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VOL. XXI., No. 24...[NEW SERIES.]...*Twenty-fourth Year.*

NEW YORK, SATURDAY, DECEMBER 11, 1869.

Contents:

(Illustrated articles are marked with an asterisk.)

WHAT WE HAVE DONE IN 1869, AND WHAT WE INTEND TO DO IN 1870.

We promised at the commencement of the present year to give increased value to the SCIENTIFIC AMERICAN, both in quantity and quality of the illustrations and general reading, and added the hope that with the hearty co-operation of our many friends we should greatly increase our circulation.

We have fulfilled our promise, and are happy to say that our hopes have not been disappointed. Numerous correspondents have expressed their satisfaction with our paper in such hearty terms as show our efforts in their behalf are thoroughly appreciated.

During the coming year we shall take still another step forward, and shall devote increased attention to the illustrations of foreign inventions, machines, designs for machinists' tools, and all matters of general industrial interest, at home and abroad. In doing this we shall incur a large additional expense, but we are resolved to spare neither pains nor expenditure to make our paper the most splendidly illustrated industrial journal of the age.

To reimburse us for this prospective expenditure, we must either increase our subscription list, or raise our subscription price. Our paper is now unparalleled in cheapness. Nothing approaching it in value is published anywhere in the world at our subscription price. Still we are resolved not to advance the rates. We rely upon the efforts of our friends to increase its circulation. Remember that for every subscriber you send us you will be remunerated in the increased value of the paper itself. Besides this remuneration we offer extra inducements in the cash prizes and splendid steel engraving, advertised in another column. The picture of some of the greatest geniuses of our age, is one which will adorn any gentleman's library, and nothing could be a more fitting ornament for an inventor's laboratory.

Those who intend to compete for the premiums offered in another column should be wide awake. We have already received encouraging letters from subscribers who propose to get up clubs, and the prospect is good that the work will go bravely on.

We are moving onward, Friends, and we mean to keep moving, and we here pledge ourselves that the SCIENTIFIC AMERICAN for 1870 shall keep march with the age in all that can adorn or improve it.

BRAIN AND MUSCLE.

It is an old proverb that what "one has not in his head he must have in his heels." This proverb is applicable to those whose memories are so treacherous that they find it necessary to go many times to perform what might have been done in once going. This old saw might have been made more comprehensive, at the expense of alliterative force, by changing it to "what one does not possess in inventive forethought he must make up for by muscular strength."

The intelligent, contriving workman, though his physical frame may be slight, is more than a match for the stupid, unthinking one, in any kind of work depending upon aught except blind strength. The former rises and the latter sinks in the scale of value, just as naturally as oil rises to the surface of water.

A man may expend a vast amount of muscular energy and do little work, and *vice versa*.

On one occasion we had a novel piece of work to get done, and took it to several shops, where its accomplishment was unsuccessfully essayed. After much trouble and expense we met a German friend, who being informed of our predicament, recommended us to a shop where he assured us we could get our work performed satisfactorily.

Being rendered somewhat skeptical by our previous experiences, we made some inquiries about the facilities of the shop recommended, and were told by our Teutonic adviser, that it possessed a tool not to be found in any of the shops previously tried, by which all sorts of difficult work impossible to the others could be quickly and excellently executed. We were curious to see this remarkable machinists' tool, which our imagination pictured as quite out of the usual run of lathes, planers, and common paraphernalia of the machine shop, but were at once informed that it would not be shown.

We sent our order to this shop by the hands of our adviser, and duly received it, just the thing we wanted. It was so satisfactory, that seeing the same gentleman a few days after, we pressed him for some description of the machine by which such a marvel of delicate and accurate work could be performed. He avowed that he could not describe it but he could give us its name. "Well what *is* the name?" cried, we.—"Brains" was the laconic reply.

Ah! what, not essentially impossible, can not be done with this great tool which the Almighty has bestowed upon man. But to use it skillfully requires practice. The commonest cause of failure is not want of natural mental ability but want of training; training that might have been attained through personal effort had its value been known. In fact all training, whether of brain or muscle, must be attained by personal exertion. The most that teachers can do is to direct, and give the best methods in which the process may proceed.

We are of those who believe the kind of training should be adapted to the intended life-occupation of the student. To the mechanic, or to any man whose occupation is connected more or less with constructive mechanics, inventive ability is of the first consequence. Not that by its exercise all will be enabled to make great improvements upon existing methods, or to strike out entirely new and original devices; but that all will, by its aid, be rendered more efficient mechanics, farmers, manufacturers, or chemists, as the case may be.

The farmer grubbing up the big stump in yonder field, is engineering on a small scale. The next stump he essays can not be got out in precisely the same way. He must modify his plan somewhat. He must *invent* a way to do it. Whether it will be the best way or the worst way, will depend upon the degree to which his inventive talent has been trained or neglected. He may break his chains and kill his team, or by skillful management uproot the unsightly stub which cumbers the ground.

This training may be constantly going on during the ordinary avocations of life. Every mechanic should feel that it is not enough to simply do a thing; it should be done in the best way possible. Studying how to do things is the best and surest way to get proper mental training. Where living teachers can not be obtained books may be. The nineteenth century in free America offers no excuse for ignorance.

THE SPIRIT OF THE AGE.

Certainly those papers which have assumed to condemn the establishment of a chair of positive philosophy at Harvard, and the publication of lectures of Professor John Fiske, the able expounder of "positivism" in that institution, by the New York *World*, have greatly mistaken the spirit of the age.

The thinkers of the period are struggling by every possible means to arrive at truth. They have disembarrassed themselves of all superstitious reverence for old doctrines and old beliefs, and have entered into their work with the determination to recognize nothing as true merely because it has long been accepted as such. They are obeying the injunction of St. Paul: "Prove all things."

The clamor of bigots against free thought and free discussion avails no more to stem the current of thought, than the howling of the wind below Niagara to stay the mighty cataract. If some—if all the men who are molding the thought of the age, are wrong in their conclusions, the prohibition of discussion in our public institutions is the very best way to perpetuate their errors. It has been in all ages by prohibiting discussion that falsehood and quackery have flourished. And no essentially false theory can ultimately outlast the scrutiny which is brought to bear upon it by free discussion.

Therefore, if positivism is a false philosophy, it has been brought to execution in its introduction to the thought which pervades our universities, and its enemies should ask no greater advantage than is given through its public exposition by one of its acknowledged champions, in the columns of a widely circulated journal. It thus offers itself to general attack, and its defeat is morally certain if it has not truth for its basis. Those who refuse to confront it are moral cowards, who do so only in the fear that their favorite creeds will suffer in the conflict.

PROGRESS OF LABOR.

In the reign of Henry VIII., artificers and laborers were compelled to eat horse-corn, beans, peas, oats, tares, and lentils. They slept on coarse straw covered with canvas, and lived in straw-thatched hovels of mud and wood, with the bare earth for a floor. They ate their food from wooden trenchers, and their clothing was of the coarsest possible materials. The laborer of to-day lives in what would have been considered a palace at the time of which we speak. He eats food which would have been deemed fit for a lord of Henry VIII.'s court, and commands furniture, clothing, books, and other mental and physical wealth which that monarch's kingdom could not have purchased.

In the three centuries which have since elapsed, labor has been constantly progressing more rapidly than capital, until at the present time the supremacy of the latter has become extremely doubtful, and many of the most careful thinkers of the age prophesy the speedy arrival of the day, when the present wages system must be abandoned for a co-operative system, in which labor shall enter into partnership with capital, and share profits according to its productive value.

THE STEAM ENGINE INDICATOR.

We are in receipt from the publisher, D. Van Nostrand, Nos. 23 Murray street and 27 Warren street, New York city, of a copy of a work on the steam engine indicator; being the treatise of Charles T. Porter, revised and adapted to American practice, by F. W. Bacon, M. E., Member of the American Society of Civil Engineers, with an appendix containing useful formulas and rules for engineers.

Were we called upon to prescribe the best method whereby a student could gain, not only the most easy but the most thorough theoretical knowledge of the laws which govern the formation and expansion of steam and the application of steam to the performance of work in engines, we should unhesitatingly recommend a course of study with the indicator. The indications of this beautiful instrument not only tell what is going on in the cylinder of an engine, but in doing this they lead the mind to the consideration of the fundamental principles of steam generation, as well as the doctrines of expansive force, latent heat, temperature, laws of condensation and radiation, and the subtile relations which all the phenomena of steam bear to each other.

Mr. Bacon has, in his revision of Mr. Porter's work, done the American engineering public a great service, and has supplied a valuable hand-book of reference and instruction. Mr. Porter's treatise has been for some time out of print, and the present revision has offered a good opportunity for the addition of much valuable matter, and the adaptation of the work to American practice.

The work commences with a full description of the indicator and the mode of applying it, and we are glad to see that Mr. Bacon has in this department been profuse in practical details which are apt to embarrass a novice. Next follows a discussion of the interpretation of indications, given in a plain and concise style, and perfectly comprehensible to men of ordinary intelligence. This part of the work contains a number of tables, by the use of which much of the labor in reducing indicator cards is avoided.

Mr. Bacon's method of determining where the true theoretic curve on a card intersects the ordinates is very clear, and will greatly assist beginners; the numerators of the fractions being constantly the number of the ordinate where the steam is cut off, and the denominator the number of the ordinate, the length of which is sought. This is well illustrated by a special diagram.

A great variety of diagrams is given. A careful study of these diagrams cannot fail to interest all who desire to understand the working of the indicator.

We herewith produce two of them, one of which was taken from an English locomotive engine, and the other from an American locomotive.

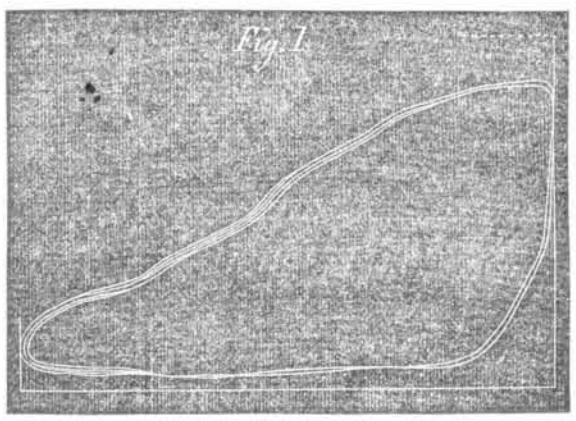

Fig. 1 is the English card, taken from the locomotive "Eagle," on the London and Southwestern Railway, in April, 1863. This diagram, with three others given by the author, are fair samples of a large number taken from the same locomotive.

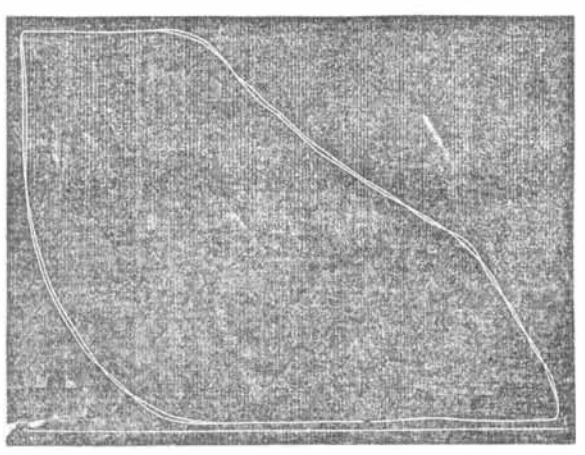

Fig. 2 is a diagram of a card taken from locomotive No. 50 on the Philadelphia, Wilmington, and Baltimore Railroad, in 1867. It was taken at sixty miles per hour, the piston making 1,222 feet per minute, with 305·46 revolutions.

In regard to this diagram, the author remarks: "Notwithstanding this extraordinary speed the lines are all well defined showing distinctly the points of cut-off and release. A remarkable point in the diagram is, that though the pencil passed over it certainly twice or more, the lines are very near to each other, showing that even under this unprecedented speed of piston, the instrument was uniform and reliable in its action. This is not a selected diagram, all others taken on the same trip show the same characteristics.

Leaving the interpretation of these diagrams to engineers, we pass to the appendix, which contains much useful information.

We shall also make a single extract from this portion of the work, which will sufficiently show its practical character. The extract relates to the measuring of steam used for heating.

"The engineer is often called to determine the amount of steam that is used to heat apartments, liquids, etc. This the indicator does not reveal directly, no further than it shows how much steam it requires for a horse power; varied, of course, by the point of cut-off and its efficiency.

"Under these circumstances we have followed the rule of Watt, which is to allow one cubic foot of water per hour for each horse power; hence we measure the water condensed in the heating pipes in a given time, and estimate accordlying.

"If it is inconvenient to reduce the water to cubic feet, it may be weighed, allowing 62·5 lbs. to the cubic foot, or it may be measured by the gallon, or 7·48 gallons per cubic foot.

"When the steam pipe enters the vessel, and it discharges the steam directly into the liquid to be heated, the water then cannot be caught to be measured; in that case we measure the increment of its contents, and thereby find the quantity of steam condensed."

On the whole, the work is one well adapted to the use of scientific and practical engineers, and cannot fail to be an important help to any who seek a complete knowledge of steam and its applications.

TO KEEP CELLARS FROM FREEZING.

An agricultural friend, at our suggestion, has tried an experiment with a cellar of an out-house, in which on several occasions vegetables have frozen, although the cellar was fortified against frost by a process known to farmers as "banking." The walls and the ceiling were pasted over with four or five thicknesses of old newspapers, a curtain of the same material being also pasted over the small low windows at the top of the cellar. The papers were pasted to the bare joists overhead, leaving an air space between them and the floor. He reports that the papers carried his roots through last winter, though the cellar was left unbanked, and he is confident they have made the cellar frost-proof.

We do not comsel the special use of old newspapers for this purpose. It is just as well or better to use coarse brown paper. Whatever paper is employed, it will be necessary to sweep down the walls thoroughly, and to use a very strong size to hold the paper to the stones. It is not necessary to press the paper down into all the depressions of the wall; every air space beneath it is an additional defense against the cold.

ANNOUNCEMENT FOR 1870.—A SPLENDID WORK OF ART AND CASH PREMIUMS TO BE GIVEN.

The SCIENTIFIC AMERICAN enters its twenty-fifth year on the first of January next, and to mark this period of a quarter of a century in which it has maintained its position as the leading journal of popular science in the world, we have purchased from the executors of the estate of the late John Skirving, Esq., and propose to issue on New Year's day, the fine steel engraving executed by John Sartain, of Philadelphia, entitled

"MEN OF PROGRESS—AMERICAN INVENTORS."

The plate is 22x36 inches, and contains the following group of illustrious inventors, namely, Prof. Morse, Prof. Henry, Thomas Blanchard, Dr. Nott, Isaiah Jennings, Charles Goodyear, J. Saxton, Dr. W. T. Morton, Erastus Bigelow, Henry Burden, Capt. John Ericsson, Elias Howe, Jr., Col. Samuel Colt, Col. R. M. Hoe, Peter Cooper, Jordan L. Mott, C. H. McCormick, James Bogardus, Frederick E. Sickles.

The likenesses are all excellent, and Mr. Sartain, who stands at the head of our American engravers on steel, in a letter addressed to us says "that it would cost $4,000 to engrave the plate now," which is a sufficient guarantee of the very high character of the engraving as a work of art.

The picture was engraved in 1868, but owing to the death of Mr. Skirving, a few copies only were printed for subscribers at $10 each. A work embracing so much merit and permanent interest to American inventors, and lovers of art, deserves to be much more widely known. We propose, therefore, to issue, on heavy paper, a limited number of copies at the original price of $10 each, to be delivered free of expense. No single picture will be sold for less than that price, but to any one desiring to subscribe for the SCIENTIFIC AMERICAN, the paper will be sent for one year, together with a copy of the engraving, upon receipt of $10. The picture will also be offered as a premium for clubs of subscribers as follows to those who do not compete for cash prizes:

For	10	names	one year	$30	one picture.
"	20	"	"	50	" "
"	30	"	"	75	two pictures.
"	40	"	"	100	three "
"	50	"	"	125	four "

In addition to the above premiums we also offer the following cash prizes:

$300	for	the largest	list of	subscribers
250	"	second	do	do
200	"	third	do	do
150	"	fourth	do	do
100	"	fifth	do	do
90	"	sixth	do	do
80	"	seventh	do	do
70	"	eighth	do	do
60	"	ninth	do	do
50	"	tenth	do	do
40	"	eleventh	do	do
35	"	twelfth	do	do
30	"	thirteenth	do	do
25	"	fourteenth	do	do
20	"	fifteenth	do	do

Subscriptions sent in competition for the cash premiums must be received at our office on or before the 10th of February next. Names can be sent from any post office, and subscriptions will be entered from time to time until the above date. Persons competing for the prizes should be particular to mark their letters "Prize List" to enable us easily to distinguish them from others.

Printed prospectuses and blanks for names furnished on application.

NEW PUBLICATIONS.

A MANUAL OF THE HAND LATHE. Comprising Concise Directions for Working Metals of all kinds, Ivory, Bone, and Precious Woods; Dyeing, Coloring, and French Polishing, Inlaying by Veneers, and various Methods Practiced to Produce Elaborate Work with dispatch and at a small expense. By Egbert P. Watson, Late of the SCIENTIFIC AMERICAN, Author of "The Modern Practice of Machinists and Engineers." Illustrated by Seventy-eight Engravings. Philadelphia: Henry Carey Baird, Industrial Publisher, 406 Walnut street. London: Sampson, Low, Son & Marston, Crown Buildings, 188 Fleet street. Price $1·50.

This work is eminently practical, and the information given is based upon the experience of the author. A brief extract from the work on the "Gluing in of Veneers," published in another column, will give a good idea of the plain and practical character of the book, and when we add that the subjects enumerated in the title above set forth are treated in the same clear and practical manner, we have said enough to convince the common-sense mechanic of the value of the work.

THE CHEMICAL FORCES—HEAT, LIGHT, ELECTRICITY. With their Applications to the Expansion, Liquefaction, and Vaporization of Solids; the Steam Engine, Photography, Spectrum Analysis, the Galvanic Battery, Electro-Plating, the Electrical Illumination of Light-Houses, the Fire Alarm of Cities, the Atlantic Telegraph, an Introduction to Chemical Physics. Designed for the Use of Academies, Colleges, and Medical Schools. Illustrated with numerous Engravings, and containing Copious Lists of Experiments, with Directions for Preparing them. By Thomas Ruggles Pynchon, M. A., Scovill Professor of Chemistry and the Natural Sciences, Trinity College, Hartford, Conn. Published by O. D. Case & Co.

A scientific book adapted to the student as well as the general reader is difficult to prepare. The author of this work has, however, shown himself skillful in meeting the difficulties of his task, though we think he displays something too much of caution in his discussion of modern views of the nature of molecular forces. In fact he can hardly be said to discuss them, contenting himself with their enunciation merely. In a work of this kind it would have been more satisfactory to have seen some more space given to this important subject. The correlation, convertibility, and equivalency of the physical forces are, however, well discussed. As the title promises, the industrial application of the chemical forces are noticed at considerable length, and it has been the aim of the author to produce a book not requiring of its reader an extensive knowledge of mathematics; it is well adapted to the use of the general reader. We notice that points liable to give difficulty to those not familiar with the subject are treated with special care, and are elucidated as only a teacher who has been accustomed to show pupils the way out of such difficulties could elucidate them. This is a valuable feature of the work, and one which will be appreciated by Mr. Pynchon's readers. We recommend the work as one of the best text-books we have met with upon the subject of which it treats.

STUDIER I GRUFBRYTNINGSVETENSKAP No. 2. UEBER GESTEINSBOHRMASCHINEN. Von Dr. phil. F. M. Stapff, Ascultant in der Bergabtheilung des Commercecollegiums. Mit Atlas enthaltend 11 theils Lithografirte theils ueberdrueckte Tafeln. Stockholm: A. Bonnier, 1869. [A TREATISE ON ROCK-DRILLING MACHINERY. By F. M. Stapff, *Ascultant* in the Mining Department of the Royal Commercial College. With an Atlas containing 11 sheets of Lithograph Plates. Stockholm: A. Bonnier, Publisher, 1869.]

This is a very copious and comprehensive treatise in the German language on rock drilling and cutting, with especial reference to mining, tunneling, etc., etc. The methods employed in the most celebrated works of this character are described, and the machinery discussed and illustrated in detail. The atlas sheets are large folio, each containing a large number of finely-executed drawings. The work is one admirably adapted to the use of engineers, and well merits an English translation.

THE AMERICAN BUILDER. Published by Charles D. Lakey, Chicago, Ill. Terms, $3·00 per annum.

The above is one of our most interesting exchanges, and we are please to learn that it is meeting with well deserved success.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The losses by fire in the United States, from last January to October, inclusive, amount to the large sum of $83,584,000.

M. Delaurier states that oxygen may be obtained very economically from manganate of lime, as this salt when heated gives off that gas very abundantly.

A surveying party of the San Diego, El Paso, and Memphis Railroad have passed the summit of the range of mountains between San Diego and Fort Yuma. They report the grade to be less than 100 feet per mile.

A writer in *Comptes Rendus* says that if articles made of copper be immersed in molten sulphur having lamp-black in suspension, they assume the appearance of bronze, and can be polished without losing that aspect.

It is stated that Mr. A. T. Stewart has purchased the block lying between North Twelfth and North Thirteenth streets, and First street and the East river, Brooklyn, for $200,000, and that he intends to build thereon a depot for the proposed railway to Hempstead.

Water collected from roofs or kept in tanks covered with zinc has been found by M. Zuirck to be so much contaminated by that metal as to prove detrimental to health, when used for domestic or industrial purposes. He recommends that such tanks or roofs be painted with asphalte varnish.

Chicago is going into the iron manufacture on a large scale, and with Lake Superior ores. A number of capitalists there have formed a company and contemplate the erection of a large mill at Joliet. Wrought iron gas and water pipes will form one feature in the production of the establishment.

The miners of the Wilkesbarre (Pennsylvania) Coal and Iron Company have a fund of five thousand dollars for the use of those of their number who may be disabled in any way. It was raised by each miner and the company giving the earnings of one day; one thousand dollars is to go to Avondale, and the balance in the above manner.

The Darien canal project is reviving. The United States steamer Nipsic, attached to the South Atlantic squadron, is under orders to proceed to the Isthmus of Darien to make surveys and explorations, with a view to determine the best location for an inter-oceanic canal. A similar survey on the Pacific shore of the Isthmus will be made at a future day. It is asserted that President Grant will recommend the early construction of this Darien ship canal in his forthcoming message. What truth there may be in the statement it is difficult to say, as never before has a president been so successful in preventing a premature publication of the contents of the annual communication to Congress.

M. Méne says that when woods of a naturally white color are painted over with a concentrated aqueous solution of permanganate of potassa, they assume the appearance of walnut wood. Different woods behave in a different manner when acted upon by this solution. The woods of the pear tree and the cherry tree are readily stained, while the white woods (the acacia, for example) resist a longer time, and resinous woods, as the fir, are still more difficult to affect. The *rationale* is that the permanganate of potassa is decomposed by the woody fibers; brown peroxide is precipitated and fixed by the potassa, which is afterwards removed by washing with water. The wood when dry is varnished, and is not easily distinguished from woods of a naturally dark color.

Correspondents of the *Chemical News* give two methods of constructing foot-paths: (1.) One part of Portland cement mixed with seven or eight parts of gravel, or old, hard rubbish, such as brick-bats, broken stones, etc., will make a neat, cheap, permanent garden walk, impervious to wet, and not readily affected by changes in the weather. (2.) A very good, and comparatively cheap foot-path may be made by laying down, first, a layer of coarsely broken-up old bricks, next, some middling coarse gravel, and over that a layer, from two to four inches in thickness, of small sea-shells. If care be taken to beat or roll the broken-up bricks and gravel into a somewhat solid mass, the shell-covered surface may be advantageously rolled in with a heavy iron roller, and will form even on soft sub-soil, a durable and inexpensive roadway.

GROOVED WHEEL RAILROAD BRAKE.—A novelty in railroad brakes, which seems to us to possess much merit, is the subject of a recent patent granted to R. d'Heureuse, whose address is Box 6,344, New York. Grooved wheels are employed between the running wheels of the truck, raised just enough to clear the rails, when it is desired that the speed be unimpeded; but when the motion is to be arrested or retarded, the grooved wheels are depressed upon the rails and the brake blocks forced down into the grooves, thus quickly effecting the purpose. This system of brake is operated by either hand or steam power, and with but a small expenditure of force. A model exhibited at the late American Institute Fair, worked well, and seemed to be a step in the direction of improvement. As the grooved wheels are arranged in the middle of the truck, the weight of the car would be sustained by them, in the event of an ordinary running wheel or its axle being broken, and many of the accidents so frequently occurring would thus be prevented.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

IMPERMEABLE PAPER COLLARS, CUFFS, ETC.—It is proposed to make these of paper which has been partially converted into vegetable parchment. It is well known that water has little or no effect on paper so prepared, and colors and patterns can be applied with the greatest facility.

PRESERVING ANIMAL AND VEGETABLE SUBSTANCES, ETC.—Mr. G. W. Perry, of Melbourne, Australia, treats the substances to be preserved as follows. They are first washed in a solution of bisulphite of lime and magnesia, and then dipped into a boiling solution of gelatin and bisulphite, and so, when dry, the substance is coated with an air-tight covering. In order to preserve animals, without removing the skin or feathers, a hot solution of bisulphite of lime and magnesia, with the addition of ten per cent of common salt must be injected into the blood vessels as soon as the blood is drained from the body, and before the carcase has become set. The viscera may then be removed, and the inside thoroughly cleansed and washed with the bisulphite solution. Fish, to be preserved, should be cleansed, the viscera removed, and then packed in barrels, filled with a pickle composed of salt and bisulphite solution. Liquids, too, such as ale and wine, or other fermented liquors, it is said, can be preserved in vessels, the inside of which have been washed with bisulphite of lime and magnesia.

MANUFACTURE OF SULPHURIC ACID.—This invention consists in the employment of ammonia, or carbonate of ammonia, to condense the nitric acid vapors escaping from the exit of the vitriol chambers. To accomplish this, ammonia, or carbonate of ammonia, is caused to come in contact with the escaping fumes, either in a cone tower or chamber. The fluid, thus resulting, is again afterwards decomposed with sulphuric acid, and the escaping nitrous fumes are returned into the vitriol chamber for the oxidation of the sulphurous acid. The patentee of this invention is Mr. Konrad Walter, Wicklow, Ireland.

MACHINERY FOR MANUFACTURING SEMOLINA AND FLOUR.—G. A. Buchholz, Shepherd's Bush, England.—The invention relates to a novel arrangement of apparatus for reducing hulled wheat to semolina, which apparatus by slight modifications, may be used to reduce the same to flour, the object being to effect such operations rapidly, and, when designing to manufacture semolina, to produce it with concurrent formation of a minimum proportion of flour or wheat dust. It is also designed to economize space in the mill by rendering the apparatus more compact than heretofore.

GRINDING MILL.—G. A. Buchholz, Shepherd's Bush, England.—This invention consists in the use of pairs of grooved rollers which are nicely adjusted to their work, and are speeded so that one roller will rotate from five to six times as fast as the other roller, and thereby reduce by a cutting in contradistinction to a crushing action, the gripped corn into particles of the required size.