Correspondence.

Where to find the Best Information on Electricity.

To the Editor of the Scientific American:

I see numerous correspondents ask what books will give them the best information on electrical science. Allow me to say that I have obtained more *practical* information out of the SCIENTIFIC AMERICAN and SUPPLEMENT than out of any set of books within my means to purchase. I have an almost unbroken file of the SCIENTIFIC AMERICAN since 1876, and such numbers of the SUPPLEMENT as contain articles of interest to me, and for the past two weeks have spent all my spare time rereading them, and was surprised at the amount of valuable information they contained.

J. S. BADGER.

Lake Geneva, Wis., Telephone Exchange, Feb. 13, 1884.

A Pocket Apparatus for Air Analysis.

Since the unwholesomeness of the air in a room or hall is nearly proportional to the percentage of carbonic acid (carbon dioxide) in the air, Dr. Wolfert, of Kaiserlautern, has devised a very simple apparatus for estimating this suspicious constituent *approximately*, to be used in school rooms, sleeping rooms, and public halls.

A small glass cylinder is filled to a certain mark with perfectly clear lime water, a very cheap article to be had at any drug store, or easily made at home. He then takes a small India rubber ball, or bulb, with a glass tube attached. On squeezing the ball until all the air is expelled it will, of course, fill itself with the air of the room. The tube is then allowed to dip into the lime water, and the air made to bubble through it by slowly, but steadily, squeezing the ball. When all the air is expelled, remove the tube from the lime water and allow the ball to fill again, taking care that no lime water is sucked into the tube or bulb. This is repeated until a precipitate of carbonate of lime is formed which obscures the numbers on the bottom of the cylinder. The number of times it must be repeated to effect this end increases with the purity of the air. Accompanying tables give the percentage corresponding thereto.

If the lime water is rendered so turbid as to be opaque by less than ten repetitions, the air is very bad, and cannot be breathed with impunity. If it requires from ten to twenty repetitions, a person may remain there for a short time. When more than twenty repetitions are necessary, the air is good enough for ordinary purposes. In sick rooms it should require at least thirty, and in contagious diseases, forty to fifty. The purer the air, of course, the longer the tests will take.

The apparatus is described in full in the *Centralblatt fur allgemeine Gesundheitsflege*, and is sold by Alt & Jaeger in Ilmenau at $1.25 to $4.

The Philadelphia International Electrical Exhibition of 1884.

This exhibition, to be held under the auspices of the Franklin Institute, will open September 2, and close October 11. Under a joint resolution of Congress, articles from abroad, imported solely for exhibition, may be entered free of duty. Exhibitors must pay an entrance fee of $5, and from ten to twenty cents per square foot for space. Exhibits will be classified as follows: Production of Electricity; Electric Conductors; Measurements; Applications of Electricity—1. Currents of low power—2. Currents of high power; Terrestrial Physics; Educational and Biographical. The exhibition building is the corner of Thirty-second Street and Lancaster Avenue, and will be opened for the reception of goods from August 11 to August 30.

On some Points in the Hygiene of the Ear.

Ordinarily the ear is not affected by exposure to the air. All tuberculous subjects, those of a strumous habit, and a considerable number who rank as peculiarly sensitive to atmospheric influences, are exceptions to the general rule. Damp air is much more apt to act perniciously than dry air. Sea-bathing is often injurious from the direct application of the cold water to the meatus giving rise to otitis media, or from the violent concussion of a wave upon the meatus, or the entrance of water into the Eustachian tubes. Fill the meatus with cotton and tell the patient not to inhale water or allow it to get into the mouth.

The effect of loud and discordant noises in the ear is often very pernicious. If the patient is removed from the noise before profound deafness results, he may spontaneously recover a good degree of hearing, or become wholly convalescent. Riding in railway cars with the windows open, ship-calking, and confinement in the never-ending clicking noise of the telegraph instrument may act perniciously on the ear. Musical sounds do not seem to do harm to the ears. Monotonous and discordant sounds seem alone to operate injuriously on the ears.

Cannon firing, or the discharge of firearms, or the concussion of any explosive sounds, especially when occurring unexpectedly, is likely to do great harm to the hearing. It may rupture the drum-head, or at once render the acoustic nerve unfit for functional activity. Hold the mouth open while the gun is being fired, so that the concussion may act simultaneously upon both surfaces of the drum membrane. The effect of compressed air, as experienced in the ears of divers, caisson-builders, etc., is often very pernicious. The principal mode of obviating such pernicious consequences is to cause a frequent interchange of air between the throat and the tympanum. This is accomplished by catheterization, either with the Eustachian catheter or Pomeroy's faucial catheter, or by Politzer's or Valsalva's operation. Sometimes simply swallowing, either with or without the stoppage of the nostrils, will be sufficient, in going from one compartment of a caisson to another having a different air pressure.

The ears require to be "changed," as the expression is, that is, induce an interchange of air between the throat and tympanum, so as to equalize the pressure. On the score of violence inflicted on the ear, the common practice of boxing the ears of children is liable to result in serious damage; pulling and pinching the auricles is much to be reprehended. With reference to the prevention of impaction of cerumen in the meatus, disease of the ears for the most part may be predicated when this tendency exists, and no efforts at cleanliness can prevent it. *Sunstroke* occasionally affects the hearing unfavorably—*The Medical Record.*

Obscuring Glass.

There are many ways of accomplishing this, some of the plans making the glass permanently frosted, others only temporarily so. For permanence, take a flat piece of marble, dip it into glass-cutters' sharp sand, moistened with water; rub over the glass, dipping frequently in sand and water. If the frosting is required very fine, finish off with emery and water. As a temporary frosting for windows, mix together a strong, *hot* solution of Epsom salts and a clear solution of gum arabic; apply warm. Or use a strong solution of sulphate of soda, warm; and when cool, wash with gum water. Or dab the glass with a lump of glazier's putty, carefully and uniformly, until the surface is equally covered. This is an excellent imitation of ground glass, and is not disturbed by rain or damp.

Impulses of Fools.

That by far the greater number of calamitous occurrences are attributable to impulses of fools appears from the investigations set on foot to locate the blame for the January chapter of horrors.

In nearly every instance the cry was raised, at first blush, that the owners of the vehicle of death were answerable for the mishap, and they were berated soundly for supposed criminal negligence, indifference to loss of life, or avaricious disregard of laws providing for the safety of passenger or employe. Subsequent inquiry, however, rarely failed to elicit the fact that but for the unaccountable behavior of a subordinate, against whose fatal conceits it were impossible to guard, the deplorable happening would not have come to pass.

Now and then, as in the case of the burning of a convent at Belleville, Ill., the loss of life was due to a lack of precaution against manifest dangers and the absence of ordinary avenues of escape. But in most instances, as in the railroad collision at Toronto, the bursting of a boiler at Rochester, N. Y., the wrecking of the steamer City of Columbus, and the mine explosion in Colorado, besides a score of calamities less fatal (including, possibly, the Broad Ripple disaster), the blame has been fastened upon those in position to bring about disastrous results by swerving from the line of duty—by departing from a strict observance of the rules and regulations laid down for their guidance.

A conductor's rash determination to run his train upon a certain siding, regardless of orders to the contrary, resulted in the death of thirty or forty persons at Toronto. An engineer conceived the daring plan of increasing the capacity of an engine by hanging a few bricks to the safety valve, the outcome of which novel proceeding was the death of four of his fellow workmen, the maiming of a number of others, and the demolishment of his employer's mill. The City of Columbus, an iron vessel fitted out with all the means of preservation and escape in use on shipboard, was wrecked on the best known portion of the Atlantic coast, on a moonlit night, at the cost of one hundred lives, because the officer in command took it into his head to save a few shiplengths in distance by hugging the shore, in direct disobedience of the captain's parting injunction. The best ventilated mine in Colorado was converted into a death trap for half a hundred miners through the agency of one of their number, whose remains were found in the gallery he had been warned not to enter with lighted lamp. Nobody survives to throw light upon the explosion of the dynamite cartridge factory in Pennsylvania, but as that peculiar type of disaster is almost invariably attributable to the single cause of heedlessness on the part of employes, grown contemptuous from long familiarity with danger, it is conjecturable that this latest instance is not an exception to the rule.

Had the fact been established that the foregoing series of accidents might have been foreseen and avoided, the interests of property and ordinary regard for human life would demand and quickly secure the taking of measures to avert like disasters. But the unpalatable truth must be confessed that the fixing of the blame for the January mishaps leaves nothing upon which to rest the consoling thought that perhaps in the future we may be saved the depiction and contemplation of daily horrors. Against the capricious workings of the human mind inventive science buffets in vain; safety valves, air brakes, levers, rudders, danger signals, stringent regulations, the lessons of experience, the uplifted arm of the law, and even the intuitive law of self-preservation are as powerless to save as the straw in the grasp of a drowning man. Owners of vessels, railways, mines, factories, and magazines, however well equipped with safety appliances may be their ships, trains, boilers, or shafts, and however perfect their confidence in the skill and prudence of those they see fit to intrust with the management thereof, can give passenger or employe no assurance of absolute safety until man's devotion to duty gains complete ascendency over his irrational impulses—a consummation most devoutly wished for, but resignedly despaired of. There is no guarding against, no escape from the impulses of fools. —*Indianapolis Times.*

Have Inventors Any Rights?

The *Manufacturers' Gazette*, referring to recent bills passed by the House, nullifying the rights of patentees, and other hostile legislation now before both branches of the national legislature, says:

"The moment any such legislation as this takes effect, our mechanical progress will be in its decadence. Why not pass one more law, that hereafter no patents shall be allowed to anybody for any length of time, and thus stop the outlay for the Patent Office, patent lawyers, etc., and that no future litigation shall be had as to rights vested in patents? Thus cutting the whole thing down and wiping out at one fell stroke millions of dollars of property, or what has been supposed to be property, and also wiping out totally one of the strongest branches of American industry, the inventors and perfecting mechanics. We might as well do the thing right while we are about it; wipe out everything that refers to it; let them start again, but make the thing sure that no man has rights that another one is bound to respect.

The *St. Louis Miller*, speaking of the bill of Mr. Ray, (H. R. 1081) of New York, before the House, says:

"There is a vast deal of twaddle in many of the arguments of those who try to break down Government grants of rights and franchises on the ground that monopoly should be discouraged. The people at large are quite indifferent as to the cost of a public benefit, until after it is secured. Then they too often seek to prevent the originators of the benefits from reaping any permanent or extended profits therefrom. The public is totally conscienceless on this point, and is ready to evade the terms of a distinct contract whenever it can be done in a slightly roundabout way. The repeated and continuous attacks upon the effectiveness of our patent law which has been made in Congress after Congress are abundantly illustrative of the spirit to which we allude. . . . Under this proposed law some piratical adventurers with a little money could readily inform themselves regarding a few meritorious articles just patented by poor and obscure inventors, could quickly manufacture immense stocks of the goods, and could then throw them on the market so suddenly and extensively that stopping the traffic by the service of notice would be simply impossible. Moreover, honorable manufacturers who might be willing to allow inventors a reasonable royalty would be afraid to make a bargain for the legitimate production of the patented novelties. They would fear to do so lest others less honorable might be even then secretly making the same goods and might soon flood the country with them. The New Yorker's bill is an unjust one, and should be forever tabled."

An Electrical Lounge.

In a furniture establishment in this city a ladies' boudoir is fitted up on the ground floor for the convenience of customers. It is carpeted, and furnished with a handsome plush lounge, chairs, tables, etc. A friend is invited to lie down upon the lounge for a moment, and, in the act of getting up, requested to touch a certain twilled binding cord containing gilt tinsel, which emits quite a sharp electric spark, much to the surprise of the victim. The spark is just as strong upon a damp, foggy day as when the weather is clear and dry. The proprietors have named the piece of furniture "an electrical lounge." How the electricity was produced was a mystery. An easy explanation was found. On investigation, the room proved to be located directly over a hot air engine, employed to work the elevator. Two belts from the engine were located over the same, and ran with great speed in opposite directions; sparks of electricity were frequently seen to be given off from the belts.

As the room overhead was kept perfectly dry from the heat of the engine, and the belts were not far from the floor, it is supposed the belts acted like a frictional electric machine, electrified the floor above, some of the electricity passing to the carpet and lounge, charging the same like a Leyden jar, and delivering a spark when touched.

Working and Thinking.

It is a no less fatal error to despise labor, when regulated by intellect, than to value it for its own sake. We are always in these days trying to separate the two; we want one man to be always thinking and another to be always working, and we call one a gentleman and the other an operative; whereas the workman ought often to be thinking and the thinker often to be working, and both should be gentlemen in the best sense. As it is, we make both ungentle, the one envying, the other despising his brother, and the mass of society is made up of morbid thinkers and miserable workers. Now, it is only by labor that thought can be made healthy, and only by thought that labor can be made happy; and the professions should be liberal, and there should be less pride felt in peculiarity of employment and more in excellence of achievement.—*Ruskin.*

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Emulsions of Petroleum and their Value as Insecticides.

BY C. V. RILEY, OF WASHINGTON, D. C.

The value of petroleum for the destruction of insects has long been recognized, and I have for years been endeavoring to solve the question of its safe and ready use for this purpose without injury to plants. This paper contains the results of extended experiments carried on under my direction by several of my assistants, and particularly by Prof. W. S. Barnard, Mr. Joseph Voyle, of Gainesville, Fla., Mr. Clifford Richardson, assistant chemist of the Department of Agriculture, and Mr. H. G. Hubbard, who has for over a year been devoting his time to practical tests in orange groves at Crescent City, Fla.

Passing over the ordinary methods of oil emulsions by phosphates, lactophosphates, and hypophosphites of lime, and various mucilaginous substances, experience shows that, for the ordinary practical purposes of the farmer and fruit grower, soap and milk are among the most available substances for the production of petroleum emulsions.

Ordinary bar soap scraped and rubbed into paste at the rate of twenty parts soap, ten parts water, thirty parts kerosene, and one part of fir balsam will make, when diluted with water, an emulsion stable enough for practical purposes, as the slight cream which in time rises to the surface, or the flakiness that often follows, is easily dissipated by a little shaking. Soap emulsions are, however, less satisfactory and efficient than those made with milk. Emulsions with milk may be made of varying strength; but one of the most satisfactory proportions is two parts of refined kerosene to one part of sour milk. This must be thoroughly churned (not merely shaken) until a butter is formed, which is thoroughly stable and will keep indefinitely in closed vessels, and may be diluted *ad libitum* with water when needed for use. The time required to bring the butter varies with the temperature, and both soap and milk emulsions are facilitated by heating the ingredients. Ordinary condensed milk may also be used by thoroughly stirring and beating it in an equal or varying quantity of kerosene.

The diluted emulsion, when prepared for use, should be finely sprayed upon the insects to be killed, its strength varying for different insects or plants, and its effect is enhanced when brought forcibly in contact with the insects.

Of mucilaginous substances, that obtained from the root of *Zamia integrifolia* (a plant quite common in parts of Florida, and from the stems of which the Florida arrowroot is obtained) has proved useful as an emulsifier.

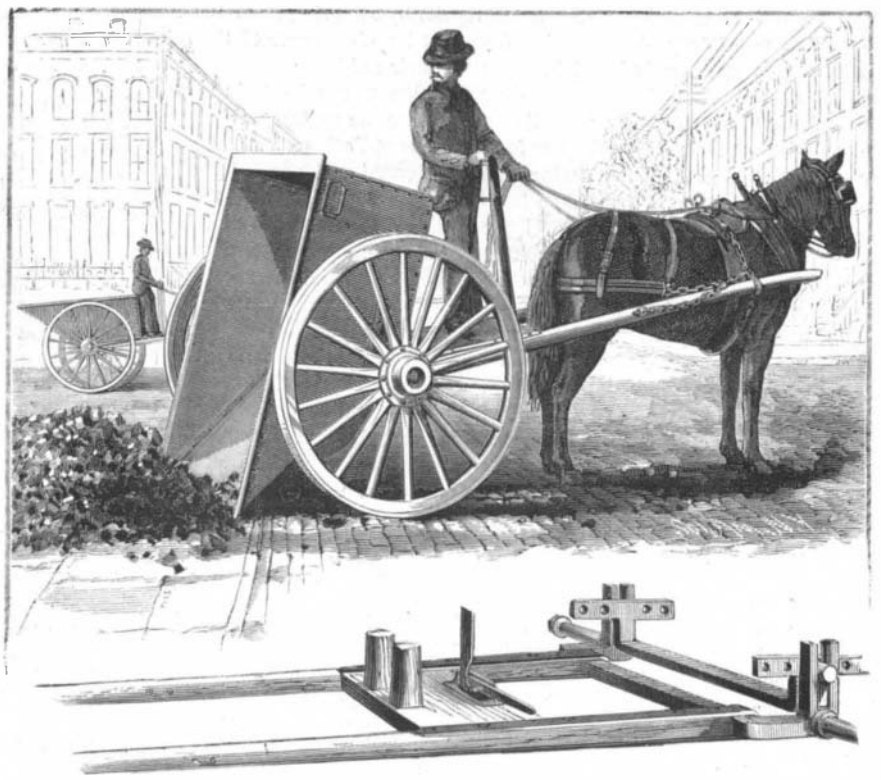
These petroleum emulsions have been used with success by Dr. J. C. Neal, of Archer, Fla., against the cotton worm, without injury to the plant; but their chief value depends on their efficacy against the different scale insects which affect citrus plants. Experience so far shows that such plants do not suffer from its judicious use, but that it must be applied with much more care to most deciduous fruit trees in order not to injure them.

IMPROVED RAPID DUMPING CART.

The dumping cart herewith illustrated is very simple in construction and at the same time durable and comparatively cheap. There is no tailboard to remove in order to dump, or replace after dumping; hence, time and labor are saved. The axle is made of one piece of iron or steel, with cranked parts that extend forward at right angles to the journals a suitable distance to give space in which the body may have room to swing when it dumps. The body is hung upon trunnions or pivots fitted in guide grooves rising vertically from the axle just back of the journals, and so adjusted that the bottom of the body will be at such distance below the trunnions that it will swing back easily to the upright position after being dumped. Springs may also be attached to the axle to relieve the force of the dump and to assist in recovering the body to its proper position. The construction of the axle is clearly shown in the lower engraving.

The shafts are attached to the axle, and are connected together by a cross bar in front of the axle. On the cross bar is secured a socket plate which carries a fastening latch engaging with a hasp which is rigidly attached to the front end of the body, so that when the latch is raised at its outer end it will swing clear of the point of the hasp and release the body for dumping; when the body falls back it will be fastened automatically. The latch lever is arranged along the connecting bar at the front of the body, so that the driver may raise it with the toe of his boot, while standing on the shafts or sitting on the edge of the box, without letting go of the reins.

This invention has been patented by Mr. Thomas Hill, whose address is Nos. 48 and 50 Railroad Avenue, Jersey City, N. J.



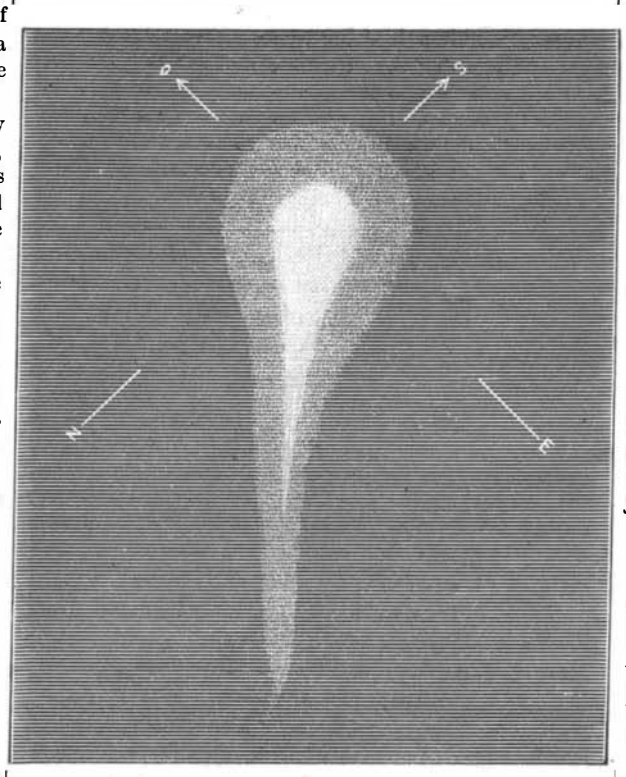
HILL'S RAPID DUMPING CART.

WE learn from a foreign contemporary, what we have never heard of at home, that "in dull seasons in America it is not an unusual thing for several manufacturers to combine, charter a steamer, and take a cargo of their goods to some of the South American and other ports, and realize very often at whatever price the goods will fetch."

THE PONS-BROOK COMET.*

On the 17th of December, at 6 h. 3 m., Marseilles mean time, I made an observation of the comet of 1812, by means of a telescope of 156 mm. aperture, provided with an eye piece that magnified 85 times. The sky was not very clear, and the observation was interrupted several times by the thick vapors by which the comet was obscured.

The comet was easily visible by the naked eye, and appeared more brilliant than the stellar mass of Hercules,



THE PONS-BROOKS COMET AS OBSERVED AT MARSEILLES.

which it resembled; only there was seen shining at times through its nebulosity a vague spark, that indicated that it possessed a tail. Seen in the telescope, the comet exhibited a nucleus, a coma, and a tail. The nucleus had the brilliancy of a star of the sixth magnitude, although its diffuse contours rendered it quite difficult to make an exact comparison with the stars. It possessed a very appreciable diameter, and was not circular, but slightly elongated in a direction nearly perpendicular to the axis of the tail.

The coma, which was very brilliant, had a diameter of about 10′, but it faded out so gradually in the heavens that it was impossible to recognize its exact limits. At first sight it resembled a globular nebula strongly condensed around a central nucleus, but, regarded attentively, it appeared as if it were double and formed of two semicircular parts that were turned toward the sun, and that were prolonged behind to form the tail. The interior portion, which was much more brilliant than the exterior, surrounded the nucleus, which latter was not, however, in the center of its curve, but was nearer to it on the side toward the sun. In extending back, this internal coma formed of itself nearly the entire tail. The external coma, which was much less luminous, was much longer, too, and it likewise was prolonged behind to form the tail; but it became invisible at a short distance, thus giving the tail a pyramidal aspect.

The tail, although it was not very brilliant, was distinguishable at first sight, and terminated in a point at a distance of 25′ from the nucleus. Like those of the coma, its edges dissolved away gradually in the sky and were lost to sight. The tail had a northwest direction—one that pointed away from the sun.

The accompanying figure is a reproduction of the drawing that I made during this observation, and represents the comet as it then appeared.—*La Nature.*

* By E. L. Trouvelot.

Politeness by Telephone.

A Mexican correspondent says: "There is a considerable variety of tongues among the messages going over the telephone wires in Mexico; many persons who cannot speak each other's language wishing frequently to be put in communication, so the offices usually have an attendant interpreter. The peremptory American method of making telephone calls—'Hello!' 'Hello?' 'Give me 1,299!' etc.—would never do in the polished Castilian tongue. Courtesy of intercourse must be preserved even between invisible communicants, and the unseeming vexatiousness and petulance which the telephone seems to provoke in Saxon moods is never allowed to obtain utterance here. The regular response from the central office to a telephone call is 'Mande usted!' which is equivalent to 'At your command!' Then preliminaries are gone through something as follows: 'Good morning, senorita; how do you do?' 'Very well, I thank you; what service may I render you?' 'Will you kindly do me the favor of enabling me to speak with Don So-and-so, No. 777?' 'With much pleasure!' etc., etc., and when the connection is made, the usual polite introductories are gone through before proceeding to the business in hand."

Growing Basket Willow.

There are many little by-productions, or what are generally so considered in relation to larger interests, that often bring to those engaged therein very substantial proceeds. A correspondent of the *Prairie Farmer* classes the growing of basket willow as at present furnishing an example of this kind. The prices have been such as to afford good profit, and the cultivation is very simple.

The cuttings, about 9 inches long, are stuck down in the soft earth in a slanting position, leaving about 2 inches above ground. There is no danger of their failing to grow. After this, the cultivation is no more than for corn. They will grow on any land. They are grown on land so wet that it could not be plowed or cultivated, but dry ground is better. At present there is not enough grown in this country for consumption, and $500,000 worth is imported each year. Peeled willow is now about $100 per ton.

Why does Flour Spoil?

Balland discusses the changes of flour in a paper contributed to *Comptes Rendus*. He says that grain contains a germ which seems to be situated near the germ. This ferment is insoluble, and has the properties of an organized ferment. It is able to endure a temperature of 212° Fahr. when dry, but is destroyed by boiling water. Both warmth and moisture are absolutely essential to its development and growth; a damp heat of 77° Fahr. is the most favorable. It acts upon the gluten liquefying.

In a properly constructed mill the greater portion of the ferment remains in the bran, and the better the flour is bolted the less of the ferment it will contain. If the mill grinds too hard or runs too fast more of it passes into the flour, hence the changes noticed in what is called flour that has heated.

The acid noticed in old flour is not the cause of the gluten decreasing, but the result of it.

Investigations upon gluten have not yet cleared up its mysteries. It seems to contain variable quantities of water, and there are certain substances, like common salt, which prevent its balling together; while others, like dilute acetic acid, directly favor it.

The gluten in flour heated to steam heat retains its properties The action of this ferment is retarded, but not prevented, by lack of water; as soon as water and heat are applied, it recovers its original properties.

The following conditions must be observed in making flour to have it keep well: It must be sound flour from hard, dry grain, which must be well hulled in properly constructed mills and thoroughly bolted. It must be kept in a place that is completely protected from heat and moisture. The French war department use air-tight metallic boxes for keeping flour in fortresses. Only flour from dry grain and the first grinding is used.

While engaged in this investigation the author has satisfied himself that the French military use the finest flour, to which, however, is added 12 to 18 per cent from the second grinding, which corresponds to the legal requirements. This latter is a source of change, and yet we cannot entirely avoid making use of the second milling, for it is in the second grinding that the very nutritious portion of the grain is separated from the bran. But we can provide against this change by storing the two different qualities *separately*, instead of mixing them. The fine flour alone keeps well, and the other, which does not keep so well, is always used fresh, and the two mixed when used.—*Chem. Zeitung.*

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