For the Scientific American.

The Employment of Zinc in the Construction of Domestic Utensils, and the Influences of the same on Health.

In consequence of the various uses for which metallic zinc is employed in the every-day pursuits of life, as in the construction of cisterns, gutters, water coolers, &c., it becomes a matter of no small moment to determine the influence which such practice exerts upon the health of persons who are in the habit of using this metal for such purposes.

It is commonly supposed that when metallic zinc is placed in water, its surface becomes covered with a thin coating of the sub-oxide, which does not increase in thickness, and that this film protects the metal from further action of chemical agents. Now, although this is true when that substance is exposed to the atmosphere, it is not the case when it is kept under the surface of water. Thus, when the water of the Ohio river, for example, is placed in a zinc vessel, freely exposed to the air, the carbonate and hydrated oxyde of zinc are rapidly formed, and subside to the bottom of the liquid. These substances are more rapidly formed in pure water than in that which contains saline or organic matter in solution. Water from melted ice is more corrosive than either well or river water, from the fact of its having parted with the salts and other matters, which it held in solution, in the act of freezing. The compounds thus formed are not soluble in water, but as they may be mechanically suspended in it, and by that means find their way into the system, it becomes highly important to determine their action on the animal economy. The carbonate of zinc does not appear to possess any poisonous action, no case, where it has produced serious consequences, ever having been reported. The oxide of zinc is not a very active substance, there being but one instance on record where it produced symptoms of poisoning. In that case the individual took twenty grains daily, until he had consumed the enormous quantity of three thousand two hundred and forty-six grains—a larger amount than is ever likely to find its way into the system under the circumstances above mentioned. The following symptoms were observed :—face of a pale earthly hue, great emaciation, loss of appetite, mental imbecility, &c.

The oxide of zinc, which is extensively manufactured in this country, is used as a substitute for white lead. This substance is employed with a view of avoiding the poisonous effects of the latter on painters and others, who are subjected to its deleterious influence. It has been supposed that this oxyde might give rise to metallic colic, and Dr. Bouvier relates the case of a man, employed in the zinc paint works, who experienced a very serious attack, resembling lead colic, but as much of the zinc of commerce contains lead in various proportions, the disease was probably caused by that metal. Later investigations, on this subject, have proved that the oxyde of zinc is incapable of producing symptoms resembling the lead disease.

On examining river, rain, and ice water that had stood for a number of weeks in zinc vessels, I could never detect a trace of lead in it. It is altogether probable that should the lead, which is alloyed with commercial zinc, find its way into the system, it is not in sufficient quantity to produce serious consequences.

It is not alone for water vessels that zinc is employed, for it has been used, for some time, in the construction of utensils for holding milk during the separation of cream. In this respect zinc exerts a very peculiar influence, which is not, however, confined exclusively to that metal. It is found that the cream separates more readily and in greater abundance, when fresh milk is placed in a zinc vessel, than in an earthen one. It is interesting to trace the cause of this; it is found that the lactic acid fermentation takes place sooner in milk when kept in an earthen vessel than it does in one of zinc, and that, too, when it is allowed to become cold before it is placed in them for experiment, so that it is not due to the more rapid abstraction of heat from the milk in the latter, from its superior conducting power, which would retard the transformation of the sugar of milk into lactic acid. I also observed that the putrifactive decomposition of the milk set in earlier in that which was contained in the earthen vessel than the zinc one. It must be borne in mind that in the first of these tranformations, the change begins in the protenic or caseous compound of the mild, and that if, by any means, this can be prevented, the milk sugar is never converted into lactic acid. Now, when the anticeptic power of all of the salts of zinc is taken into account, it will not be difficult to explain these remarkable results. Thus, when milk is placed in a zinc vessel, the oxide, which covers its surface, is divided between a portion of each of the acids which are combined with the alkaline and earthy bases of that fluid, and in that way rapidly diffused through it; and the salts, thus formed, by their anticeptic power, prevent the incipient putrefaction of the caseous matter of the milk, which is always the primary cause of the souring of that liquid.

It is highly important to determine whether the practice of allowing milk to remain in zinc vessels is injurious to health. From the attention which I have given this subject, I think it is not if the milk be removed before the lactic acid fermentation commences, as by that means the formation of the lactate of zinc would be prevented, which is the only salt at all likely to be found in sufficient quantity to give rise to serious results. It is said that nausea and vomiting have been produced by the use of milk and cream that have been allowed to stand in zinc vessels; but this is not likely to occur if the milk be removed before it becomes sour; it must also be remembered that the lactate of zinc is the least soluble salt of that metal.

Metallic zinc, or rather the salts formed of it, exerts a similar influence in retarding the putrefaction of urine. This is not surprising, when we bear in mind the analogy between the changes which this fluid undergoes, during putrefaction and the lactic acid fermentation. The putrefaction of the organic matter which exists in river water, is retarded when that liquid is kept in a zinc vessel; and the same remark will apply to all waters containing nitrogenized substances

The rancidity of fats and fixed oils is retarded by being in contact with a zinc surface, and I find that a small portion of the oxide or carbonate of zinc, rubbed up with any of the fats, exerts a similar influence.

CHAS. W. WRIGHT, M. D.
Cincinnati, Sept. 14, 1852.

Cyanide of Potassium.

The following is the process of M. Clemon, a chemist of Paris, for obtaining this salt, which occupy such an important place in the industrial arts, especially in electro plating :—

Mix intimately eight parts of ferro-cyanide of potassium, perfectly de-hydrated by calcination, and three parts of perfectly dry carbonate of potash, and heat the mixture in a covered crucible, or what is better an iron pot, until the fused mass attains a red-heat, when it will become limpid, and a sample taken out with the rod and cooled, will appear perfectly white, in this state all the ferro-cyanide is reduced. If the crucible be now taken out of the fire, the disengagement of the gas ceases when the mass has become a little cool, and the iron which has been separated in the operation so disposes itself, that with a little address and slight tapping of the crucible, the principal part of the cyanide of potassium may be poured off from the iron, which remains in the crucible.

To obtain the cyanide perfectly free from iron, place it across an iron ladle, pierced with fine holes, and strongly heated beforehand, in a vessel also heated, of greater height than width, either of silver, iron, or porcelain, or even fire-ware, but with smooth sides, and let it gradually cool. In this state the ferruginous portion may be extracted by means of a sharp instrument from that which is free from iron. The purity of the cyanide of potassium entirely depends on the purity of the materials employed; the presence of sulphur in the carbonate of potash should therefore be avoided; the ferro-cyanide of potassium of commerce almost invariably contains sulphate of potass, the presence of which is objectionable. The use of purified tartar might perhaps be advantageously substituted for that of carbonate of potash. Should any sulphur be present, a sulphuret of potassium would be formed in the cyanide of that metal, from which considerable inconvenience would arise in the employment of the cyanide in chemical analysis, and in its application to the preparations of the gold, silver, and copper solutions employed in the electro-plating processes.

When the mixture is melted, as before mentioned, there is at first formed only cyanide of potassium and carbonate of the protoxide of iron; but this last quickly changes, at the temperature to which it is exposed, into carbonic acid, carbonic oxide, and sesquioxide of iron; and this last, when the cyanide of potassium is melted, becomes converted into metallic iron. It is only by a long sustained heat that the carbonate of protoxide of iron is decomposed, so that long after the decomposition of the ferrocyanide of potassium, and the formation of cyanide of potassium has taken place, there is still a disengagement of gas. Consequently, the proportion of cyanide of potassium, which is simultaneously formed, should entirely depend on the duration of the fusion. The iron which remains after a prolonged fusion of the cyanide of potassium, out of contact of air, being washed with hot water, disengages, when an acid is poured on it, not only hydrogen, but always a little carbonic acid gas.

If we follow the directione given in most chemical works, where Liebig's process for the preparation of cyanide of potassium is incorrectly given, and in which it is stated that the materials must be melted, so that the mass submitted to a bright red-heat becomes tranquil,—only a grey-colored product will be obtained.

If a closed iron vessel be employed, and the disengaged gases collected, it will be seen that in proportion as the temperature rises, the relative proportion between the carbonic acid and the carbonic oxide changes, the latter constantly increasing. It is evident that at a high temperature, one portion of the carbonic acid, which passes through the cyanide of potassium, should be reduced into carbonic oxide, and this reduction, without doubt, extends even in part to the carbonic oxide itself; that is to say, that its carbon is separated, and that this renders the product of a grey color. If we dissolve in cold water some cyanide of potassium completely free from particles of iron, and which has thus become grey, and filter the solution, there remains in the filter a black substance, which, being dried, burns away completely on a slip of platinum, and in fact, possesses all the qualities of charcoal. This carbon, in a state of extreme division, does not separate, either by fusion or repose, from the cyanide of potassium, on account of its feeble specific gravity. If a little of this grey cyanide be added to each new melting it may be purified from this carbon, and no injury done to the product of the new materials employed, as the iron in separating, withdraws the finely-divided carbon, and leaves the cyanide in a state of purity.

McCormick's Reaper in England.

We recently gave an account of a trial of reaping machines at Lewes, England, by a Committee of the Royal Agricultural Society, when the premium was awarded to Garret's improved Hussey Reaper, on the ground that it cut closer to the soil. A number of trials have been made in that country of a more thorough character between the said machines, and reports have been made favorable to McCormick's. The London Times of the 9th ult. contains an account of a trial between one of McCormick's and two of Hussey's, in cutting 100 acres each, about which a favorable report was made of McCormick's reaper, by a Committee of the Royal Agricultural College at Cerincester. The following is a report taken from the Scotsman, of Sept. 8, 1852, an able paper published in Edinburgh. It says :—

"In quoting the reports on the late trials of the rival American reaping machines in various parts of England, we omitted to give the report of the Committee of the Driffield Farmers' Club :—

'Though your committee had expected the following machines to be on the ground, viz.: —M'Cormick's, represented by Mr. W. S. M'Cormick (brother of the patentee); Hussey's, by Mr. Crosskill, of Beverley; another of Hussey's, by Messrs. Dray & Co.; and one by Mr. Wray, of Leeming; only the two former were submitted to their inspection, and, as the competition was confined to these two only, your committee was able to bestow a more undivided attention on their respective merits than had a larger number competed.

The trial took place on Friday the 13th inst., on a crop of wheat at Kelleythorpe, and, had your committee confined their report simply to the direction they received from the club, as to their superiority, and "which of the machines is best adapted for practical use in this district," their labors might have been brought to a close by stating that M'Cormick's machine was, in their opinion, superior to Hussey's in every respect; and that, on all standing crops of grain, of whatever kind, and where the ground was tolerably even, M'Cormick's may be advantageously employed.

But, as your committee are of opinion that it would be more satisfactory, not only to individual members of the club, and an act of justice to the owners and patrons of the successful machine, they beg to suggest the propriety of their being permitted to lay before the club, somewhat in detail, the reasons which led to the conclusion they come to; and fearlessly state, notwithstanding adverse decisions, that M'Cormick's reaper, as regards power, speed, efficiency, and apparent durability, is far superior to Hussey's.

M'Cormick's machine is six feet wide, and Hussey's five feet; but, as it would be impossible always to keep up the cutting exactly to that width, they conceive that six inches less is all that can be calculated upon, and that these widths—viz., five and a-half feet, and four and a-half feet—and the horses moving at an average speed of two and a-half miles an hour (a speed which your committee would recommend,) Hussey's machine would, in five and a-half hours, cut seven and a-half acres; while, in the same time, and with fully as little horse power, M'Cormick's would do 9 a. 0 r. 26 p. Another matter worthy of consideration is that one man only is needed to drive the horses in M'Cormick's, the horses being yoked abreast; whilst two are necessary in Hussey's, having to draw in a line.—M'Cormick's machine also possesses another advantage in having a wooden reel, which, without injury to the corn, materially assists the man who pulls away the sheaves, and gives him a better opportunity of adjusting their size.

But the greatest superiority in M'Cormick's machine over that of Hussey's, which your committee have to notice, is that of the sheaves, when pulled off, are laid in such a way as not to impede its working, so that two men and two horses may move on uninterruptedly, leaving the rest of the laborers to be otherwise employed; while in Hussey's the sheaves are left behind and a sufficient number of workmen is consequently required to remove them, so that the machine may go on. This your committe need not point out as a grave objection, more especially when the crops are much mixed with clover or seeds, and it is desirable to let the sheaves remain unbound for a few days.

Your committee are further of opinion that, from the violent reverberatory motion imparted to every part of Hussey's machine, durability is not to be expected, and that the form of the serated cutters in M'Cormick's machine is far preferable to the deeply indented cutters in Hussey's, and that they will not nearly so often need renewing.

Your committee now beg to state that the above conc usions have not been hastily adopted, and that their best and closest attention was given during the working of the machines; that they have no particular or party purpose to serve, their only object being to recommend that machine which they consider most likely to benefit themselves and the farming community generally, and that, in giving a decided preference to M'Cormick's, their opinions were unanimous.' "

Ohio Wines.

Messrs. Longworth & Zimmerman, of Cincinnati, will put up 150,000 bottles of still, and 180,000 bottles of sparkling Catawba wines this season. There are 1,200 acres of grapes under cultivation near that city.