1. Light is inimical to the development of bacteria, and the microscopic fungi associated with putrefaction and decay, its action on the latter organism being apparently less rapid than upon the former.

2. Under favorable conditions it wholly prevents that development, but under less favorable it may only retard.

3. The preservative quality of light, as might be expected, is most powerful in the direct solar rays, but can be demonstrated to exist in ordinary diffused daylight.

4. So far as the investigation has gone, it would appear that it is chiefly, but perhaps not entirely, associated with the actinic rays of the spectrum.

5. The fitness of a cultivation liquid to act as a nidus is not impaired by insolation.

6. The germs originally present in such a liquid may be wholly destroyed, and a putrescible fluid perfectly preserved by the unaided action of light.

We observe with some surprise that these gentlemen, in making the delicate experiments, adopted a plan of first thoroughly cleansing the tubes with strong sulphuric acid, and finally, before use, rinsed them with tap water, then the "Pasteur's solution" was introduced. As tap water in London contains bacteria and numerous other forms of life, it appears an improper fluid to be used for such a purpose. In the course of the investigations it was observed that when bacteria appeared early and in large numbers in the solutions used, the mycelium of penicillium, or other microscopic fungus, was rarely seen, the bacteria apparently preoccupying the ground; when, however, the development of the bacteria was, from some cause, retarded or prevented, tufts of delicate mycelium were frequently found in the solutions after they had been incased or removed into diffused light. No mycelium, however, appeared during the period of exposure of a solution except under certain conditions, nor indeed afterwards, if this was sufficiently prolonged. They infer accordingly that light may retard or altogether prevent the appearance of mycelial fungi, but that its influence in this respect is slower and less powerful than upon the schizomycetes. They suggest also that this may explain, in part at least, the sparing distribution of bacteria in ordinary air, as compared with the prevalence of the spores of penicillium, etc., a fact observed by Burdon Sanderson and others.

Glue and its Manufacture.

Glue is an important commercial animal product, and its manufacture is carried on upon a large scale. Many refuse products are used in its composition; animal skin in every form, uncombined with tannin, may be made into glue. The substances most largely and generally employed are the parings of hides and skins from the tanneries and slaughter-houses, known as glue pieces, fleshings, pelts from furriers, the hoofs and ears of horses, calves, and sheep. The parings of ox and other thick hides make the strongest, and afford about forty-five per cent of glue. Dried sinews, the core or bony support inside horns, fish bones, with membrane and other offal, are also the raw materials used for making glue and size.

The process of manufacturing glue is as follows: The clippings and refuse materials are first placed in a lime pit, and when sufficiently steeped they are immersed in water, well washed, rinsed, and placed on hurdles to dry. Afterwards they are boiled to the consistency of thick jelly, which is passed, while hot, through osier baskets, or bags and nets made of rope, to separate the grosser particles of dirt or bones from it, and allowed to stand some time to purify further. When the remaining impurities have settled to the bottom it is melted and boiled a second time, and when thick enough it is drawn off into a vessel and maintained at a temperature which will keep it liquid. This gives further time for the deposition of solid impurities, and for clarification, by the addition of such chemicals as the manufacturers may prefer.

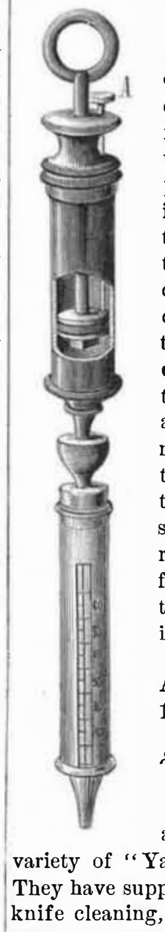
The glue is then run off into wooden coolers, about six feet long, one foot broad, and two feet deep. Here it becomes a firm jelly, which is cut out by a spade into square cakes, each cake being deposited in a sort of wooden box, open in several slits or divisions to the back. The glue is cut into slices by passing a brass wire, attached to a kind of bow, along the slits. These slices are placed upon nets, the marks of which are seen on the dry glue, and stretched in wooden frames, removed to the open air, placed in piles, with proper intervals for the admission of air, each pile being roofed in, as a protection from the weather. When the glue is about three quarters dry it is removed into lofts, where in the course of some weeks the hardening is completed. The cakes are finally dried off in a stove room at an elevated temperature, which when they are once solid only serves to harden and improve their quality.

Good glue should contain no specks, but be transparent and clear when held up to the light. The best glue swells without melting when immersed in cold water, and resumes its former size on drying. Shreds or parings of vellum and parchment make an almost colorless glue; old gloves, rabbit skins, and the like are frequently employed in this manufacture. The method of softening glue for use is to break it into small pieces, soak for twelve to twenty hours in cold water, then set it over a fire, and gradually raise its temperature until it is all dissolved, taking care to stir it frequently while melting. Prepared in this way it cools down into a stiff jelly, which requires only a little warming to fit it for use. Amber colored glue is that most esteemed by cabinet makers. Glue must not be used in a freezing temperature.

Fresh glue dries much more readily than that which has been once or twice melted. Dry glue steeped in cold water absorbs different quantities of water according to the quality of the glue, while the proportion of water so absorbed may be used as a test of the quality of the glue. From careful experiments with dry glue immersed for twenty-four hours in water, at the temperature of 60° Fah., and thereby transformed into a jelly, it was found that the finest ordinary glue, or that made from white bones, absorbs twelve times its weight of water in twenty-four hours; from dark bones, the glue absorbs nine times its weight of water, while the ordinary glue made from animal refuse absorbs but three to five times its own weight of water.—*Boston Cultivator.*

COLMER'S DOSIMETER.

We illustrate herewith a dose measurer, or dosimeter," the invention of Dr. George Colmer, of Springfield, La.



There has always been an uncertainty in measuring fluids by drops, and this little instrument is designed to enable an apothecary or nurse to determine with certainty the precise dose desired. The dosimeter which Professor R. H. Thurston uses consists of a steel wire tapered smoothly to an extremely fine point. The first drops flowing from this instrument vary in weight, but after a time the most accurate chemical scales fail to detect any variation. But these drops are of course very minute. Dr. Colmer's invention consists in a graduated transparent tube with tapered end, and graduated for indicating drops, minims, or other measures. In the top is fixed a syringe, which has a rod, A, adjustable endwise, so that by turning it, it may be introduced any desired distance into the tube of the syringe, and will thus stop the upward stroke of the piston at any desired point. It is thus possible to positively regulate the quantity of liquid drawn or forced up into the graduated transparent tube. Not a drop will escape until pressure is applied to the piston.

It was patented through the Scientific American Patent Agency on November 13, 1877.

American Exports of Furniture, Coffins, etc.

We are indebted to our ingenious brothers at the other side of the Atlantic for a vast variety of "Yankee notions," in the shape of inventions. They have supplied us with machines for sewing, washing, knife cleaning, egg beating, cinder sifting, apple paring, window cleaning, and many others, from nut crackers to quartz crushers. These we have utilized and appreciated. But it is not only in patented inventions that our American cousins have befriended us. A new trade has lately grown up between Europe and America, which must, sooner or later, be felt in an important branch of native industry. It is not generally known, but such is the fact, that American upholsterers are now exporting to Great Britain and the continent large quantities of ready made furniture, from kitchen chairs and tables to the most elegant accessories of the drawing room. The facility with which these objects are turned out is almost marvelous. The native woods of America are easy to work, and susceptible of a fine polish. The wood applicable to the better class furniture is so abundant that it is wholly superfluous to use veneers. The consequence is, that the objects are manufactured solid, and bear much more wear and tear than articles of a similar class made in England. The prices are also much more reasonable, because skilled labor is, to a great extent, dispensed with, and cheap machinery is substituted for manual dexterity. But it is not only in the matter of household furniture that competition is to be dreaded. The Americans are now sending us window sashes, doors, skirting boards, panel work, wainscots, and all descriptions of joinery. With this assistance, the builder may regard with more composure strikes among the carpenters. But our transatlantic friends do not limit their interest to the living only. Their far-seeing benevolence takes notice of us even in death; for American coffins (vastly superior to the home-made article) are to be had in the market at prices little more than half of those charged by native undertakers.—*Dublin Farmers' Gazette.*

Gunpowder and Nitroglycerin.

According to the *Revue Industrielle* a volume of gunpowder produces at the ordinary temperature 190 volumes of gas. Owing to the heat produced, this gas occupies about four times the above mentioned volumes, or about 760 volumes of gas are produced immediately after the explosion.

A volume of nitroglycerin produces 1,300 volumes of gas at the ordinary temperature, and admitting that the heat produced by the explosion is two and a half times that produced by gunpowder, this volume would be increased to 13,000 volumes.

In building the Tay bridge (the longest railway bridge in the world), at Dundee, Scotland, work was carried on at night by the light of two Gramme machines and two Serrin lamps of 1,000-candle power.

Action of Compressed Oxygen.

Recent investigations have disclosed the fact that oxygen under high pressure rapidly destroys all living beings and organic compounds.

All the varied phenomena of fermentation, in which the chemical action depends upon the presence of living organisms, are, says the *Journal of Chemistry,* completely arrested by the action of compressed oxygen, even if exerted only for a brief time; while fermentations due to dissolved matter, like diastase, perfectly resist its influence. M. Bert, to whom this curious discovery is due, has found a practical application of it in the field of physiological research.

The ripening of fruits is arrested by exposure to compressed oxygen, and hence it must arise from cellular evolution. The poison of the scorpion, on the other hand, whether liquid or redissolved in water, entirely resists the action of the compressed gas.

Such poisons evidently owe their power to chemical compounds akin to the vegetable alkaloids. Fresh vaccine matter subjected for more than a week to oxygen under a pressure equal to 50 atmospheres retained its virtue, from which it would appear that the active principle in vaccine matter is not certain living organisms or cells, as some have supposed.

The virus of glanders, after similar treatment, quickly infected horses inoculated with it; and carbuncular blood, though freed from bacteria, was found to retain its dangerous properties. These must therefore be put in the same class with vaccine matter.

If these results are confirmed by further investigations, the discovery will lead to the settlement of many disputed questions in physiological chemistry.

THE LIFE OF A MILLION PEOPLE.

The supplement of the "Thirty-fifth Annual Report" of the Register General (England) presents some valuable and interesting statistics. The report singles out, in imagination, a generation of one million persons, and traces its eventful journey from the moment of birth to the end of life. Of these, taking the whole of England, more than one fourth die before they reach five years of age, and most of the survivors have been attacked once or oftener by disease. During the next five years the tenure of life becomes more sure, and between five and ten years of age the number of deaths is less than a seventh part of that of the first quinquenniad.

Between ten and fifteen the average mortality is lower than at any other period. From fifteen to twenty the number of deaths increases again, especially among women, many of whom fall a prey to consumption and child-birth. At this period the effect of dangerous occupations begins to affect the death rate. Fully eight times as many men as women die of violent deaths. The number of violent deaths continues to rise from twenty to twenty-five, and keeps high for at least twenty years, that is, until the age of forty-five is reached. Consumption is prevalent and fatal from twenty to forty-five, and is responsible for nearly half the deaths. From thirty-five to forty-five the effect of wear and tear begins to reveal itself, and many persons succumb to diseases of the important viscera. By fifty-five the imagined million has dwindled down to less than one half, or 421,115. After this the death rate increases more rapidly, and although the number of lives grows less, the number of deaths in each of the twenty-five years after fifty-five increases; the higher rate is sustained for ten years longer, until by degrees all disappear.

It is somewhat surprising to find that at seventy-five 161,124 remain on an average; at eighty-five, 38,565, of whom Dr. Farr calculates that only 202 reach the age of one hundred years. At fifty-three the number of men and women surviving is about equal, but from fifty-five and onwards the women exceed the men. Of 100 women living at the age of fifty-five and upwards 11 are spinsters, 43 widows, and 46 wives; of 100 men, 9 are bachelors, 24 widowers, and 67 husbands.

As regards occupation it is interesting to note that while the clergy generally have an average good health, members of the medical profession are subject to a high rate of mortality, which up to the age of forty-five is, we are told, much about the average. Chemists and druggists, commercial clerks, mercers, and drapers also seem to be less healthy than the average. Persons who work in wood, as coachmakers, wheelwrights, carpenters, joiners, and sawyers, have healthier lives than most men. Publicans, butchers, and fishmongers have not, as a rule, good lives. Carvers and gilders, plumbers and glaziers, suffer much from the metallic poisons to which they are exposed, while the mortality of those engaged in earthenware manufacture approaches, after the age of thirty-five, double the average. Tailors and shoemakers are also unhealthy as a class. As might be expected farmers and agricultural laborers are at the present time among the healthiest classes, but the young farmer, for some undiscovered reason, appears to have a less healthy life than the laborer of the same age; from the age of thirty-five and upward, however, the farmer is the healthier of the two.

As to the social condition of the people of England, it may be noted that at the present day, and for the last thirty years, women marry at an earlier age than formerly, one fourth marrying before the age of 21 years.

Among unmarried men the mortality is above the average, but it does not appear whether this arises from the want of domestic comfort, or is due to the fact that the weakly men do not marry.