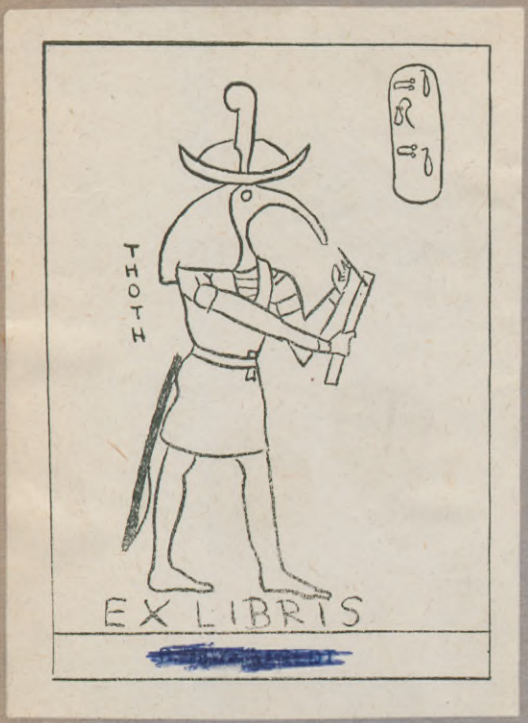

AN ESSAY ON CULINARY POISONS.

CONTAINING

CAUTIONS

RELATIVE TO THE

USE of LAUREL-LEAVES,

HEMLOCK, MUSHROOMS, COPPER-VESSELS, EARTHEN JARS, &c.

WITH

Obſervations on the ADULTERATION of BREAD and FLOUR,

And the NATURE and PROPERTIES of WATER.

Unde fames homini vetitorum tanta ciborum?
Audetis veſci, genus ô mortale? quod, oro,
Ne facite; et monitis animos advertite noſtris.

OVID. MET. xv. 138.

LONDON.
Printed for G. KEARSLY, at No. 46, near Serjeants Inn, Fleet-Street.

M,DCC,LXXXI.

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PRE-

PREFACE.

MANKIND are ſubject to innumerable diſeaſes, from which other animals are exempted. But from whence do theſe diſeaſes ariſe? From the ſeeds of mortality in the human frame? From luxury and intemperance? Or from an indiſcreet uſe of vegetable and mineral poiſons in the preparation of our food? ---From the laſt of theſe ſources we certainly derive many troubleſome, and ſometimes fatal diſorders: ſo that, on many occaſions, we may exclaim with the ſons of the prophets*, "There is death in the pot!"

* 2 Kings iv. 40.

The

The deſign of this publication is to guard people againſt theſe diſaſters; and, if poſſible, to prevent ſome of the calamities of human life. If it ſhould anſwer this uſeful purpoſe, the author's ambition will be fully gratified.

ON

ON

CULINARY POISONS.

1. The LAURO-CERASUS, or Common LAUREL.

THE water diſtilled from the leaves of this tree has been frequently mixed with brandy, and other ſpirituous liquors, in order to give them the flavour of ratifia; and the leaves are often uſed in cookery, to communicate the ſame kind of taſte to cream, cuſtards, puddings, and ſome ſorts of ſweetmeats. But, in the year 1728, an account of two women dying ſuddenly in Dublin, after drinking ſome of the common diſtilled laurel water, gave riſe to ſeveral experiments, made upon dogs, with the diſtilled water, and with the infuſion of the leaves of the

lauro-ceraſus, communicated by Dr. Madden, phyſician at Dublin, to the Royal Society in England, and afterwards repeated (in the year 1731) and confirmed by Dr. Mortimer, F. R. S. by which it appeared, that both the water and the infuſion brought on convulſions, palſy, and death, when taken by the mouth, or anus *.

Dr. Mead † ſpeaks of the foregoing accident and experiments in theſe terms: "A ſmall quantity of this water killed two women, who drank it, very ſuddenly. Hereupon a learned phyſician, ſurprized at the event, (this plant having never been thought to be any wiſe noxious) made ſeveral experiments with it upon dogs, which were afterwards, ſome of them, repeated here, with the ſame fatal ſucceſs."

Dr. Mortimer affirms, "that laurel-water is equally mortal with the bite of the rattle-ſnake, and more quick in its operations than any mineral poiſon."

* See Philoſophical Tranſactions, No. 418, and 420.

† Mead on Poiſons, Eſſay v.

Dr.

Dr. James ſays: "laurel-water is the moſt deleterious poiſon perhaps known, killing almoſt inſtantaneouſly ‡."

The laurus of the ancients, or the *bay*, is, on the contrary, of a ſalutary nature, and of uſe in ſeveral diſorders.

It may be ſaid, that the laurel in cuſtards, and other articles of cookery, is uſed in very ſmall quantities, and has never been attended with any pernicious effect.——But, I aſk, who can pretend to aſſert, that it has not occaſioned ſome latent diſorder, or ſome complaints, which have been aſcribed to other cauſes? What perſon of ſenſe or prudence would truſt to the diſcretion of an ignorant cook, in the uſe of a dangerous ingredient in his puddings or cuſtards? Or, who, but a madman, would chooſe to ſeaſon his victuals with poiſon?

The remedy is from ten to forty drops of ſal ammoniac, in a glaſs of water, repeated as the ſymptoms may require.

‡ James's Diſpenſatory, book iii. c. 1. p. 228.

2. Small HEMLOCK, or FOOLS PARSLEY.

Description.

The firſt leaves are divided into numerous ſmall parts, which are of a pale green, oval, pointed, and deeply indented. The ſtalk is ſlender, round, upright, ſtriated, and about a yard high. The flowers are white, growing at the tops of the branches in little umbells. It is an annual plant, common in orchards and kitchen gardens, and flowers in June and July. This plant has been often miſtaken for parſley: and from thence it has received the name of *Fools Parſley*.

Though it ſeems not to be of ſo virulent a nature as the larger hemlock, yet Boerhaave places it among the vegetable poiſons, in his Inſtitutes; and, in his Hiſtory of Plants, produces an inſtance of its pernicious effects ‡. It is therefore

‡ Inſtitutes, § 1138, Hiſt. of Plants, p. 93.

fore neceſſary to guard againſt it in collecting herbs for ſallads, and other purpoſes.

3. MUSHROOMS.

Muſhrooms have been long uſed in ſauces, in ketchup, and other forms of cookery. They were highly eſteemed by the Romans, as they are at preſent, by the French, Italians, and other nations.

Pliny exclaims againſt the luxury of his countrymen in this article; and wonders, what extraordinary pleaſure there can be, in eating ſuch *dangerous food**. The ancient writers on the Materia Medica ſeem to agree, that muſhrooms are in general unwholeſome; and the moderns, Lemery, Allen, Geoffroy, Boerhaave, Linnæus, and others, concur in the ſame opinion. There are numerous inſtances upon record of their fatal effects. Al-

* Quæ voluptas tanta *ancipitis* cibi? Plin. Nat. Hiſt. xxii. 23.

Almoſt all of them, as the laſt-mentioned author affirms, " are fraught with poiſon †."

The common eſculent kinds, if eaten too freely, frequently bring on heart-burns, ſickneſſes, vomitings, diarrhœas, dyſenteries, and other dangerous ſymptoms. It is therefore to be wiſhed, that they were baniſhed from the table. But, if the palate muſt be indulged in theſe treacherous gratifications, or, as Seneca ‡ calls them, this " voluptuous poiſon", it is neceſſary, that they, who are employed in collecting them, ſhould be extremely cautious, leſt they ſhould collect ſuch as are abſolutely pernicious; which, conſidering to whoſe care this is generally committed, may, and undoubtedly has, frequently happened §.

† Fungi plerique VENENO TURGENT. Linnæi Amæn. Acad. vol. 1.

‡ Quid tu illos boletos, VOLUPTARIUM VENENUM, nihil occulti operis judicas facere, etiamſi præſentanei non furant? SEN. EP. 95.

§ See Gentleman's Magazine, December, 1755; and Supplement, September, 1757.

The

The eatable muſhrooms at firſt appear of a roundiſh form, like a button; the upper part and the ſtalk are very white; the under part is of a livid fleſh-colour; but the fleſhy part, when broken, is very white. When theſe are ſuffered to remain undiſturbed, they will grow to a large ſize, and expand themſelves almoſt to a flatneſs, and the red part underneath will change to a dark colour.

COPPER VESSELS.

Copper, when it is handled, yields an offenſive ſmell, and if touched with the tongue, a ſharp pungent taſte, and even excites a nauſea. Verdegris is nothing but a ſolution of this metal by vegetable acids. And it is well known, that a very ſmall quantity of this ſolution will produce cholics, vomitings, intolerable thirſt, univerſal con-

convulſions, and other dangerous ſymptoms. If theſe effects, and the prodigious diviſibility of this metal be conſidered, there can be no doubt of its being a violent and ſubtile poiſon. We are daily expoſed to this poiſon by the preſent uſe of copper veſſels for dreſſing our food. The very air of the kitchen, abounding with oleaginous and ſaline particles, penetrates and diſpoſes them to diſſolution, before they are uſed. Water, by ſtanding ſome time in a copper veſſel, is impregnated with verdegris, as may be demonſtrated by throwing into it a ſmall quantity of any volatile alkali, which will immediately tinge it with a paler or deeper blue, in proportion to the ruſt contained in the water. Vinegar, apple-ſauce, greens, oil, greaſe, butter, and almoſt every other kind of food, will extract the verdegris in a greater degree. It is true, people imagine, that the ill effects of copper are prevented by its being tinned: but the tin, which adheres to the copper, is ſo extremely thin, that it is ſoon penetrated by the verdegris, which inſinuates itſelf through the pores of that metal, and appears green upon the ſurface.

M. Amy,

M. Amy, of the Academy of Sciences at Paris, obſerves, that " verdegris is one of the moſt violent poiſons in nature:" yet, ſays he, " rather than quit an old cuſtom, the greater part of mankind are content to ſwallow ſome of this poiſon every day". Amy's Treat. upon Ciſterns, printed at Paris, 1750.

M. Thiery, in a theſis, which is added to this tract, has more particularly conſidered the noxious qualities of copper, and the various means, by which they may be communicated to whatever we eat or drink. " Our food, ſays he, receives its quantity of poiſon in the kitchen, by the uſe of copper pans and diſhes. The brewer mingles poiſon in our beer, by boiling it in a copper. Salt is diſtributed to the people from copper ſcales, covered with verdegris." Pickled cucumbers are rendered green by an infuſion of copper coin. " The paſtry-cook bakes our tarts in copper patty-pans. But confections and ſyrups have greater powers of deſtruction: for they are ſet over a fire in copper veſſels, which have not been tinned; and the verdegris is plentifully extracted by the acidity of the compoſition. And though we do not, after all, ſwallow

death in a ſingle doſe, yet it is certain, that a quantity of poiſon, however ſmall, which is repeated with every meal, muſt produce more fatal effects, than is generally believed".

Bell-metal kettles are very often uſed in boiling cucumbers for pickling, in order to make them green. This is an abſurd and dangerous practice. If the cucumbers acquire any additional greenneſs by the uſe of theſe kettles, they can only derive it from the copper, of which they are made.

According to ſome writers, bell-metal is a compoſition of tin and copper, or pewter and copper, in the proportion of twenty pounds of pewter, or twenty-three pounds of tin, to one hundred weight of copper. According to others, this metal is made of copper, a thouſand pounds; tin, from two to three hundred pounds; and braſs, one hundred and fifty pounds *.

Spoons and other kitchen utenſils are frequently made of a mixed metal, called alchemy; or, as it is vulgarly pronounced, ockimy. The ruſt of this metal, as well as the former, is highly pernicious.

* Lord Bacon's Phyſ. Remains.

White

White alchemy is made of pan-braſs, one pound; and arſenicum, three ounces. Red alchemy is made of copper, and auripigmentum, or orpiment †.

The author of a tract, entitled, Serious Reflections on the dangers attending the uſe of copper veſſels, publiſhed at London in 1755, aſſerts, that "the greater frequency of palſies, apoplexies, madneſs, and all the frightful train of nervous diſorders, which ſuddenly attack us, without our being able to account for the cauſe, or which gradually weaken our vital faculties, are the poiſonous effects of this pernicious matter, taken into the body inſenſibly with our victuals, and thereby intermixed with our blood and juices".

However this may be, it is certain, that there have been innumerable inſtances of the pernicious conſequences of eating food dreſſed in copper veſſels, not ſufficiently cleaned from this ruſt. On this account the Senate of Sweden, about the year 1753, prohibited copper veſſels, and ordered, that none, but ſuch as were made of iron, ſhould be uſed in their fleets and armies.

† Lord Bacon's Phyſ. Remains.

But if copper veſſels are ſtill continued, every cook and good houſewife ſhould be particularly careful in keeping them clean and well tinned; and ſhould ſuffer nothing to remain in them longer, than it is abſolutely neceſſary for the purpoſe of cookery.

REMEDY.

" The common cure, ſays Dr. Mead, of all poiſons taken into the ſtomach, muſt be by throwing them up again, by vomiting, as ſoon as poſſible, and defending the membranes from their pungent acrimony. Drinking very large quantities of warm milk, with oil of ſweet almonds, till the vomiting ceaſes, will anſwer the firſt intention. The other, in mineral poiſons, (for the effects of vegetable poiſons, after they have been vomited up, generally go off by diluting plentifully with ſoft and fat liquids) requires particular care, which may be in this way. The force of theſe depends upon a combination of metallic particles with ſaline cryſtals: therefore the diſuniting of theſe muſt deſtroy their power. This

may

may be done by drinking a quantity of a lixivium made by a ſolution of ſalt of tartar in water: for this ſalt, uniting with the corroſive cryſtalline ſalt, will, after ſome degree of effervescence, kill it, as the chemiſts ſpeak; by which means, being diſengaged from the mineral globules, it will be rendered of no effect"*.

The SOLUTION or SALT of LEAD.

Lead is a metal eaſily corroded, eſpecially by the warm ſteams of acids, ſuch as vinegar, cyder, lemon-juice, rheniſh wine, &c. And this ſolution, or ſalt of lead, is a ſlow and inſidious, though certain poiſon. The glazing of all our common brown pottery ware, is either lead or lead ore. If black, it is lead ore, with a ſmall proportion of manganeſe, which is a ſpecies of iron ore. If yellow, the glazing is lead ore, and appears yellowiſh by having ſome pipe or white clay

* Mead on Poiſons, Eſſay iv.

clay under it. The colour of the common pottery ware is red, as the veſſels are made of the ſame clay with common bricks. Theſe veſſels are ſo porous, that they are penetrated by all ſalts, acid or alkaline, and are unfit for retaining any ſaline ſubſtance. They are improper, though too often uſed, for preſerving ſour fruits or pickles. The glazing of ſuch veſſels is corroded by the vinegar; for, upon evaporating the liquor, a quantity of the ſalt of lead will be found at the bottom. A ſure way of judging, whether the vinegar, or other acids, have diſſolved part of the glazing, is, by their becoming vapid, or loſing their ſharpneſs, and acquiring a ſweetiſh taſte by ſtanding in them for ſome time: in which caſe the contents are to be thrown away as pernicious.

The ſubſtance of the pottery ware commonly called Delft, the beſt being made at Delft in Holland, is a whitiſh clay when baked, and ſoft, as not having endured a great heat in baking. The glazing is a compoſition of calcined lead, calcined tin, ſand, ſome coarſe alkaline ſalt, and ſandiver; which being run into a white glaſs, the white colour being owing to the tin, is afterwards ground

ground in a mill, then mixed with water, and the veſſels, after being baked in the furnace, are dipped into it, and put into the furnace a ſecond time; by which means, with a ſmall degree of heat, the white glaſs runs upon the veſſels. This glazing is exceedingly ſoft and eaſily cracks. What effects acids will have upon it, the author of theſe obſervations cannot ſay, not having tried them: but they ſeem to be improper for inſpiſſating the juice of lemons, oranges, or any other acid fruits.

The moſt proper veſſels for theſe purpoſes are porcelain or china ware. The ſubſtance of them is of ſo cloſe a texture, that no ſaline, or other liquor, can penetrate them. The glazing, which is made likewiſe of the ſubſtance of the china, is ſo firm and cloſe, that no ſalt or ſaline ſubſtance can have the leaſt effect upon it. It muſt, however, be obſerved, that this remark is only applicable to the porcelain made in China: for ſome ſpecies of the European manufactory are certainly glazed with a fine glaſs of lead, &c.

Next to china is the ſtone ware, commonly called the Staffordſhire ware. The ſubſtance of theſe

theſe veſſels is a compoſition of black flint, and a ſtrong clay, that bakes white. Their outſides are glazed by throwing into the furnace, when well heated, common or ſea ſalt decrepitated; the ſteam or acid of which, flying up among the veſſels, vitrifies the outſides of them, and gives them the glazing. This ſtone ware does not appear to be injured or affected by any kind of ſalts, either acid or alkaline, or any liquors, hot or cold. They are therefore extremely proper for all common uſes, but require a careful management, as they are much apter to crack with any ſudden heat, than china.

The Heſſian ware, or the veſſels made of the ſame ſubſtance with the Duke d'Alva's bottles, commonly called grey-beards, ſeem to be made of ſtrong pipe clay, mixed with ſand, and glazed in the baking, by the alkaline ſalt, which ariſes from the wood uſed in baking them, wood having always the effect, when the furnace is intenſe, to vitrify the outſide of all clays*.

* Diſſert. by James Lind, M. D.

REMARKS

REMARKS on the ADULTERATION of BREAD and FLOUR.

Extracted from a Treatiſe " On the nature of bread, honeſtly and diſhoneſtly made", publiſhed in 1757, by JAMES MANNING, M. D.

The author tells us, that in the ſophiſtication of flour, mealmen and bakers have been known to uſe bean meal, chalk, whiting, ſlaked lime, alum, and even aſhes of bones. The firſt, bean flour, is perfectly innocent, and affords a nouriſhment equal to that of wheat; but there is a toughneſs in bean flour, and its colour is duſky. To remove theſe defects, chalk is added to whiten it, alum to give the whole compound that conſiſtence, which is neceſſary to make it knead well in the dough, and jalap to take off the aſtringency. It may be ſuppoſed, that theſe horrid iniquities are only imaginary, or at leaſt exaggerated, and that ſuch mixtures muſt

be diſcoverable even by the moſt ordinary taſte; but as ſome adulterations of this nature have certainly been practiced, the following experiments may ſerve to gratify curioſity, or diſcover frauds, where any ſuch exiſt.

" To diſcover whether flour be adulterated with whiting or chalk, mix with it ſome juice of lemon or good vinegar. If the flour be pure, they will remain together at reſt; but if there be a mixture of whiting or chalk, a fermentation, like the working of yeſt, will enſue. The adulterated meal is whiter and heavier than the good: the quantity that an ordinary tea-diſh will contain, has been found to weigh more than the ſame quantity of genuine flour, by four drachms, and 19 grains, Troy.

" The regular method to detect theſe frauds in bread is this: cut the crum of a loaf into very thin ſlices; break them, but not into very ſmall pieces, and put them into a glaſs cucurbit, with a large quantity of water. Set this, without ſhaking, in a ſand furnace, and let it ſtand, with a moderate warmth, four and twenty hours. The crumb of the bread will in this time ſoften in all its

its parts, and the ingredients will ſeperate from it. The alum will diſſolve in the water, and may be extracted from it in the uſual way. The jalap, if any have been uſed, will ſwim upon the top in a coarſe film, and the other ingredients, being heavy, will ſink to the bottom. This is the beſt and moſt regular method of finding the deceit; but as cucurbits, and ſand furnaces, are not at hand in private families, there is a more familiar method.

" Let the crum of a loaf be ſliced as before directed, and put it, with a great deal of water, into a large earthen pipkin. Let this be ſet over a very gentle fire, and kept a long time moderately hot; and the pap being poured off, the bone aſhes, or other ingredients, will be found at the bottom."

On WATER.

Obſervations on Water, extracted from Dr. Rotherham's Philoſophical Enquiry, &c.

IT is a long eſtabliſhed obſervation, that the beſt waters boil and cool again the ſooneſt; and that they evaporate in the leaſt time, and with the leaſt degree of heat.

A well known mark of the purity of water is its ſoftneſs. This quality is diſcoverable by the touch, if we only waſh our hands in it: and the diſtinction between hard and ſoft water generally ariſes from its difficult or eaſy union with oily ſubſtances.

Soft

Soft water is the moſt proper for the waſhing and bleaching of linen, the making of paper, and for moſt medicinal purpoſes. It mixes more uniformly with milk, and does not curdle it, as hard waters frequently do. It boils peaſe and beans ſofter, and mixes better with flour, rice, oatmeal, &c. In boiling meat it gives it a more agreeable colour than hard water, which often boils it red.

There are however ſome purpoſes, to which hard water is more proper: as, in ſeveral kinds of dying; in making ſtarch; and in the rincing of ſoap out of linen, after it has been waſhed; as it is obſerved to give the linen a better colour, and an agreeable firmneſs or criſpneſs; but the linen thus treated requires more ſoap, when it comes to be waſhed again. Hard water gives a better colour to greens, and a firmneſs to all ſorts of fiſh, eſpecially cod, when boiled in it.

The Burton, Nottinghamſhire, Liverpool, and ſeveral other kinds of ale, which are much admired, are ſaid to be brewed with hard water. But Dr. Mead and others condemn the uſe of theſe liquors, as productive of various diſorders, and particularly the cholic.

From

From theſe remarks we may reaſonably infer, that hard water cannot ſo well anſwer the purpoſes of diluting and digeſting our food; as it will not ſo readily mix and unite with the different parts of it, nor aſſimulate and digeſt them properly. Beſides the large quantities of acid and nitrous ſalts, with the loads of ſelenite and calcareous earth, which theſe waters generally contain, will naturally diſpoſe them to form obſtructions, when, by the courſe of circulation, theſe ſolid particles come into the minuteſt veſſels, more eſpecially thoſe of the glands. Hence they are often blamed, as laying the foundation of ſcrophulous, ſtrumous, and other glandular ſwellings and obſtructions.

It is from the quantity of ſtony matter, which the hard waters generally contain, that moſt of them have large incruſtations upon the ſides of the veſſels, in which they are boiled; and they have by ſome been diſapproved for this reaſon, as cauſing the ſtone. But the calculous concretions in the bladder and kidneys are of a very different nature from theſe incruſtations; and, as Dr. Heberden juſtly obſerves, "they totally differ from all foſſil ſtones in every thing except the name; and the pre-

pretended experience of the effects of certain ſtony waters in breeding the ſtone, may, upon the beſt authorities, be rejected as falſe*.

The beſt way of determing the hardneſs or ſoftneſs of water, is by ſcraping any certain quantity of ſoap into it, and obſerving how it diſſolves or lathers. If water be perfectly ſoft, the ſoap will diſſolve quickly, uniformly, and without curdling; and, upon ſhaking the glaſs briſkly, will raiſe a ſtrong froth or lather at the top. But the ſmalleſt degree of hardneſs will ſhew itſelf, either by the ſoap not diſſolving ſo readily, by its turning curdly and uneven, or by leſs froth remaining after it is agitated; and the different degrees of hardneſs may hereby be very well determined. The beſt way of making this trial is with a ſmall quantity of Caſtile ſoap, viz. about a grain to an ounce of water.

RAIN-WATER.

In ſummer-time rain-water brings along with it the ſeeds and embryos of vegetables and animalcula,

† Medical Tranſ. by the Coll. of Phyſ. vol. 1. p. 7.

malcua, which render it diſagreeable to the taſte, and promote its putrefaction. If it be kept in wooden veſſels, it will ſoon ſtink, and become unfit for uſe; and then, if it be viewed with a microſcope, it will be found to contain an amazing number of various animalcula; and particularly thoſe, which, from their form and motion, are called the wheel animals*. Theſe animalcula are ſuppoſed to be the chief cauſe of the water's putrefaction.

Rain water is a little hard, when it firſt falls; but in two or three days it becomes perfectly ſoft.

The rain, which falls through the ſmoke of large towns, is rendered foul and black; more eſpecially if it be collected, as it generally is, from the roofs of houſes; when it brings with it a great many particles of ſoot, which give it a very diſagreeable taſte and colour. Where the tiles are blackened by the ſmoke of glaſs-houſes, &c. the water,

* Baker's Miſcroſcope made eaſy, p. 83. Employment for the Microſcope, p. 295.

water, which falls from them, is unfit for almoſt any domeſtic purpoſes.

When rain-water ſubſides, and is well filtered, it becomes perfectly clear and bright. If it be kept in wooden veſſels, it contracts a particular ſmell, taſte and colour from the wood.

Clean earthen jars are the beſt for keeping water. Though leaden ciſterns may be uſed with ſafety, if they be kept clear from vegetable acids; all of which are found to corrode lead, and to produce a very noxious ſalt. The veſſels, in which water is preſerved, ſhould be covered, to prevent any duſt or filth from getting in; and the water will be more agreeable, if kept in a cool place.

SNOW-WATER.

Some of the greateſt philoſophers and phyſicians have differed much in their opinion of ſnow-water. Hippocrates, Hoffman, and others, condemn it. But Boerhaave, on the other hand, is

laviſh in its encomiums. He aſſerts, that ſnow, which is collected from the tops of high ſandy mountains, at a diſtance from any towns or houſes, where it has fallen after a long ſharp froſt, in calm weather, and lies at a conſiderable height above the ſurface of the earth, produces water, "which is the pureſt of all, quite immutable, capable of being kept for many years, and is a ſingular remedy for inflammations of the eyes" *.

Dr. Rotheram having mentioned the efficacy of ſnow-water in burns, and in fertilizing the ground, relates the following experiment, which, though it may appear of a trivial nature, he very juſtly remarks, is not below the notice of a philoſopher.

"One effect of ſnow, ofwhich I do not remember any where to have read, is, that a certain quantity of it, taken up freſh from the ground, and mixed in a flour-pudding, will ſupply the place of eggs, and make it equally light. The quantity allotted is two table ſpoonfuls, inſtead of one egg; and if this proportion be much exceeded, the pudding will not adhere together, but will fall to pieces in boiling. I aſſert this from the experience

* Boerh. Chem. vol. 1. p. 349. London edit. 1735.

rience of my own family; and any one, who chooſes to try it, will find it to be a fact".

SPRING WATER.

As all our ſprings are originally ſupplied by rain, or melted ſnow, and hail, ſtrained through the pores and cavities of the earth, their waters will vary according to the different ſoils, or ſtrata, through which they paſs. If waters meet with nothing in their ſubterraneous paſſages, which will unite with them, or diſſolve in them, they iſſue out in their greateſt purity. The ſprings, which come from gravel, ſand, or ſome light and porous ſtones, are generally the pureſt, and beſt; for the water being filtered through their ſmall pores, is cleared from almoſt every foreign ſubſtance or impurity, which it had contracted in the air; acquires an agreeable coolneſs, and becomes limpid, bright, and ſparkling.

But, as there are few ſoils, which do not contain ſome kinds of ſalt, or other mineral ſubſtances, which are ſoluble in water, moſt of our ſprings are found to partake, in ſome meaſure, of

the nature of the ſoil, through which they paſs, and are innocent, ſalutary, or noxious, in proportion to the quantity, kind, or mixture, of the various ingredients, of which they are compoſed; and the conſtitution, of the perſon, who uſes them: and ſome of them are of great medicinal efficacy.

STAGNANT WATER.

Stagnant water in ponds and ditches is generally eſteemed the worſt. But large lakes, which are kept in almoſt a continual agitation by the wind, do not properly come within the denomination of ſtagnant waters.

PUMP WATER, eſpecially in LONDON.

It appears from the analyſis performed by Dr. Heberden †, that ſeveral pump waters in London, which he had examined, and probably moſt of

† See Medical Tranſact. vol. 1.

of them, contain powder of lime-ſtone, and the mineral acids of vitriol, nitre, and ſea-ſalt, united in various proportions. Theſe waters are likewiſe tainted with an oilineſs, which gives them a remarkably yellowiſh caſt, when compared with pure diſtilled water. It is reaſonable to think, that waters impregnated with ſuch active ſubſtances, in a quantity ſufficient to render them diſagreeable to the taſte, cannot always be drunk with impunity. They have accordingly been ſuſpected of occaſioning pains in the ſtomach and bowels, glandular tumors and coſtiveneſs, where the ſimple lime-ſtone prevails; and diarrhœas, where much of it is united with the ſolution of acids; and it is probable, that a continued uſe of ſuch water may be the cauſe of many other diſorders, eſpecially to the infirm, and to children. From whence it follows, that a change of place may often be of as much uſe to weak perſons, from the change of water, as of air.

Some obſcure notion of the unwholeſomeneſs of pump water, induces many perſons to boil it, and let it ſtand to grow cold; by which it will indeed be made to part from moſt of its unneutralized lime-ſtone and ſelenite; but at the ſame time it will become more ſtrongly impregnated

nated with the ſaline matter, and therefore it will be worſe.

If a ſmall quantity of ſalt of tartar were added to the water, it would readily precipitate both the looſe lime-ſtone, and likewiſe that which is united to the acids. Ten or fifteen grains would generally be enough for a pint; but the exact proportion would readily be found, by continuing to add to it, by little and little, till it ceaſed to occaſion white clouds. This is an eaſy way, not only of freeing the water from its lime-ſtone, but alſo of changing the ſaline part into nitre and ſal ſylvii, both of which we know, by long experience, to be innocent.

But the beſt way of avoiding the bad effects of pump water would be, not to make a conſtant uſe of it; and in a place ſo well ſupplied with river water as London, there is very little neceſſity to drink of the ſprings, which in ſo large a city, beſides their natural contents, muſt collect many additional impurities from cellars, burying-grounds, common-ſewers, and many other offenſive places, with which they undoubtedly often com-

communicate ; ſo that it is indeed a wonder, that we find this water at all tolerable*.

THAMES and NEW-RIVER WATER.

River waters partake of the properties of their ſprings, and the channels, through which they run ; yet, in a wonderful manner, they ſoon free themſelves from their impurities. The motion of the current †, the abſorption of the ſoil, the ſun and rain, have each of them a conſiderable ſhare in this effect.

The Thames water, eſpecially in the neighbourhood of London, is mixed with many impure ingredients. It is ſaid to become offenſive in ſeven or eight days, or ſometimes ſooner, if it be kept in unſeaſoned caſks. In this ſtate it generates a quantity of foul inflammable air, as may be ſeen by holding the flame of a candle to the bung-hole of a caſk when it is firſt opened. But by

* See Medical Tranſact. vol. 1.

† The moſt rapid rivers contain, cæteris paribus, the pureſt water.

by this fermentation it ſoon purifies itſelf; and by opening the bung, it will often become ſweet in twenty-four hours, and ſooner, if it be poured from one veſſel to another, or ventilated *.

METHODS, BY WHICH WATER MAY BE OBTAINED IN ITS GREATEST PURITY.

As it appears, that almoſt all the water uſed in cookery is tainted with impure ingredients; rain water, with a great variety of volatile bodies, fuliginous particles, exhalations, inviſible ſeeds, and inſects; river, pond, and well water, with a mixture of ſoil and mud, decayed vegetables, and the ſpawn of vermin, it will be very proper to purify it, before it is uſed for drinking, or any culinary purpoſe. This may be done by various contrivances.

1. The water of the Thames, and that of the New River, are very often muddy, or taſte ſtrongly of weeds and leaves. Dr. Heberden acknowledges, that the latter fault cannot eaſily be re-

* Philoſ. Tranſ. No. 127, 268. Boerh. Elem. of Chem. vol. 1. p. 333. Rotheram's Philoſ. Inquiry.

remedied ; but, he obſerves, they would ſoon be freed from their muddineſs, if kept ſome time in an open jar : and he is of opinion, that if the water given to very young children, were thus purified, it might prevent ſome of their bowel-diſorders, and ſo contribute a little to leſſen that amazing mortality among the children, which are nurſed in London.

2. Rain water, when grown putrid, as Boerhaave aſſures us, may be eaſily rendered wholeſome again, and may be drunk without being offenſive, by only boiling it a few moments : for by this expedient, the animals that are in it will be deſtroyed, and, with the reſt of the impurities, will ſubſide to the bottom. If then, ſays he, you make it moderately acid, by adding to it a ſmall quantity of acid that is very ſtrong, it will be fit for uſe. This is found to be of excellent ſervice under the Equator, and between the Tropics, where the waters putrify in a horrible manner, and breed a multitude of inſects, and yet muſt be drunk. For the ſame reaſon, a ſmall quantity of ſpirit of vitriol, mixed with water, will prevent its growing putrid, and breeding any animals, and,

at the ſame time, preſerve it wholeſome and good *.

3. A common way of purifying water is by filtration. Water, which is filterated through porous ſtones, is extremely clear and limpid; but ſome writers have aſſerted, that it acquires a petrifying quality in its paſſage, which, at length, may produce diſagreeable effects ‡. However this may be, theſe ſtones are too dear for common uſe.

Dr. Rotheram aſſerts, that one of the readieſt and beſt methods of filtering water, is, to let it run through a bed of clean ſand. This is, he ſays, preferable to the filtering-ſtone, as it performs its work much ſooner; and the grains of ſand are of ſo many different figures, that they are pretty ſure to ſtop the progreſs of any bodies of ſenſible bulk, in paſſing through them §.

* Boerh. Chem. vol. 1. p. 348.

‡ M. Amy on Ciſterns; but ſee above, p. 31.

§ If you view ten thouſand grains of ſand through a microſcope, you will ſcarcely find two of the ſame ſize and ſhape. Rotheram's Philoſophical Inquiry, p. 48.

" A friend

" A friend of mine, ſays the Doctor, in this town [Newcaſtle] has a ciſtern for collecting rain water, ſo conſtructed, that it both allows the water to ſubſide, and the upper part of it to run through a bed of ſand, which is raiſed by a partition above the bottom of the ciſtern; by which means the water becomes perfectly clear and bright, and is preferred by moſt who have taſted it, to any other water in this town".

4. Some have objected, but probably without reaſon, to this mode of filtration, on a preſumption, that the ſand has the ſame effect on the water as the filtering ſtone: for it is ſaid, that the ſand is inſenſibly diſſolved by the water; ſo that in four or five years it will have loſt a fifth part of its weight. M. Amy therefore recommends the filtration of water through a ſpunge, more or leſs compreſſed. And this, he aſſures us, will render it, not only more clear, but more wholeſome, than either a ſtone or ſand.

5. As the pureſt of all water is obtained by diſtillation, Dr. Heberden recommends this method, as particularly uſeful where fuel is cheap,

and the water is bad ; as it is in ſome of our foreign ſettlements.

The firſt running of diſtilled water has a diſagreeable muſty taſte: on this account, if the ſtill hold twenty gallons, it will be neceſſary to throw away the firſt gallon. The reſt, through free from this muſtineſs, will have a diſagreeable empyreumatic or burnt taſte. This taſte goes off by keeping about a month, by ventillation, in a few minutes, or by boiling the water in an open veſſel. Diſtilled water muſt be kept in perfectly clean glaſs or ſtone bottles, with glaſs ſtoppers, or metal covers; and then, having in it no principle of corruption, it is incapable of being ſpoiled, and will keep juſt the ſame for ever. But the leaſt particle of any animal or vegetable ſubſtance, will ſpoil a great quantity ; and therefore the ſtill and bottles ſhould be kept wholly for this uſe.

This proceſs, though certainly attended with many good effects, requires too much time and attention for common uſe; and therefore, in general, it may be ſufficient to adopt the mode of

of filteration, recommended by Dr. Rotheram, or that which is propoſed by M. Amy.

The obſervations, which I have here laid before the reader, are not new. They have been communicated to the public by others. But they are diſperſed through many different publications. I have therefore thrown them into a ſmall compaſs. And I flatter myſelf, that, in this commodious form, they may be acceptable to the public; as many of the foregoing articles are of infinite importance to the health, and conſequently to the happineſs of mankind.

F I N I S.