

Jupiter.

Although Jupiter has passed its best position, it is very conspicuous in the evening.

On October 1 Jupiter rises at 2h. 38m. P.M., comes to meridian at 7h. 16m. P.M., and sets at 11h. 54m. P.M. On October 31 Jupiter rises at 47m. after noon, and sets at 10h. 8m. P.M.

Jupiter is always interesting; the changes of position of the four moons give great variety to the views which can be obtained with a small glass.

If we take the hours between 8 and 10 P.M. for our observations, we shall find fourteen evenings in October when some one of the four satellites is invisible, and one evening when two are invisible.

The 1st satellite is lost to sight during a part of these hours on the 1st, 8th, 17th and 24th of October, by going behind the planet. The same satellite is unseen at these hours on the 9th and 16th, because it is in front of the planet and its light is lost in that of the planet.

On October 4 the 2d and 4th satellites are missing at the same time, both being behind the planet. The 4th (that which is furthest from the planet) goes behind the planet early in the evening; the 2d, which is the smallest of the moons, disappears later; from 9 to 10 P.M. Jupiter is seen with two moons only.

October 13 the 2d satellite is not seen until after 9 P.M., as its light is lost in that of Jupiter, and on October 20 the same moon is again invisible because it is between us and the planet in transit. On October 22 this satellite may be seen to reappear from an eclipse, it having passed through the shadow of Jupiter.

The 3d satellite, which is the largest, is not seen on October 5 until it has passed off from the planet's face. On October 12, at about 9 P.M., this large satellite disappears (to small telescopes) by coming between the planet and our view; on October 23 it cannot be seen early in the evening, but comes out of the planet's shadow; and on October 30 it is not seen because it is behind the planet. Jupiter will be very near the moon October 31.

Saturn.

Saturn is in excellent position for evening observers. October 1 Saturn rises at 5h. 27m. P.M., and sets at 5h. 6m. A.M. of the next day. October 31 Saturn rises at 3h. 24m. P.M., and sets at 2h. 59m. on the next morning.

Saturn comes to the meridian at 11h. 16m. on October 1, at a height, in this latitude) of 45°. It can readily be known by its steady white light.

The ring which surrounds Saturn is seen now nearly on edge, so that to a small telescope it will seem like a line of light projecting on each side of the planet's disk. An ordinary telescope of perhaps two or three inches aperture will show the largest satellite, Titan.

Uranus.

Uranus will not be seen during October unless it be with a glass and in the early morning hours. Uranus rises on October 1 at 2h. 56m. A.M., and on the 31st at 1h. 5m. A.M.

Neptune.

Neptune rises on October 1 at 6h. 59m. P.M., and on the 31st at 5h. P.M. It will come to the meridian October 27th nearly at midnight, and its position is good, but to see it requires the best telescopes.

The Pigments of the Retina.

Some time ago we referred to the highly interesting experiments of Dr. Kühne, of Heidelberg, in connection with "visual purple"—that pigment of the retina which has been proved to be so susceptible to the influence of light. Following up his investigations, Dr. Kühne has published several important papers on the subject, the last of which appears in the current number of the *Journal of Physiology*. In the article under consideration, the author takes up the other retinal pigments, which are either not at all or only slightly affected by exposure to light.

In one of his previous papers he gives the method of preparation, the properties, and spectroscopic appearances of three distinct pigments of great stability, which he had discovered, and succeeded in isolating from the retina of a bird. In the same paper he simply mentions the black pigment of the retina, which he believes to be exceedingly stable, and but slightly alterable by light; but, while the paper was still in press, he discovered that this black pigment does not resist the action of light so perfectly as he was at first led to suppose, and is, after all, slowly altered by exposure; he therefore remarks that "if we consider the extremely widespread occurrence in the animal kingdom of the black pigment of the eye, and other similarly stable pigments, it is scarcely possible to repress the idea that these, in addition to visual purple, also represent visual excitants, or so-called visual substances, and are intended to be decomposed by light during life, and to yield those substances which stimulate chemically the terminal apparatus of the visual organ." He likewise directs attention to the remarkable fact that the retinal pigments of a bird he has discovered are so mixed with oil globules that the colors in the cones of the retina represent exactly half the colors of the spectrum, viz., from red to yellowish green, so that with their complementary colors they yield all the colors of the spectrum. He has observed, further, that these three pigments are most readily decomposed by blue light, less by green, and not at all by red.

The importance of these various discoveries of the able German histologist, in reference to vision, can scarcely be overestimated.

Insect Powder.

Why the flowers of the composite plants *Pyrethrum carneum* and *P. roseum*, when pulverized to form the well-known "Persian Insect Powder," should prove so destructive to insects, while perfectly innocuous to other forms of animal life, has not hitherto been understood. Rother, who has investigated the chemical composition of *P. roseum*, ascribes its active powers to the presence of an acid, or, more properly, of a glycoside, which he terms Persicin. It is a brown non-crystallizable substance, having the odor of honey, and when boiled with hydrochloric acid is converted into sugar and Persiretin. With alkalies it forms a neutral amorphous salt, as well as an acid crystallizable one.

Persiretin also behaves like an acid. The plant contains, in addition, an oily resin-like acid, Persiceïn. No alkaloid was found by Rother; Bellesone, however, obtained from the plant a crystallizable substance which exhibited exceedingly acetic properties. Hager, who has examined the flowers of both *P. carneum* and *P. roseum*, attributes their insecticide effects to the presence of two substances, one of which, a body allied to trimethylamine, is combined with an acid in the flower. This powder as well as the pollen has a peculiarly powerful effect as an irritant. Hager finds that aqueous or alcoholic extracts of the powdered flowers contain little of these ingredients, and consequently to be of no value as insecticides.

What Makes Success,

In business life two things are essential to success: First, sound judgment; second, activity. In all departments we find a greater deficiency in judgment than in other requisites. Long familiarity in a given department does not necessarily produce it, though this will undoubtedly aid and strengthen it. Only by reliance on one s self, and feeling individually responsible for the results of action founded on one's own efforts, can the fact be established of good or bad judgment. Special talent will not furnish it for a man who may have capacity for acquiring information, may be able to enter into learned discussions on supply or demand, may have vast knowledge of productions, their sources of supply, and their various uses, and still lack the ability to apply to practical and everyday use the benefits of such information.

So also one may become familiar with all the details of business through long experience in the service of others, and as a servant, or in an executive capacity, making himself invaluable without ever realizing the responsibility attached to individual discretion or judgment. In this belief we find an answer to the oft-repeated inquiry why so large a portion of business men are unsuccessful; to claim that so many fail to meet fair success through force of adverse circumstances, instead of permitting circumstances to control them. Men who have the capacity to comprehend the whole question presented to them, to properly weigh not only the side of success but of failure, and who understand the importance of right thinking and the full penalty of mistake, are the ones who succeed, and whether they get credit for having good judgment or not, they certainly exercise it.

Roses in Pots.

The ever-blooming roses are best for house culture in pots—because they bloom quicker and more continuously than any of the others, and besides this, their style and habit of growth are more bushy and better adapted to the purpose. They can be kept nicely with other growing plants, and with proper attention to their requirements will bloom freely. (1.) Do not use too large pots—if possible, not more than three or four inches. The rule is, one size larger than the plants have been grown in. The smaller the pot—provided, of course, it is large enough to contain the plant—the quicker and stronger the plant will start. It is very difficult to get a small plant to live and grow in a large pot. A rose will not bloom much till the pot is well filled with roots; therefore, small pots facilitate quick bloom. If the pots are old, they should first be thoroughly washed. If new, they should be soaked in water, otherwise they will absorb the moisture from the plant. (2.) Have good rich soil—mellow and friable. That made from old decomposed sods is best. If manure is used, it should be old and thoroughly composted; fresh manure is injurious. (3.) Put some bits of broken crockery, charcoal, or other similar material. in the bottom of each pot to facilitate drainage, then enough fine earth to raise the plant to a proper height. It should not be much deeper than it was before. Next put in the plant and spread out its roots as near their natural position as possible; then fill in fine earth and press firmly down with the hand. When done, the pot should not be quite full; a little space is needed for water. (4.) When first potted, water thoroughly, and if the sun is strong, shade for a few days; then give full light and air. Though the plant should not be allowed to wither for want of water, the earth should get moderately dry before watering again. Too much water is worse than not enough. Very little water is needed until the plant starts to grow.—*Guide to Rose Culture.*

Dyspepsia.

This malady, which is prevalent in all countries and especially so in the United States, has been ably treated, from a physiological standpoint, by Dr. J. Cornillon, of Vichy Springs, France. His lengthy paper on the relations of dyspepsia with constitutional diseases may be found in the SCIENTIFIC AMERICAN SUPPLEMENT of July 15 and 22, and will be read with interest and profit by all dyspeptic sufferers. Send 20 cents to this office for the two numbers, 132, 133.

New Agricultural Inventions.

Mr. George E. Clow, of Seymour, Ind., has patented an improved Scythe Snath Fastening, which consists of a ferrule formed with solid neck extension and enlarged head, slotted to receive and adjust the clamping loop. This device admits of a quick adjustment of the scythe on the snath.

Mr. John C. Welsh, of Stokes Station, Ill., has patented an improved Sulky Plow which possesses several novel features that cannot be properly described without an engraving.

The Deepest Mines in Nevada.

The Yellow Jacket is now the deepest mine on the Comstock lode, the greatest depth attained in it being on the 2,400 level, which is 2,833 feet below the Gould and Curry croppings, the datum line for the Comstock mines. The next deepest mine on the lode is the Savage, in which the greatest depth attained is 2,430 feet from the surface, or 2,643 below the datum line. The 2,200 level of the Yellow Jacket is equal to the 5,400 level of the Imperial; the latter is the third deepest mine on the lode.

ONE hundred and eleven thousand nine hundred and fifty-five persons visited the Paris Exhibition on the 15th of August, one of the chief holidays of the year.

AT a great shoe manufactory in Lynn, Mass., recently, a pair of kid side-laced woman's boots was made from the stock in just eleven minutes, in sight of visitors.