

ways be borne in mind that the questions of price, and the considerations of supply and demand, must, to a great extent, regulate the adaptation of any particular wood.

With regard to those woods referred to as being tried by Mr. Worthington Smith, he remarks in his report that any of them would be useful for some classes of work, if they could be imported, prepared, and sold for a farthing, or less than a halfpenny, per square inch.

Specimens of all the woods here enumerated are contained in the Kew Museum.

COMPOSITE PORTRAITS.

NOT long since we gave a figure from a drawing by Mr. Gallieni, which, looked at from a distance, seemed to be a death's head, but which, when examined more closely, was seen to represent two children caressing a dog. Since then we have had occasion to publish some landscapes of Kircher and his imitators, which, looked at sideways, exhibited human profiles. This sort of amusement has exercised the skill of artists of all times, and engravings, and even paintings, of double aspect are very numerous. Chance has recently put into our hands a very curious work of this kind, which is due to a skillful artist named Gaillot. It is an album of quite ancient lithographs, which was published at Berlin by Senefelder. The author, under the title of "Arts and Trades," has drawn some very amusing faces that are formed through the tools and objects used in the profession represented. We reproduce a few specimens

half as good as the plain, old, strong term "hand-craft."

An aid to hand-craft is rede-craft—the power to read, to reason, and to think; or, as it is said in the book of Common Prayer, "to read, mark, learn, and inwardly digest." By rede-craft we find out what other men have done; we get our book learning, we are made heirs to thoughts that breathe and words that burn, we enter into the life, the acts, the arts, the loves, the lore of the wise, the witty, the cunning, and the worthy of all ages and all places; we learn, as says the peasant poet of Scotland,

"The song whose thunderous chime
Eternal echoes render—
The mournful Tuscan's haunted rhyme,
And Milton's starry splendor!"

I do not pit rede-craft against hand-craft. Quite otherwise, I call them not foes (as some would), but friends. They are brothers, partners, consorts, who can work together, as right hand and left hand, as science and art, as theory and practice. Rede-craft may call for books and hand-craft for tools, but it is by the help of both books and tools that mankind moves on. Indeed, we shall not err wide of the mark if we say that a book is a tool, for it is the instrument which we make use of in certain cases when we wish to find out what other men have thought and done. Perhaps you will not be as ready to admit that a tool is a book. But take for example the plow. Compare the form in use to-day on a first-rate farm with that which is pictured on ancient stones long hid in Egypt—ages old.

or a char-boy. They do not know the pleasure there is in working, and especially in making. They have never learned to guide the fingers by the brain. They like to hear, or see, or own, or eat, what others have made, but they do not like to put their own hands to work. If you doubt what I say, put a notice in the paper asking for a clerk, and you will have a hundred answers for every one that will come when you ask for a workman. So it comes to pass that young men grow up whose hands have not been trained to any kind of skill; they wish, therefore, to be buyers and sellers, traders, dealers, and so the market is overstocked with clerks, book-keepers, salesmen, and small shop-keepers, while it is understocked in all the higher walks of hand-craft. Some men can only get on by force of arms, lifting, pounding, heaving, or by power of sitting at counter or a desk and "clerking it."

Machinery works against hand-craft. In many branches of labor, the hand now has but little to do, and that little is always the same, so that labor becomes tiresome and the workman dull. Machines can be made to cut statuary, to weave beautiful tapestry, to fashion needles, to grind out music, to make long calculations; alas! the machine has also been brought into politics. Of course, a land cannot thrive without machinery; it is that mechanical giant, the steam engine, which carries the corn, the cotton, and the sugar from our rich valleys to the hungry of other lands, and brings back to us the product of their looms. Nevertheless, he who lives by the machine alone lives but half a life; while he who uses his hand to contrive and to adorn drives dullness from his path. A true artist and a true artisan are one. Hand-craft, the power to shape, to curve, to beautify, to create, gives pleasure and dignity to labor.

In other times and in other lands, hand-craft has had more honor than it has had with us. Let me give some examples. Not long ago, I went to one of the shrines of education, the Sorbonne in Paris. Two paintings adorn the chapel walls, not of saints or martyrs, nor of apostles or prophets, perhaps I should say of both saints and prophets, *Labor* and *Humilitas*, Industry and Modesty.

The touch of Phidias was his own, and so inimitable that a few months ago, an American, scanning, with his practiced eye, the galleries of the Louvre, recognized a fragment of the work of Phidias, long separated from the Parthenon frieze which Lord Elgin sent to London. The sculptor's touch could not be mistaken. It was as truly his own as his signature, his autograph. Ruskin, in a lecture on the relation of Art to Morals, calls attention to a note which Durer made on some drawings sent him by Raphael: "These figures Raphael drew and sent to Albert Durer in Nurnberg, to show him his hand, 'sein hand zu weisen.'" Ruskin compares this phrase with other contests of hand-craft, Apelles and Protogenes showing their skill by drawing a line; Giotto in striking a circle.

In the household of the Kings of Prussia there is a custom, if not a law, that every boy shall learn a trade. I believe this is a fact, though I have no certain proof of it. The Emperor Wilhelm is said to be a glazier, the Crown Prince a compositor, and on the Emperor's birthday not long ago his majesty received an engraving by Prince Henry and a book bound by Prince Waldemar, two younger sons of the Crown Prince. Let me refer to sacred writ; the prophet Isaiah, telling of the golden days which are to come, when the voice of weeping shall be no more heard in the land, nor the voice of crying, when the child shall die an hundred years old, and men shall eat of the fruit of the vineyards they have planted, adds this striking promise, as the culm of all hope, that the elect of the Lord shall long enjoy the work of their hands.

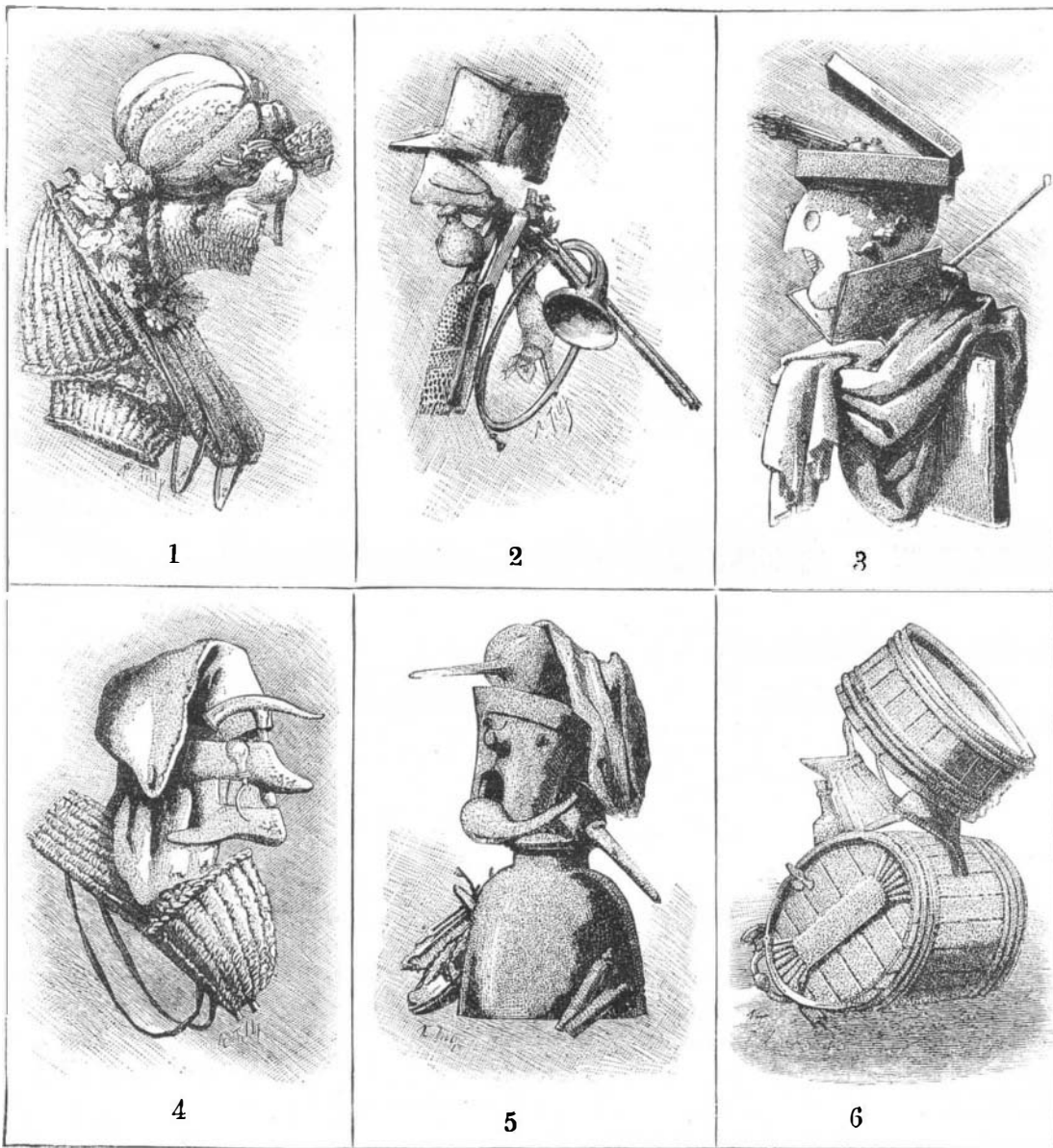
Now, in view of what has been said, my first point is this: We who have to deal with the young, we all who love our fellow-men, we all who desire that our times, our city, our country, should be thrifty, happy, and content, must each in his place and way give high honor to labor. We, especially, who are teachers and parents, should see to it that the young get "hand-craft" while they are getting "rede-craft." How can this be done?

Mothers begin right in the nursery, teaching little fingers to play before the tongue can lisp a sentence. Alas! this natural training has often been stopped at school. Hitherto, until quite lately, in schools both low and high, rede-craft has had the place of honor, hand-craft has had no chance. But a change is coming. In the highest of all schools, universities, for example, work rooms, labor places, "laboratories," are now thought to be as useful as book rooms, reading rooms, libraries.

What mean those buildings which you have seen spring up within a few years past in all the college greens of New England? They are libraries and laboratories. They show that rede-craft and hand-craft are alike held in honor, and that a liberal education means skill in getting and skill in using knowledge; that knowledge comes from searching books and searching nature; that the brain and the hand are in close league. So too, in the lowest school, as far as possible from the university, the kindergarten has won its place and the blocks, and straws, and bands, the chalk, the clay, the scissors, are in use to make young fingers deft. Between the highest and the lowest schools there is a like call for hand-craft. Seeing this need, the authorities in our public schools have begun to project special schools for such training, and are looking for guidance far and near. At this intermediate stage, for boy and girls who are between the age of the kindergarten and the age of the college or the shop, for youth between eight and sixteen, there is much to be done; people are hardly aware how much is needed to secure fit training for the rising generation.

It seems sometimes as if one of the most needed forms of hand-craft would become a lost art, even good handwriting. We cannot give much credit to schools if they send out many who are skilled in algebra or in Latin, but who cannot write a page of English so that it can be read without effort.

Drawing is another kind of hand-craft, quite too much neglected. I think it should be laid down as a law of the road to knowledge, that everybody must learn to draw as well as to write. The pencil may be mastered just as readily as the pen. It is a simpler tool. The child draws before he writes, and savages begin their language with pictures; but we wisacres of this age of books let our young folks drop their slate pencils and their Fabers, and practice with their Gil-



COMPOSITE PORTRAITS.—OCCUPATIONS.

1. Green-grocer. 2. Hunter. 3. Artist. 4. Cobbler. 5. Chemist. 6. Cooper.

of these essentially original compositions of Gaillot. The green grocer is formed of a melon for the head, of an artichoke and its stem for the forehead and nose, of a pannier for the bust, etc. The hunter is made up of a gun, of a powder horn, and of a hunting horn, etc.; and so on for the other professions. This is an amusing exercise in drawing that we have thought worthy of reproducing. Any one who is skillful with his pencil might exercise himself in imagining other compositions of the same kind.—*La Nature*.

HAND-CRAFT AND REDE-CRAFT.—A PLEA FOR THE FIRST NAMED.*

By DANIEL C. GILMAN, President of the Johns Hopkins University, Baltimore.

I CANNOT think of a theme more fit for this hour and place than hand-craft. I begin by saying "hand-craft," for that is the form of the word now in vogue, that which we are wonted to see in print and hear in speech; but I like rather the old form, "hand-craft," which was used by our sires so long ago as the Anglo-Saxon days. Both words mean the same thing, the power of the hand to seize, hold, shape, match, carve, paint, dig, bake, make, or weave. Neither form is in fashion, as we know very well, for people choose nowadays such Latin words as "technical ability," "manual labor," "industrial pursuits," "dexterity," "professional artisanship," "manufacture," "decorative art," and "technological occupations," not one of which is

See how the idea of the plow has grown, and bear in mind that its graceful curves, its fitness for a special soil, or for a special crop, its labor-saving shape, came not by chance, but by thought. Indeed, a plow is made up from the thoughts and toils of generations of plowmen. Look at a Collins ax; it is also the record of man's thought. Lay it side by side with the hatchet of Uncas or Miantonomoh, or with an ax of the age of bronze, and think how many minds have worked on the head and on the helve, how much skill has been spent in getting the metal, in making it hard, in shaping the edge, in fixing the weight, in forming the handle. From simple tools, turn to complex; to the printing press, the sewing machine, the locomotive, the telegraph, the ocean steamer; all are full of ideas. All are the offspring of hand-craft and rede-craft, of skill and thought, of practice put on record, of science and art.

Now, the welfare of each one of us, the welfare of our land, the welfare of our race, rests on this union. You may almost take the measure of a man's brain, if you can find out what he sees with his eyes and what he does with hands; you may judge of a country, or of a city, if you know what it makes.

I do not know that we need ask which is best, hand-craft or rede-craft. Certainly "the eye cannot say to the hand, I have no need of thee." At times, hand-craft becomes rede-craft, for when the eye is blind the hand takes its place, and the finger learns to read, running over the printed page to find out what is written, as quickly as the eye.

In these days, there are too many who look down on hand-craft. They think only of the tasks of a drudge

* Read before the Worcester Free Industrial Institute, June 25, 1885.

lots and their Esterbrooks. Let us say, in every school and in every house, the child must not only learn to read and write, he must learn to draw. We cannot afford to let our young folks grow up without this power. A new French book is just now much talked about, with this droll title, "The Life of a Wise Man, by an Ignoramus." It is the story of the great Pasteur, whose discoveries in respect to life have made him world renowned. I turned to the book, eager to find out the key to such success, and I found the old story—"the child was father of the man." This philosopher, whose eye is so skilled in observing nature, and whose hand is so apt in experiments, is the boy grown up whose pictures were so good that the villagers thought him at thirteen an artist of rank.

Girls should learn the first lesson of hand-craft with the needle; boys may (and they will always prize the knowledge), but girls must. It is wise that our schools are going back to old fashioned ways, and saying that girls must be taught to sew.

Boys should practice their hands upon the knife. John Bull used to laugh at Brother Jonathan for whittling, and Mr. Punch always drew the Yankee with a blade in his fingers; but they found out long ago in Great Britain that whittling in this land led to something, a Boston notion, a wooden clock, a yacht America, a labor-saving machine, a cargo of woodenware, a shop full of knick-knacks, an age of inventions. Boys need not be kept back to the hand-craft of the knife. For in-doors there are the type case and printing press, the paint box, the tool box, the lathe; and for out doors, the trowel, the spade, the grafting knife. It matters not how many of the minor arts the youth acquires. The more the merrier. Let each one gain the most he can in all such ways; for arts like these bring no harm in their train; quite otherwise, they lure good fortune to their company.

Play, as well as work, may bring out hand-craft. The gun, the bat, the rein, the rod, the oar, all manly sports, are good training for the hand. Walking insures fresh air, but it does not train the body or mind like games and sports which are played out of doors. A man of great fame as an explorer and as a student of nature (he who discovered, in the West, bones of horses with two, three, and four toes, and who found the remains of birds with teeth) once told me that his success was largely due to the sports of his youth. His boyish love of fishing gave him his manly skill in exploration.

I speak as if hand-craft was to be learned by sport. So it may. It may also be learned by labor. Day by day for weeks I have been watching from my study window a stately inn rise from the cellar just across the road. A bricklayer has been there employed whose touch is like the stroke of an artist. He handled each brick as if it were porcelain, balanced it carefully in his hand, measured with his eye just the amount of mortar which it needed, and dropped the block into its bed, without staining its edge, without varying from the plumb line, by a stroke of hand-craft as true as the sculptor's. Toil gave him skill.

The second point I make is this: If you really value hand-craft, buy that which shows hand-craft, encourage those who are engaged in hand-craft, help on with your voice and with your pocket, those who bring taste and skill and art into the works of their hand. If your means are so small that you only buy what you need for your daily wants, you cannot have much choice, you must buy that which is cheapest; but hardly any one within the sound of my voice is so restricted as that; almost if not quite every one buys something every year for his pleasure, a curtain, a rug, a wall paper, a chair, or a table not certainly needed, a vase, a clock, a mantel ornament, a piece of jewelry, a portrait, an etching, a picture. Now whenever you make such a purchase, to please your taste, to make your parlor or your chamber more attractive, choose that which shows good handiwork. Such a choice will last. You will not tire of it as you will of that which has but a commonplace form or pattern.

I come now to a third point. That which has just been said applies chiefly to things whose price is fixed by beauty. But handiwork gives us many works not pleasing to the eye, yet of the highest skill—a Jacquard loom, a Corliss engine, a Hoe printing press, a Winchester rifle, an Edison dynamo, a Bell telephone. Ruskin may scout the work of machinery, and up to a certain point may take us with him. Let us allow that works of art marked by the artist's own touch—the gates of Paradise by Ghiberti, a shield by Cellini, a statue by Michael Angelo, are better than all reproductions and imitations, better than plaster casts by Eichler, electrotypes by Barbiedienne, or chromes by Prang. But even Ruskin cannot suppress the fact that machinery brings to every thrifty cottage in New England comforts and adornments which, in the days of Queen Bess, were not known outside of the palace. Be mindful, then, that handiwork makes machines which are wonders of productive force—weaving tissues such as Penelope never saw, of woolen, cotton, linen, and silk, to carpet our floors, cover our tables, cushion our chairs, and clothe our bodies; machines of which Vulcan never dreamed, to point a needle, bore a rifle, cut a watch wheel, or rule a series of lines, measuring forty thousand to an inch, with sureness which the unaided hand can never equal. Machinery is a triumph of handiwork as truly as sculpture and architecture. The fingers which can plan and build a steamship or a suspension bridge, which can make the Quinebaug and the Blackstone turn spindles by the hundred thousand, which can turn a rag heap into spotless paper, and make myriads of useful and artful articles from rough metal, are fingers which this age alone has evolved. The craft which makes useful things cheap can make cheap things beautiful. The Japanese will teach us how to form and finish, if we do not first teach them how to slight and sham.

A fourth point is this. If hand-craft is of such worth, boys and girls must be trained in it. This, I am well aware is no new thought. Forty years ago schools of applied science were added to Harvard and Yale colleges; twenty years ago Congress gave enough land-scrip to aid in founding at least one such school in every State; men of wealth, like many whom you have known and whom you honor, have given large sums for like ends. Now the people at large are waking up. They see their needs; they have the means to supply what they want. Is there the will? Know they the way? Far and near the cry is heard for a different training from that now given in the public schools.

Many are trying to find it. Almost every large town has its experiment—and many smaller places have theirs. Nobody seems to know just what is best. Even the words which express the want are vague. Bright and thoughtful people differ as to what might, can, and should be done. A society has been formed in New York to bring together the needed data. The Slater trustees, charged with the care of a large fund for the training of freedmen, have said that manual training must be given in all the schools they aid. The town of Toledo in Ohio opened, some time since, a school of practical training for boys, which worked so well that another has lately been opened for girls. St. Louis is doing famously. Philadelphia has several experiments in progress. Baltimore has made a start. In New York there are many noteworthy movements—half a dozen at least full of life and hope. Boston was never behindhand in knowledge, and in the new education is very alert, the efforts of a single lady deserving praise of high degree. These are but signs of the times.

Some things may be set down as fixed; for example, most of those who have thought on this theme will agree on the points I am about to name, though they may or may not like the names which I venture to propose:

1. Kindergarten work should be taught in the nurseries and infant schools of rich and poor.
2. Drawing should be taught in schools of every grade, till the hand uses the pencil as readily as the pen.
3. Every girl at school if not at home should learn to sew.
4. Every boy should learn the use of tools, the gardener's or the carpenter's, or both.
5. Well planned exercises, fitted to strengthen the various bodily organs, arms, fingers, wrists, lungs, etc., are good. Driving, swimming, rowing, and other manly sports should be favored.

What precedes is at the basis of good work. In addition:

6. With good teachers, quite young children may learn the minor decorative arts, carving, leather stamping, brass beating and the like, as is shown in the Leland classes of Philadelphia.

7. In towns, boys who begin to earn a living when they enter their teens may be taught in evening schools to practice the craft of carpentry, bricklaying, plastering, plumbing, gas fitting, etc., as is shown successfully in the Auchmuty schools of New York. Trade schools they are called; schools of practice for workmen would be a better name.

8. Boys who can carry their studies through the later teens may learn, while at the high school or technical school or college, to work in wood and metals with precision, as I have lately seen in the College of the City of New York, at Cornell University, and elsewhere—colleges or high schools with work-shops and practice classes. If they can take the time to fit themselves to be foremen and leaders in machine shops and factories, they may be trained in theoretical and practical mechanics, as in the Worcester Industrial Institute and in a score of other places; but the youth must have talent as well as time to win the race in these hard paths. These are schools for foremen, or, if we may use a foreign word like Kindergarten, they are Meister-schaft schools.

9. Youths who wish to enter the highest departments of engineering must follow advanced courses of mathematics and physics, and must learn to apply this knowledge. The better colleges and universities afford abundant opportunities for such training, but their scientific laboratories are fitted only for those who love long study as well as hard. These are schools for engineers.

10. Girls are most likely to excel in the lighter arts—to design (for furniture or fabrics), to embroider, to carve, to engrave, to etch, to model, to paint. Here also success depends largely upon that which was in-born, though girls of moderate talent in art, by patience, may become skilled in many kinds of art work. Schools for this instruction are schools of art (elementary, decorative, professional, etc.).

If there be those in this hall who think that hand-craft is adverse to rede-craft, let me ask them to study the lives of men of mark. Isaac Newton began his life as a farm-boy who carried truck to a market town; Spinoza, the philosopher of Amsterdam, ground lenses for his livelihood; Watt, the inventor of the steam engine, was mechanic to the University of Glasgow; Per-son, the great professor of Greek, was trained as a weaver; George Washington was a land surveyor; Benjamin Franklin a printer.

Before I close let me draw a lesson from the history of our land. Some of you doubtless bear in mind that before the late war men used to say, "Cotton is king;" and why so? Because the trades which hung on this crop were so many and so strong that they ruled all others. The rise or fall of a penny in the price of cotton at Liverpool affected planters in the South, spinners in the North, seamen on the ocean, bankers and money-changers everywhere. Now wheat and petroleum share the sovereignty; but then cotton was king. Who enthroned this harmless plant? Two masters of hand-craft, one of whom was born a few miles east of this place in Westborough; the other was a native of England who spent most of his days a few miles south of this city. Within five years—not quite a century ago—these two men were putting in forms which could be seen, ideas which brought our countrymen large measures of both weal and woe. In 1790, Samuel Slater, once an apprentice to Strutt and Arkwright, built the mill at Pawtucket which taught Americans the art of cotton-spinning; and before 1795, Eli Whitney had invented the gin which easily cleansed the cotton boll of its seeds, and so made marketable the great crop we have spoken of. Many men have made more noise in the world than Slater and Whitney; few if any can be named whose peaceable hand-craft has done so much to give this country its front place in the markets of the globe.

Let me come nearer home, and as I take my seat let me name a son of this very town who loved hand-craft and rede-craft, and worthily aided both—Isaiah Thomas, the patriot printer, editor, and publisher, historian of the printer's craft in this land, and founder of the far famed antiquarian library, eldest in that group of institutions which gave to Worcester its rank in the world of letters, as its many products give it standing in the world of industry and art.

Mindful of three such worthies, it is not strange that Salisbury, Washburn, Boylston, and many more have built up this high school of handicraft; it will be no wonder if others like minded build on the foundations which have been so fitly laid.

MAKING SEA WATER POTABLE.*

By THOMAS KAY, President of the Stockport Natural History Society.

THE author called attention to the absence of research in this direction, and how man, endowed to overcome every physical disability which encompassed him on land, was powerless to live on the wide ocean, although it is teeming with life.

The water for experiment was taken from the English Channel, about fifty miles southwest of the Eddystone Lighthouse, and it was found to correspond closely with the analysis of the Atlantic published by Roscoe, viz.: Total solids 35.976, of which the total chlorides are 32.730, representing 19.863 of chlorine.

The waters of the Irish Sea and the English Channel nearer to the German Ocean, from their neighborhood to great rivers, are weaker than the above.

Schweitzer's analysis of the waters of the English Channel, near Brighton, was taken as representing the composition of the sea, and is here given:

Sodium chloride.....	27.059
Potassium ".....	0.766
Magnesium ".....	3.666
" bromide.....	0.029
" sulphate.....	2.296
Calcium ".....	1.406
" carbonate.....	0.033
Iodine and ammoniacal salts.....	traces
Water.....	964.795

1000.000

The chlorides in the—

Irish Sea are about.....	30 per mille.
English Channel are about.....	31 "
Beyond the Eddystone are.....	32 "

As the requirement for a potable sea water does not arise except in mid-ocean, the proportion of 32 per mille must be taken as the basis of calculation.

This represents as near 20 per mille of chlorine as possible.

From the analysis shown it will be perceived that the chlorides of sodium and magnesium are in great preponderance.

It is to the former of these that the baneful effects of sea water when drunk are to be ascribed, for chloride of sodium or common salt produces thirst probably by its styptic action on the salivary glands, and scurvy by its deleterious action on the blood when taken in excess.

Sodium chloride being the principal noxious element in sea water, and soda in combination with a vegetable or organic acid, such as citric acid, tartaric acid, or malic acid, being innocuous, the conclusion is that the element of evil to be avoided is chlorine.

After describing various experiments, and calling attention to the power of earthy matters in abstracting salts from solutions by which he hoped the process would be perfected, an imperial pint of water from beyond the Eddystone was shown mixed with 960 grains of citrate of silver and 4 grains of the free citric acid.

Each part of the chlorides requires three parts by weight of the silver citrate to throw down the chlorine, thus:



The silver chloride formed a dense insoluble precipitate, and the supernatant fluid, was decanted and filtered through a rubber tube and handed round as a beverage.

It contained in each fluid ounce by calculation about:

18 grains of citrate of soda.
1½ " " " magnesia.
1½ " " " potash.
1 " " sulphate of magnesia.
½ " " lime.
½ " citric acid.

with less than half a grain of undecomposed chlorides.

To analyze this liquid therapeutically, it may be broadly stated that salts of potash are diuretic, salts of magnesia aperient, and salts of soda neutral, except in excessive doses, or in combination with acids of varying medicinal action; thus, soda in nitric acid, nitrate of soda, is a diuretic, following the law of nitrates as nitrate of potash, a most powerful diuretic, nitrous ether, etc.; while soda in combination with sulphuric acid as sulphate of soda is aperient, following the law of sulphates, which increase aperient action, as in sulphate of magnesia, etc.

Thus it would seem that soda holds the scales evenly between potash and magnesia in this medical sense, and that it is weighed, so to speak, on either side by the kind of mineral acid with which it may be combined.

With non-poisonous vegetable acids, and these slightly in excess, there is not such an effect produced.

Sodium is an important constituent of the human body, and citric acid, from its carbon, almost a food. Although no one would advocate saline drinks in excess, yet, under especial circumstances, the solution of it in the form of citrate can hardly be hurtful when used to moisten the throat and tongue, for it will never be used under circumstances where it can be taken in large quantities.

In the converted sea water the bulk of the solids is composed of inert citrate of soda. There is a little citrate of potash, which is a feeble diuretic; a little citrate and sulphate of magnesia, a slight aperient, corrected, however, by the constipatory half grain of sulphate of lime; so that the whole practically is inoperative.

The combination of these salts in nature's proportions would seem to indicate that they must be the best for administration in these ailments to which their use would be beneficial.

Citrate of silver is an almost insoluble salt, and requires to be kept from the light, air, and organic matter, it being very easily decomposed.

A stoppered bottle covered with India-rubber was exhibited as indicating a suitable preserver of the salt,

* Read lately before the Manchester Literary and Philosophical Society