Egotism in the Shop.

The opinionated man is likely to be a disturbing force wherever he may be placed, but nowhere is he more objectionable than in the factory or shop. There he is a bar to progress, a foe to improvement, unless perchance the progress or improvement lies in the direction of his own inclination or belief. Every man is entitled to a wholesome respect for his own opinions, but it is stating a self-evident fact to say that no man should consider that he is master of all information on anyone given subject. A machinist may be a most excellent workman, and yet there are those who can tell him many things about his work that he never thought of before. An inventor may be very ingenious and have a quite fertile brain, but it is not unlikely that he could find men "within a stone's throw" who could offer him suggestions that would materially aid in perfecting his invention.

It is wonderful how little success will satisfy a man. As soon as certain mechanics are enabled to accomplish a portion of their work with reasonable skill, they at once conceive the erroneous idea that they have nothing more to learn, and assume by this very attitude that they are masters of their art. Upon observing such workmen we are forcibly impressed with the belief that "a little learning is a dangerous thing."

But if egotism is deleterious in the workman, how much more is it so in the manager of an establishment! If the workman is old fogyish he need not necessarily impart his antiquated notions to his colaborers, but if the head of the establishment is such, the whole institution will be more or less influenced by his peculiarities.

The machine shop is a bad place for a man possessing an inordinate bump of self-esteem. He, like the bull in the china shop, is likely to do a great deal of harm. A machinist, above all others, should be a man of enterprise and of broad comprehension. He should be a many-sided man, with a keen observation, and a power to grasp new ideas and make them valuable to himself But when the machinist is a man of one idea, he is likely to stand in his own light and to bar the progress of others who depend upon his judgment. An inventor once went to a machinist for assistance in perfecting a new mechanical device. As is generally the case in such an undertaking, grave difficulties were encountered The inventor, at the time when they were attempting to overcome an important obstacle, suggested a somewhat novel way out of their trouble The machinist opposed this course strenuously, because it was one which he had been taught was erroneous He would not listen to reason, and by his persistence caused the inventor to follow his plans, to the former's loss. After experimenting for a long while, the machinist was at last forced by sheer necessity to adopt the inventor's suggestions. Had he been willing to give the hints named a fair investigation, he would have saved the inventor anxiety, labor, and money.

The president of a large manufacturing establishment was showing the same to some visitors, one of whom suggested to him in a spirit of kindness that the design of a part of the plant which was then in process of erection might be improved in a material particular. This suggestion was haughtily rejected with the curt saying that he thought the men in charge knew what they were about. This might be so, but as the suggestion was an important, if not vital, one, the part of prudence would have been to have looked into the matter to see whether a mistake was not actually being made, the party making the criticism being an expert in the business. The manufacturer, it is claimed, by his stubbornness failed to avail himself of a suggestion that would save his company many thousands annually. His self-reliance in that instance cost some one dearly

One should be willing to receive instructions from any reliable source. The adage, "We are never too old to learn," is a good one. In this era of progress, when old theories are daily being shattered, and new ideas enthroned in their place, the man is indeed blind who says that there is none capable of teaching him. Such are not the real master spirits of the age They are the fossils, who only seemingly live. Really progressive minds are as different from them as day from night.—*The Industrial World.*

Increased Duration of Life.

The stage to which we have at present attained may be stated thus: Compared with the period 1838-1854 (the earliest for which there are trustworthy records) the average of a man's life is now 41 9 years instead of 39 9, and of a woman's 45·3 instead of 41 9 years, an addition of 8 per cent to the female life and 5 per cent to the male Of each thousand males born at the present day, 44 more will attain the age of 35 than used to be the case previous to 1871. For the whole of life the estimate now is, that of 1,000 persons (one-half males and one-half females) 35 survive at the age of forty-five, 26 at fifty-five, 9 at sixty-five, 3 at seventy-five, and 1 at eighty-five. To put the case in another way, every thousand persons born since 1870 will live about 2,700 years longer than before. In other words, the life of a thousand persons is now equal in duration to that of 1,070 persons previously; and 1,000 births will now keep up the growth of our population as well as 1,070 births used to do. This is equivalent in result to an increase of our population, and in the best form, viz., not by more births but by fewer deaths, which means fewer maladies and better health. What is more, nearly 70 per cent of this increase of life takes place (or is lived) in the "useful period"—namely, between the ages of twenty and sixty. Thus of the 2,700 additional years lived by each thousand of our population, 70 per cent, or 1,890 years, will be a direct addition to the working power of our people.

It is to be remembered that there might be a great addition to the births in a country with little addition to the national working power—nay, with an actual reduction of the national wealth and prosperity—seeing that, regarded as "economic agents," children are simply a source of expense, and so also are a majority of the elderly who have passed the age of threescore. On the other hand, as already said, only one-quarter of the longer or additional life now enjoyed by our people is passed in the useless periods of childhood and old age, and more than one-third of it is lived at ages when life is in its highest vigor, and most productive alike of wealth and enjoyment.—*Cornhill Magazine.*

THE HARDEN HAND GRENADE FIRE EXTINGUISHER.

In our issue of July 12 we referred to this hand grenade, and gave an account of an exhibition showing its practical efficiency, witnessed by a representative of the SCIENTIFIC AMERICAN. It is at once so simple, cheap, and effective, particularly in the incipiency of a conflagration, that it can hardly be wondered at that it has been imitated by others, and this has caused the company to adopt a patented form of package, besides their former patents on the liquid and solid salts which furnish the fire extinguishing properties.

This new form is represented in the accompanying engraving, showing a bottle with a star in medallion form. The manner in which it is used is, as has been before stated, to simply break the grenade, generally throwing it by hand, "in such manner that the contents will be liberated into the flames." One or more of them may also be hung up around

THE HARDEN HAND GRENADE FIRE EXTINGUISHER.

workshops, factories, or offices in places where any danger of fire may be apprehended, as it takes very little direct heat of the flame upon them to explode the bottles and liberate the fire-extinguishing gases. All managers of fire departments lay great stress upon the importance of checking a conflagration in its incipient stages, and a liberal use of these stationary grenades through buildings generally would undoubtedly prove most efficient in this direction, while those thrown by hand are far more efficient and easily available than any number of buckets of water would be.

In accordance with an order from the Navy Department, Chief Engineer Isherwood made tests of this grenade and reported thereon with great detail in most emphatic commendation of its excellent qualities He says

"The department may have entire confidence in the ability of these grenades to extinguish flame and in very large masses, incipient fires, that is to say, fires just commencing, in which the mass of flame is not great and with not much solid combustible in ignition can be extinguished almost instantaneously and with very little material For the protection of valuable papers and other combustible matter in fireproof buildings, I am of opinion that every room should be supplied with these grenades, and that a proper number should be kept conveniently in the corridors ready for instant use by the watchman There is no doubt the mixture within the bottles will retain its efficiency undiminished during an indefinite period The carbonic dioxide and ammoniacal gases developed from the liquid by heat are the best that modern chemistry can furnish for the extinction of flame"

The New England Fire Insurance Exchange, of Boston, and the Insurance Exchange of Providence, R. I., have practically examined the working of this grenade and highly recommended its general adoption, as have also the officers of a large number of the fire insurance companies of New York and other leading cities.

Combustion of Explosive Gas Mixtures.

Experiments in regard to the flashing temperature of explosive gases, and the velocity with which the flame is transmitted, have been made by Mallard and Le Chatelier.

1. The flashing temperature of explosive gases composed of hydrogen and oxygen being at 550° C., carbonic oxide and oxygen at 655° C, and that of marsh gas and oxygen at 650° C., on adding of a large volume of indifferent gases to a volume of marsh gas and oxygen, the flashing point becomes but slightly altered, while addition of an equal volume of carbonic acid to a mixture of carbonic oxide and oxygen raises the flashing temperature from 655° to 700° C. Marsh gas and air or oxygen intermixed with a neutral gas can be heated for ten seconds at a temperature above the flashing point; the retardation of the ignition increases with the amount of indifferent gas added, and is a maximum at temperatures little above the flashing point.

2. The velocity with which the flame is transmitted depends upon various conditions, the ignition is either conducted from one stratum to one above and below, transmission by contact, or is propagated by means of high pressure, transmission by an explosive wave.

This latter conduction of the flame has been investigated by Berthelot and Nieille The two transmissions correspond to the combustion and explosion of liquid and solid explosives like nitro-glycerine and dynamite Intermediate between both are numerous other modes of transmitting the flame, which depend on accessory conditions and unknown influences. The velocity of transmission by contact probably never exceeds 20 m per second, which has been verified by numerous experiments. The maximal conducting power of a mixture composed of 40 per cent hydrogen and oxygen, the equivalent quantity of hydrogen being 30 per cent, is equal to 4 3 m per second, a mixture of marsh gas and air transmits the flame with a velocity of 0·6 m.; illuminating gas and air with such of 1 25 m., and the gaseous explosive of carbonic oxide and oxygen with a velocity of 2 m. per second. The quantity of oxygen employed in these measurements has been less than its chemical equivalent, and the product of combustion was thus intermixed with a portion of the inflammable gas. The conducting power increases with the initial temperature, and depends upon the width of the tube; by using narrow tubes in the examination of explosive gases with great conducting power, the transmission of the flame is accompanied by irregular oscillations and, when these oscillations follow each other very rapidly, cause diminution and finally extinction of the flame It is at first communicated with uniform velocity, and assumes after some time, which depends upon the conductive power of the explosive gases, a vibratory motion, the report of the flame becomes louder before and after each vibratory period, and, traversing gases of high conducting power, is extinguished before it has reached the final vibratory period.

When the transmitted pressure caused by vibratory motion and extension of the burned gas is equal to that produced by heating the explosive gases to the flashing temperature, the combustion is propagated with a velocity of the compressed wave, we have then a transmission of a flame by an explosive wave

The Influence of Magnetism on the Development of the Embryo.

Prof Carlo Maggiorani has recently read an account of some experiments on this subject before the Academia dei Lincei.

During the process of artificial incubation the author exposed a number of eggs to the influence of powerful magnets. A similar set of eggs, being hatched in the same manner, but kept away from all magnetic action, served as a check. Cases of arrested development were four times more numerous in the first group than in the second. Analogous facts had been previously published in the *Natura* (Florence, 1878). Microscopic examination showed that the sterilization of these germs was probably due to an intense vascularization of the yolk sac.

After the birth of the chickens this increased mortality continued, deaths being three times more numerous in the magnetized group All the counter test chickens reached their full development, while of the 114 of the first group 60 presented notable imperfections Their movements were also abnormal There were three cases of paralysis and two of contractions.

Six of these chickens arrived at maturity. Of these, two were cocks of a splendid stature, and endowed with an insatiable reproductive appetite With the four pullets it was quite the contrary. One of them never laid at all, and the three others generally produced merely minute eggs (the heaviest weighing only 30 grms.), without yolks, without germinal spot, and, in a word, sterile.

The magnetic influence upon the embryo is therefore evident, and its action upon the structure and the functions of the germ is still manifest when the latter is arrived at maturity.

May we not, to explain this effect of the magnets, suppose an interference between the magnetic vibrations and the heat vibrations which animate the molecules of the fecundated germ, and impel them toward a new condition of organic equilibrium? This influence generally prevents, and more rarely retards, the development of the embryos (hypertrophy in the two cocks, and atrophy in the four hens), and, as interference implies analogy, may we not infer that the vibrations which impel the germ toward its development are analogous to the magnetic vibrations?—*Jour. of Science.*