that the animal frame adapts itself to the kind of work re- not care to run the risk with alum powders. As to the quired of it; the muscles that come into play grow more and alumina salt being in an insoluble condition, I shall, in a more capable of performing it. This point is well observed future article, have something more to say, to satisfy the by comparing those whose labors affect one set of muscles scientific men; but I think the public will have received, chiefly with those accustomed to a great variety of motionthe hod carrier and the gymnast, for example.

The force of inertia is constantly experienced in every motion we make. We cannot even rise from a chair without leaning forward first, i. e., placing our bodies in a position favorable for overcoming their inertia. In leaping, flying, etc., the initial effort is always the greatest, much less force being afterward required to keep up the motion. All these efforts result in fatigue proportional to their intensity. average 1.2 inch from the ground at every step. In walking up stairs the force expended is much greater. By the time a lady has ascended three flights of stairs, she experiences more fatigue than after walking around two blocks in New York. The study of animal mechanics may be productive of great advantage to us, by leading us to a better understanding of the laws of fatigue and rest.

Professor Trowbridge's paper was followed by a discussion in which Messrs. Newberry, Warner, and Martin took part. Attention was drawn to the wonderful instinct by which birds so adjust the resisting surfaces of their bodies as to be able to sail across and even against powerful currents of air with apparent ease, and to another cause of superiority of animal over artificial mechanism, namely, the mysterious nerve communication by means of which the different organs transmit their sensations to the brain of the animal, and in return receive instantaneous commands, enabling them to adapt themselves to every emergency. C. F. K.

Correspondence.

Alum in Baking Powders.

To the Editor of the Scientific American:

Sik: In your issue of the 7th inst. I noticed an article on labor of fitting each die or chaser to the bead. the above subject by Henry Pemberton, Jr., as also some editorial remarks by yourself. With respect to Mr. Pemberton's remarks, I would state that it is evident he formed his opinion on entirely à theoretical basis. His opinion is one which would very probably be expressed by any number of persons who rely on theories instead of on facts. Mr. Pemberton states that when an alum baking powder is used in baking, the alumina of the alun; is precipitated and be comes insoluble by heating. A very distinguished scientific man writes to me, and says: "This is a matter of experiment, and facts thus obtained are undoubtedly worth far more than conclusions derived from theoretical considerations." This last paragraph has embodied in it my views on this subject, and it strikes me it would have been proper for Mr. Pemberton to have made a few experiments with bread or biscuits made with an alum powder, to see if the alumina was really in an insoluble or in a soluble condition, before expressing so decided an opinion. I am perfectly wellaware that when an alum baking powder is used in baking, the alum is transformed into another alumina salt, provided the constituents of the powder are combined in exact chemical equivalents. If, however, the constituents are not in exact equivalent proportion (which is more probable than otherwise, as chemical weights are seldom, if ever, adopted by manufacturers), there will be a certain per cent of alum left unaltered. There would, therefore, be present in the baked product in which may be either planed or fitted in with a file from the either case an alumina salt; and in the last, or more probable case, in addition to the alumina salt, some unaltered alum. So that, supposing a portion of the alum was transformed dies. Another style of chasers is constructed upon the ininto an insoluble alumina salt (which has not been proved as terchangeable system, with threads at each end, and are held yet in the baked product), it is evident persons eating the in the cases by studs, thereby becoming as serviceable as two baked product would run the risk of taking into their stomachs the unaltered alum. It is true the per cent of this would probably be small, but by its continued use would certainly bring about serious disorders in the system. As by merely turning a screw in the front of the head. The die regards the alumina salt, let us stop a minute. Wagner states: "The active principle of alum is evidently the sul- machine. One set of case dies can be removed and another phate of alumina, not the sulphate of potassa and ammonia." inserted in the head in less than one minute by changing a That alumina is the poisonous element of alum, I think the stop pin, projecting from the sleeve, from its position when following provings clearly demonstrate, which I take from the machine is working, to a point opposite a hole in the ing 8,248 hands, with a capital invested of \$5,714,032, paythat alumina bears the same relation to alum (being its is furnished with each machine. All the working parts of to tobacco. Supposing, again, that the alumina salt formed device is positive and requires but one movement of the lever in baking was in an insoluble condition (which I have already for unlocking and opening the dies or closing and locking. stated has not been demonstrated) and not considering the be willing to run the risk of eating the baked product, for fear that the heat of the oven was not in the proper condition to render it all insoluble. Supposing, on high scientific authority, I should state that a salt of antimony (take for example tartar emetic) if added to a cup of tea would be completely neutralized by the tannin or rendered "insoluble" for instance. How many persons would I find willing to constructed with the care and extreme accuracy for which drink the tea? Not many, I am quite positive; and this is the this company are so well known. view I think the public will take about alum baking pow-

A great advantage of animal over artificial mechanism is ket composed of wholesome constituents, I think they will after carefully reading the above, sufficient satisfaction or explanation to convince them that alum baking powders are most dangerous to use.

In answer to "Pro Bono Publico," I would state that my intention was in the beginning to expose injurious baking powders: not to advertise baking powders. It was necessary for me to select a good baking powder for comparison, which might have been any of the other powders other than the one selected, if I found it composed of wholesome elements. For Thus, in walking on a level plane, the body is raised on an me to publish the whole list and have my name on every baking powder can in the country, as I have been asked to do by a large number of manufacturers already, is more than I am willing to do, and also, I think, more than the public would think of asking of me. Respectfully,

HENRY A. MOTT, JR., Ph.D., E. M.

New York, November 28, 1878.

P. S.-Mr. Dooley insinuated to you that my analysis of his powder was not correct. Now, in justice to me and the public who wish only the truth, I suggest that Dooley publish in your paper a correct analysis of its composition. I found over 26 per cent of burnt alum in one sample.

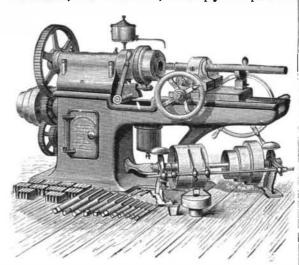
H. A. Mott, Jr.

IMPROVED BOLT CUTTER.

The annexed engraving represents a machine for cutting screw threads on bolts, and is one of superior design. It is 224 members of the solar system known. named the No. 5 National Bolt Cutter, and is adapted for cutting threads on bolts from one inch to two and a half incbes in diameter. Among other good features claimed by covered, the greatest number in one year. Prof. C. H. F. the manufacturers the following may be mentioned as the most prominent ones.

The die head is constructed to receive blocks or cases, with inserted chasers, forming the dies, thus doing away with the

The chasers, four in number, are simply flat pieces of



THE NATIONAL BOLT CUTTER.

steel, averaging about an inch and a quarter in length, and rough stock. A small screw in the end of the case sets the chasers forward as it becomes necessary to dress over the sets of dies. Broken or damaged chasers can be replaced by duplicates at little expense.

The adjustment of dies to the proper size is accomplished head can be quickly stripped without removing it from the

The die blocks are beld rigidly by the inclosing sleeve amount of alum left unaltered, I doubt if the public would when locked, and consequently cut bolts of more uniform diameter than is the case when the chasers or cutters can spring away from the bolt when cutting.

Machines of this description are made of various sizes, and for special purposes with the necessary modifications in gearing and proportions. They are supplied with all necessary adjuncts and facilities for lubricating the parts, and are

Further information may be obtained from the makers, ders. When they can obtain a number of powders on the mar- the Pratt & Whitney Company, of Hartford, Conn.

ASTRONOMICAL NOTES.

BY BERLIN H. WRIGHT,

PENN YAN, N. Y., Saturday, December 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. 451 mo. Uranus rises. Uranus rise	H.M. 9 16 eve. 7 52 eve.	

FIRST MAGNITUDE STARS, ETC.

H.M.		H.M.
Alpheratz in meridian 5 33 eve.		
Mira (var.) in meridian 7 44 eve.	Regulus rises	848 eve.
Algol (var.) in meridian 8 31 eve.	Spica rises	1 29 mo.
? stars (Pleiades) in merid. 9 11 eve.		
Aldebaran in meridian 9 59 eve.		
Capella in meridian 10 38 eve.		
Rigel in meridian 10 39 eve.		
Betelgeuse in meridian11 19 eve.	Deneb sets	0 07 mc
Sirius rises 7 10 eve.	Fomalhaut sets	8 21 eve.

MOON'S PLACE IN THE CO	NSTELLATIONS AT 7 P.M.
Saturday, Aqua us. 9° Sunday, Aquarius. 21° Monday, Pisces. 3° Tuesday. Pisces. 15°	Wednesday, Pisces 27° Thursday, Aries 9° Friday, Aries 21°

REMARKS.

Venus is still invisible, setting only 18 minutes after the sun. Saturn will be about 7° south of the moon December 30. The earth will be nearest the sun January 2, 1879.

Prof. James C. Watson, late of Ann Arbor, Mich., and Prof. Lewis Swift, of Rochester, N. Y., are, we believe, of the opinion that the planets discovered by them during the July eclipse are identical. Thus two planets were discovered within 2m. 52 seconds after the commencement of the search for them. Exclusive of comets, there are now

There are now 190 asteroids known, unless others bave been discovered since October 1. In 1875 there were 17 dis-Peters, of the Litchfield Observatory, Hamilton College, bas discovered the greatest number-31. Professor Watson follows bim in the list, having discovered 23. The following shows the number discovered in the different months, September being the lucky month:

January, 11; February, 15; March, 15; April, 24; May, 14; June, 8; July, 8; August, 21; September, 33; October, 16; November, 22; December, 3.

January 9 Neptune will be 10° 43m. 47 sec. south and 5° 10m. 48 sec. east of a Arietis. January 29 Neptune will be 10° 41m. 50 sec. south and 5° 12m. 45 sec. east of a Arietis.

A line from Lambda (91) Ceti through Mu (87) Ceti produced five degrees northwest, will pass very close to Neptune. Lambda and Mu form the northern side of a pentagonal figure (sides 3°-5°) in the Wbale's head.

New Mechanical Inventions.

Mr. James Griffin, of Mendocino, Cal., has patented an improved Saw Guille, that may be adjusted by the operator when the saw is in the cut, which is of special advantage when sawing long timber, and by which the wear of the parts is taken up in easy manner, so as to keep the guide always in good working condition.

Mr. Charles Galigber, of Cairo, Ill., bas patented an improved Millstone Curb and Chop Conveyer. In this contrivance the meal cannot choke up or become clogged, but falls freely from the vicinity of the stones as soon as it comes out from between them. Access of air is thus permitted to the stones, and the flour is not injured by detention between the grinding surfaces or by friction against the stone and curb.

Mr. Harrison W. Holley, of Hale's Ford, Va., has invented an improved Machine for Rolling and Cutting Tobacco, which consists, essentially, of three sets of pressure rolls, arranged successively close together, an endless feed belt passing through the first set of rolls, longitudinal knives on the second set, and transverse knives on the third set, all of said rolls being geared together, so as to press and cut the tobacco as it is carried through the machine by the endless belt.

Southern Factories.

According to a carefully prepared statement of Gen. L. P. Walker, of Alabama, that State has 2,118 factories, workmy Encyclopædia of Materia Medica: "It destroys the flange at the rear of the head, then, by means of the lever, ing annually in wages \$2,227,968, and yielding annually in appetite, produces sour eructations, heartburn, pain in the pushing the sleeve back to the flange, uncovering the cases, products \$13,040,644. Florida bas 630 factories, working abdominal ring, the rectum is rendered inactive, constipal and permitting their removal and replacement by hand. The 2,749 hands, with a capital invested of \$1,679,930, paying tion or loose bloody discharges are produced." From these machine can be quickly converted into a nut tapper by re- annually in wages \$989,592, and yielding annually in proprovings it will be seen that the effects of alumina on the moving the case dies and putting in their place a steel block ducts \$4,685,403. Georgia has 3,846 factories, working system are substantially the same as alum. That is to say, to which is secured a universal chuck for holding taps that 17,871 hands, with a capital invested of \$13,930,125, paying in wages \$4,844,508, yielding annually in products \$31,196,active principle) as morphine does to opium or nicotine dees the die head are protected from chips or dirt. The locking 115. Louisiana has 2,557 factories, working 30,071 hands, with a capital invested of \$18,313,974, paying in wages \$4.-593,470, yielding annually in products \$24,161,905. Mississippi has 1,731 factories, working 5,941 hands, with a capital invested of \$4,501,714, paying in wages \$1,579,428, yielding annually in products \$8,154,758. South Carolina has 1,584 factories, working 8,141 hands, with a capital invested of \$5,400,418, paying in wages \$1,543,715, yielding annually in products \$9,858,981. Texas has 2,319 factories, working 7,927 bands, with a capital invested of \$5,284,110, paying in wages \$1,787,835, yielding annually in products \$11,517,302. Aggregate number of factories, 14,884; aggregate number of hands employed, 80,948; aggregate capital invested, \$54,824,303; aggregate wages paid annually, \$17,-514,516; aggregate annual value of products, \$102,615,108.