THE INCREASING WEALTH OF THE WORLD.

We are at present in such a stage of the development of the industry of all civilized nations that the increase in producing capacity far outstrips increase of population, so that the amount produced and consumed on an average by every person far exceeds in quantity and value that which was ever before known. It should not be lost sight of that only food, drink, fuel, and clothing are entirely consumed, but that all the other products of industry are utilized for building and manufacturing, by which operations nothing in reality disappears; but, on the contrary, the value of the manufactured material is increased. Thus the stone and timber are transformed into dwellings and furniture, the iron into railroads, engines, and steamships, and the products of metallurgy into all kinds of tools and machinery, all much more valuable than the material used to produce them; so that in their case the value of property is raised by two steps, first by the production of the raw material, second, by the use of this in making the objects desired. Even the fuel consumed under the steam boiler of a manufactory gives more than its equivalent in the products of the manufacture; and who will deny that the value of the development of human society is not worth a great deal more than the value of the food and other necessaries consumed by the human race? Therefore, strictly speaking, even in this case nothing can be considered lost, but humanity in general is the constant gainer. So the workman who earns his wages gives the products of his labor back to his employers, a value surpassing that of his earnings if this was not so, he would not have been employed; and thus the workman has, besides earning a living for himself and his household, contributed his share to the increase of the wealth of the world. Even the Chinaman who, after several years of toil here, returns to his native home, carrying some of his earnings with him, if looked at from this point of view, leaves behind him in the results of his labors a greater value than all that he can possibly carry off; he has thus been a benefit to us, and has the full right to go where he pleases.

If we look at the statistics of the increase of productive capacity in various branches among different nations, we are especially struck at the development that has taken place during the last decade. Let us, for instance, take the single article of iron. In the United States, in 1860 it was confined to half a million tuns, while in 1870 it was increased to over two million tuns, employing 150,000 workmen; while 850,000 men are employed to work this iron into all kinds of machines, etc., making one million men employed by the iron industry alone. The value of the raw material is estimated at $200,000,000, increasing by further labor to $1,000,000,000. The production of steel manufacture in Germany is still more startling; in 1860 only 250 tuns of manufactured steel, worth three millions of dollars, was produced by 4,000 workmen, while in 1870, 2,000 tuns, worth twenty millions of dollars, was the result of the labor of 14,000 workmen.

Let us take a totally different branch, cheese; in 1853 one million pounds of cheese were exported from here to England, and in 1870 seven million pounds. The State of New York alone has now nearly 1,000 cheese manufactories, which use the milk of more than 250,000 cows, making therefrom 80,000,000 pounds of cheese, which is 1,000 pounds of cheese for every three cows. The cheese production of the whole United States is now over 100,000,000 pounds, of which 60,000,000 are exported. England exports scarcely 3,000,000 pounds, while little Holland, which used to be the principal cheese producing country of the world, exports at present 25,000,000 pounds. This latter fact suggests the extent which the cheese production of the United States may reach in the course of years, and the wealth which its exportation will bring back, as the Hollanders used to boast that their cheese production alone was more valuable and reliable than a gold mine, very few of which surpassed the Dutch cheese in the profits realized.

We could easily fill many pages with other illustrations of the immense increase of the production which, as it continually far outstrips the increase in population, cannot fail to increase the sum total of valuable property. This view of productive capacity and its results is the best argument against that conservative class of people who sometimes raise their voices against useful inventions and new patents, under pretext that such improvements often take the bread out of the mouth of the workmen, who are unable to compete with hand labor against machine labor. Experience has proved that all such fears are totally groundless, and in every case have the machines which increased production been a blessing in the end, giving more labor and higher wages to those using them than they could obtain by their unimproved methods and much smaller productive capacities. So since the art of printing has superseded manual copying, there are probably a thousand printers for every manuscript writers of the olden times; when at a recent period the sewing machine superseded a great many of the most tedious duties of the seamstress, the prophecy that its use would impoverish a large class of women who made their living by sewing was not fulfilled. On the contrary, the sewing machine has been a benefit all round; and so it must be with every invention which enlarges the total amount of the valuable products of labor, and therefore contributes its share to the increase of the world's wealth.

Commissioners to Vienna.

There are a sufficient number of Commissioners to the Vienna exhibition appointed by the President to make a respectable show here if they would remain at home. Some eighty have been appointed and confirmed by the Senate, and we are informed that the end is not yet.

SCIENTIFIC AND PRACTICAL INFORMATION.

GOLD IN LAPLAND.

Traces of gold had been discovered years ago in different parts of Lapland, but not until a certain Ewast, formerly a California miner, with some companions explored the country was much attention given to it. They found in a short time gold to the value of more than $190. A large number of adventurers rushed to the gold districts, many of whom were without means and had had no experience in mining. By a ukase of the Senate of Finland, dated April, 1870, it was decreed that the privilege of obtaining gold should be granted only to applicants who had sufficient capital for the effective prosecution of the work. Several companies were then formed, and about 19 of them were registered towards the end of June, 1870. They began near Ivalo, on the river Tanna, where large buildings for the workmen were erected. This river forms the boundary line between Lapland and Norway, and the working was soon extended along its shores near Vasko and Tanna-Juk, also along the rivers Kenna and Kytnien. The greatest yield was obtained from the river Tanna. The gold found showed traces of platinum. The gold-bearing sand of the river showed great resemblance to that of the river Sacramento, Cal. The method of obtaining the gold was similar to that used in California, namely, by washing it out in a wooden trough.

In July, 1870, a Norwegian captain named Daal explored the western shore of the river Tanna and the result was that the greatest yield was discovered at the confluence of the Ivalo and Tanna. The Norwegian government then granted to the Russian companies the privilege of extending their works to their side of the river. In the middle part of September, every vestige of vegetation disappeared, owing to the approach of winter, and compelled the abandonment of the work till the following spring. In the seven weeks from July 21 to September 9, 124,141 cubic feet of gold-containing sand were washed, yielding 615 ozs. of the precious metal.

INK PLANT.

The botanists of Europe are endeavoring to acclimatize a plant growing in New Granada, which is valuble for the manufacture of ink. The juice, called "Chanhi," is reddish, but changes after a few hours into a deep black, and is then ready for use. The "Chanhi" has less destructive influence on the steel pens than common ink. Experiments made in Spain demonstrated that the ink was not even spoiled by sea water, which is invariably deleterious to ordinary ink.

TESTING GOLD USED IN GILDING.

P. Guyot proposes for this purpose the use of a solution of chloride of gold or a solution of nitrate of silver. Neither affects at all the genuine gilding, but imitations, when touched with the former solution, show a brown spot, and with the latter, a gray spot. The gilt designs of wall papers are examined by Guyot with chloride of sulphur. One drop of this salt, placed on imitation gold paper, produces a dark brown rim, which does not appear when gold has been used. Thin gold leaves, if placed with chloride of sulphur in closed bottles and well shaken, show no change, but alloys of base metals gradually blacken. If the gold is placed in hermetically closed bottles under a slight aerostatic pressure, it will disappear in a short time and combine with the chlorine to form chloride of gold.

CONSUMPTION OF TIN.

According to the *Polytechnisches Çentral Blatt* the annual consumption of tin in America and Europe was in 1868 and 1869 about 22,000 tuns; in 1870, 24,000 tuns; in 1871, 27,000 tuns. Should the consumption increase in the same ratio, possibly the production will not be equal to the demand, as during the last year only about 27,593 tuns were produced, as follows: Of English tin, 10,500 tuns; of Banca tin, 90,000 tuns; of Straits tin, 9,500 tuns; of Billiton tin, 2,700 tuns; total, 27,593 tuns.

CINCHONA TREES IN INDIA.

In the plantations of the English government on the Neilgherry hills, there are about 2,600,000 cinchona trees, which cover over 950 acres of land. The largest trees are 30 feet high with a circumference of three feet. The quantity of 7,295 pounds of splendid bark was sold last year in London at the price of from 50 to 60 cents per pound. There were also furnished about 35,000 pounds to the Indian depots, so that the proceeds amount to about $8,000. The capital invested by the government for the introduction of this important tree will soon have been repaid with interest. Hundreds of natives have been cured of fever annually with the quinine obtained, and the object of the beneficent intention of bringing the antidote of fever within reach of the poorest has been fully realized.

TO PRESERVE CHEMICALS.

Earthen vessels are now constructed with a groove near the top. The groove is filled with castor oil, with which the cover is brought in contact in closing. The connection with the outer air is thereby totally interrupted. Chloride of lime, for instance, was preserved in this manner for two years, without deteriorating in the least by the absorption of moisture.

SOLIDIFICATION OF NITROUS OXIDE.

Mr. T. Wells exhibited, at a recent meeting of the Chemical Society in London, the formation of solid nitrous oxide in large quantities. Liquid nitrous oxide quickly solidifies if a current of air be passed through it. Unlike carbonic acid, the liquefied gas can readily be preserved for some length of time in an open vessel, provided it be kept still. Liquid carbonic acid becomes solid immediately it is allowed to escape from the vessel containing it, since the vapor tension of the carbonic snow at the time of its formation is much above the atmospheric pressure: whilst liquid nitrous oxide boils at 1·92 Cent. and solidifies at 1·99°, so that the vapor tension of the solid is less than one atmosphere. The density of the liquid at 0° is ·9004, and, like liquid carbonic acid, it is very expansible and immiscible in water.

ADULTERATION OF RHUBARB AND YELLOW MUSTARD.

When rhubarb or mustard is adulterated with turmeric root, the adulteration is easily detected by shaking it for 1 or 2 minutes with absolute alcohol, filtering and then adding, first a concentrated solution of borax and then some hydrochloric acid. If the solution turns brown on adding the borax and retains its brown color on the addition of the acid, it indicates the presence of turmeric. This is a simple case of reversing the usual turmeric test for borax, and making the borax the reagent which detects the turmeric. It seems strange enough that until recently this had not been thought of.

IODINE IN SUBSTANCES CONTAINING TANNIN.

It is a well known fact that iodine, when dissolved in liquids containing tannin, cannot be detected by the ordinary starch test. Tessier has found, however, that on adding to such a solution a few drops of a neutral solution of chloride of iron, the iodine is at once set free, and can be detected by covering the test glass with a watch glass or an inverted funnel, coated on the inside with a starch paste.

UTILIZATION OF SOAPSTONE CLIPPINGS FOR BUTTONS, ETC.

The powder or other filings of soapstone (steatite) obtained in the manufacture of gas burners is saturated with soluble glass, dried, and ground. In a suitable press, buttons and similar articles are pressed from this powder, burned in retorts, dipped again in solution of glass and once more burned. They are then placed in a rotating cask, polished by water, dried and again polished by rotation in a similar cask with soapstone powder. Dominoes and dice are pressed in similar manner in dies of brass or steel, and then polished.

Hygiene.

A new fortnightly journal of sanitary science, bearing the above title, comes before the public in an attractive form from the press of G. P. Putnam's Sons, New York city. $2 per annum. From the last issue we extract the following:

REGIMEN FOR SPRING.—The amount of work done in the human body during the winter, in the mere maintenance of our normal 100° of heat, would of itself be sufficient to overload the system with tissue waste by the return of spring. But when to this is added the special nerve waste caused by the wear and tear of the brain and nervous system, in the whirl of excitement and mental activity of a city winter, there should be no wonder that March is accredited with bringing "humors" and giving rise to "pains." Increased production and reduced excretion of waste, or refuse matter, of the ashes of the human furnace, are the real causes, and not any occult influence of the season. Knowing this we are the better able to understand why roots and salads, "green food" and little meat, are now craved by the natural appetite; and to recognize the wise hygienic principle in the observance of Lent, with its meager diet and abstinence from worldly gayity and excitement. What we need, physically, in this milder weather, is to "train down;" to favor the "moulting of the tissues," as Chambers says; and, mentally, to get rid of brain fag and worry—for only by rest can the nervous system be restored.

Abundance of exercise, free bathing, spare diet, should be the rules for the coming month or two. To use the furnace illustration again, the amount and quality of fuel should be reduced, and the flues and pipes be cleansed. Exercise and bathing, by favoring excretion and elimination, will do the latter, and rid the system of much perilous stuff accumulated during the suspension of out door exercise. As to the fuel, fish, with its food for the brain and nerves, but scanter supply for adipose and muscle, should enter largely into the spring dietary. Fruits also, of which, thanks to modern methods, there is abundant supply even now, and vegetables, too, favor the "wasting" process. The class of agents of which we wrote in our last—tea, coffee, tobacco and alcohol—which retard tissue change should be used either more sparingly or not at all; and thus the usual "bilious" and other complications of spring may be largely avoided.

A Voice from Colorado.

MESSRS. MUNN & CO.,

Gentlemen:—I hereby acknowledge the receipt of the SCIENTIFIC AMERICAN for all of the members forming the club which I sent you, also of two copies of the Science Record, and of one copy of your splendid steel engraving, which came in good shape. All of the subscribers express entire satisfaction, and many much regret not having taken your paper years ago. Everybody should have it; lawyers, doctors, ministers, farmers, mechanics, all classes should have it, as it contains the most authenticated, useful and interesting matter published. Accept my best wishes.

Yours truly, JOHN H. PRICE.

ALL new subscriptions to the SCIENTIFIC AMERICAN will be commenced with the number issued in the week the names are received at this office, unless back numbers are ordered. All the numbers back to January 1st may be had, and subscriptions entered from that date if desired.

THE winter in the vicinity of the White Mountains was very severe. Snow to the depth of twelve feet fell, while the thermometer indicated forty degrees below zero on several occasions.

Stupidities.

Under this head, Dr. Hall, in his *Journal of Health* for March, 1873, humorously discourses on the tendency of the times, as follows:

It is really a great wonder that everybody is not dead and buried, and the world itself used up entirely, if the thousandth part of what is told us about microscopical and other "discoveries," so called, is true. One man will have it that the glorious Union over which the stripes and stars float so proudly will soon become depopulated, because respectable people don't have children; another has discovered myriads of bugs in the chatelaines and waterfalls of the ladies, boring into their skulls and sucking out all the remaining brains of the dear delightfuls. A German *savan* now tells us that every sip of tea we take is full of oily globules which get into the lungs direct, weaken them, set up a cough, and the person dies of consumption. Another man has found that the purest spring water, clear as crystal to all appearance, if let alone will deposit a sediment which generates typhoid fever; hence he proposes that everybody shall quit drinking water. Another says that bread has so much lime in it that it is turning us all to bone, and makes us stiff in the joints, that being the reason we have no lithe, sprightly old men now-a-days; hence we are full of limps and rheumatics long before our time, therefore we had better quit eating bread altogether, and live on rice and sago and tapioca. The water cure folk assure us that pork and beans and ham and eggs are full of abominable *trichinæ*, and that, if one is swallowed and gets fairly nestled into the system, he, she or it will breed a million more in a short time, and that roast beef has juvenile tape worms in it. And here come Tom, Dick, and Harry, all in a row, loaded down with microscopes and spy glasses which show as plain as day that the air is swarming with living monsters and putrid poisons, which fly into the mouth and crawl up the nose and creep into the ear; hence it is death to breath such pestilential air, and that the best way is to keep the mouth shut, plug up the nose, and ram cotton into the ears.

Ever so many learned professional gentlemen have been torturing poor figures for years to make them tell the stupendous fib that everybody is either crazy or soon will be; that the annual increase is ten per cent, consequently in eleven years everybody will be crazy, and more too.

The fact is that the people who spend their time in hatching out these tomfooleries, ought to be put to work and be made to earn an honest living. This world has been pretty well taken care of for some thousands of years, increasing in comfort and wealth and life, the average length of which last has doubled within two centuries, and the population increased perhaps three fold; and the presumption is that the Great Maker of all will so arrange all the antagonistic forces of life for the future as eventually to make "the wilderness and solitary place to be glad, and the desert to rejoice and blossom as the rose," and the race be happy still.

Rolling Mill Notes.

It is estimated that one tenth of the entire population of the United States is dependent for support upon the production and manufacture of iron. The value of the metal annually manufactured is $900,000.000, and 940,000 workmen are employed in the industry, the aggregate of whose wages reaches $600,000,000. There has been a vast increase of furnace capacity and additional machinery put in by our rolling mills during the past eight or ten months, and there is every prospect of still further growth.

We are indebted to a pamphlet lately issued by Messrs. Lewis and Rossiter, of Pittsburgh, Pa., for the following interesting information in reference to iron and rolling mills: Regarding material, English and American irons differ from each other in certain general characteristics. American is softer than English. As respects resistance to tensile strain, it is more ductile and tougher; while yielding more readily to immediate force, it will stand a greater ultimate strain; it also, undergoes vibration without crystalizing better than does English iron. The latter, being harder, stands a greater immediate tensile strain but yields to a less ultimate force. The same general difference exists as regards compressive strain.

If a bar of iron is measured and found to be exactly one foot long when cold, after it is heated to a darkish yellow it will have expanded from one eighth to one quarter of an inch in its length, varying with the degree of heat used and the quality of the bar. It follows, then, that in order to turn rolls which shall produce a definite section of iron, the last groove should be made somewhat larger than the section desired. It requires considerable experience and practice to place the exact amount of contraction in bars of complicated sections. The most accurate way of measuring the contraction is by means of a double ended calliper, having one side longer than the other. A very convenient size for use is when one side measures $4\frac{1}{2}$ inches and the other $4\frac{35}{64}$ inches from center to tips. For finishing work in roll turning the best of steel should be used; but in turning up and roughing out hard iron, cast iron cutters chilled on the surface may be employed to advantage. It is also advisable to use water in turning up hard iron or soft iron with fast speeds.

Fire, under rolling mills that have been built on made ground, has been the occasion of much trouble. Some of the mill owners, to prevent a recurrence of damage, have caused to be laid, beneath new furnaces, brick paving some two or three feet in depth and wider than the base of the furnace usually requires. Others, when making ground, have mixed common earth with the cinders that are thrown from the mill. Lately a fire under a Pittsburgh establishment burned over one year and was then only extinguished by an unusually high flood in the river. When laying foundations for machinery on ground made from rolling mill refuse, the pits should be dug low enough to reach solid ground, and then only the floor will sink in event of a fire.

An ingenious way of getting speeds for a roll train has recently been put in practice. The train has two sets of pinions and two sets of housings which, of course, are in the usual position between the roughing rolls and the crab. The pinions nearest the crab are different in diameter, the top one being the smallest. Between these two sets of pinions, but one spindle is employed, and by using this spindle on the top pinions, the fastest speed is gained. By using it on the larger middle pinion, the train is made to run slower; and by dropping to the lower and largest pinion, the slowest required speed is obtained. Between the first set of pinions and the crab is the usual breaking spindle, always coupled to the middle pinion; and between the second set of pinions and the roughing rolls are the three spindles: these are never changed. The idea was put in use with an eight inch guide train that could not otherwise well be altered from the original mode of driving. The plan is capable of further application.

A rail mill pinion has been in use for the last twelve months with two false teeth which were put in as follows: A dovetail groove was cut about one inch below the roots of the teeth and a cast iron piece having two teeth was nicely fitted in. This piece is firmly held in position by two wrought iron bands shrunk on each end near the teeth. A straightening plate, after getting hollow on its surface through use, has been straightened by hammering on its concave sides. A good steel punch is capable of piercing through a thickness of iron equal to the diameter of the punch.

A correspondent, referring to the rolling mills of Belgium, says that they are but poorly managed. The largest establishment is the John Cockerill works at Seraing on the river Meuse. The buildings cover one hundred acres and twelve thousand hands are employed. Locomotives and marine engines of the most powerful form are constructed. The company has its own coal mines and blast furnaces.

High Pressure Steam.

The compound cylinders are supposed to be so adjusted, says Professor Osborn Reynolds, that the work done in each cylinder equals half the whole work, that is, the expansion in the first cylinder equals the expansion in the second. This rule will not be quite accurate, but nearly; I do not know that there is any rule in practice. The difference in cylinder room, it must be noticed, is very much in favor of high pressures, as it diminishes in each case as the pressure increases. Thus the area of piston required at 300 lbs. is only half that required at 20 lbs. pressure in a condensing engine. And it is to be noticed that in the compound engines the necessary increase is much smaller for high pressures than for low pressures. At 20 lbs. the high pressure cylinder has half the area of the low pressure cylinder, whilst at 300 lbs. it has only about one twelfth.

Now as regards the strength of the engine. This is the great objection to the use of high rates of expansion. The machinery of an engine to work at 300 lbs. must, only to do the same work, be seven times as strong as that which works at 20 lbs. Here, then, is a fatal objection against the use of steam at high pressures, unless it can be met in some way. This is where the advantage of compound engines comes in: while the pressure in the one increases from 76 to 438, the other increases from 63 to 112. Thus by the use of compound engines the pressure on the pistons can be kept quite within reason.

To sum up then: By the use of steam at 100 lb. we may do with little more than half the coal required for a pressure of 14 lbs. with only three quarters the cylinder room, and shall only increase the greatest pressure on the piston by about 10 per cent. With 300 lbs. we do with 20 per cent less coal than at 100 lbs. with two thirds the cylinder room, and we must increase the strength of the machinery by 40 per cent.

I think, then, that we must look for economy by increasing the ratio of expansion and the use of high pressure steam so far, and only so far, as is necessary for the expansion for engines in which the release takes place at or below the pressure of the atmosphere. There will be advantage in pressures at least up to 120 or 130 lbs. Beyond this it must be a question for experience to decide how high we shall go.

In such engines as use a blast we shall find that there is great economy in using very high pressures of steam, provided the rate of expansion is increased. Thus, in a locomotive in which the blast was fixed at 30 lbs. it would be much more economical to use steam at 200 lbs. and expand four times, than at 100 lbs. and expand twice, and the blast would be much the same.

A New Mode of Treating Dyspepsia.

The Archives of Scientific and Practical Medicine, a new monthly edited by Dr. Brown Séquard and published by the Lippincotts, contains, among other very interesting articles, one in which the editor describes a novel mode of treatment which he first tried with perfect success in a very bad case of dyspepsia in 1851, and which has since been tested, with more or less satisfactory results, in many cases of dyspepsia, chlorosis, and anæmia. The following is an extract from the account of the first case:

"After a few days, finding that he had not improved, I decided to try a radical change of his alimentation, as regards the quantity of food to be taken at a time. Instead of three meals a day, I made him take sixty or more. Every twelve or fifteen minutes he took two or three mouthfuls of solid food, chiefly meat and bread. He drank a little less than a wineglass of Bordeaux wine and water every thirty or forty minutes. On the very first day this mode of alimentation was begun his digestive troubles disappeared, and within a week he was so well that he returned to Paris. * * * He continued the same mode of alimentation for almost three weeks, and then gradually diminished the number of his homœpathic meals, and increased the amount taken at each of them, until in about eight or ten days he came to eat only three times a day, and a full meal at each time."

The following paragraphs will serve to give the reader a clearer idea of the treatment commended:

"The plan consists in giving but very little of solid or fluid food or any kind of drink at a time, and giving these things at regular intervals of from ten to twenty or thirty minutes. All sorts of food may be taken in that way, but during the short period when such a trial is made, it is obvious that the fancies of the patients are to be laid aside, and that nourishing food, such as roasted or broiled meat, and especially beef, mutton, eggs, well baked bread, and milk, with butter and cheese, and a very moderate quantity of vegetables and fruit ought to constitute the dietary of the patients we try to relieve. This plan should be pursued two or three weeks, after which the patient should gradually return to the ordinary system of eating three times a day.

The most varied diet as regards the kind of food can be followed under this plan as well as when one has only two or three meals a day. The only absolutely essential points are that the amount of food taken every 10, 15, 20, or 30 minutes be very small (from one to four mouthfuls), and that the quantity of solid food in a day be from 32 to 40 ounces, or a little less when, instead of water, the patient drinks beef tea or milk."

Japanese Boys in the Boston Schools.

Mr. Charles L. Flint, chairman of the committee of the Rice school district in Boston, in presenting his quarterly report to the School Board, made the following interesting statement respecting the education in that school of a number of boys from Japan:

"At the beginning of the present school year, September 2, 1872, four boys from Japan, Kentaro Kaneko, fifteen years, Zeikichi Tanaka, fourteen years, Takuma Dan, thirteen years, and Chokicni Kikkawa, twelve years of age, entered the Rice school. They had then been in the country only six months and under the instruction of a private teacher. They were found to be able to enter upon the studies of the fifth class according to the present course. Kaneko today ranks at the head of the second or sub-masters' class; Tanaka and Dan nearly at the head of the third or ushers' class; while Kikkawa is among the first of the fourth class. Their conduct has been entirely unexceptionable, and their example in each class has aided the teachers and stimulated their classmates to greater exertion. Their gentle and gentlemanly manner has made them friends throughout the school, no boys being more popular with their classmates than they. When they entered the school it was with great difficulty that they could be understood. Now they speak and read quite plainly, and write in better English than a majority of even first class boys! A composition of several pages recently written by Kaneko required scarcely a single correction, either in grammar or spelling. It would be a most excellent thing for the whole school if there could be a dozen such boys in every class. They are very thorough in everything, and rarely require to be told anything twice."

A Singular Fish.

The *Rochester Union* describes a curious fish caught three months ago, in Chautauqua Lake, the third of the same sort captured in the Lake within the past forty years:

The fish is about six feet in length, and when caught weighed one hundred and thirty-four pounds. There are one back and three belly fins. But the head is what is most wonderful and peculiar about the fish. The mouth opens far back and wide enough to receive a nail cask. There is a large falling lip or jaw that sets back and upward as the mouth opens. The inside of the mouth is covered with a species of coarse hair somewhat resembling the small feathers or down of an ostrich. Projecting for almost fourteen inches from the upper jaw is a sort of shovel blade made of a hard substance. This instrument would seem to be intended for throwing food into its mouth rather than for attacking other objects or defending itself against assault. As this fish has no teeth, it is supposed that it subsists upon animalculæ or other substances, floating in the water, which are drawn or forced into its mouth by the blade attached to its jaw.

Economy of Fuel.

A correspondent in *The British Workman* tells how to build a fire as follows: The person laying a fire should fill the grate up to the top bar with coals, putting large pieces at the bottom and smaller over them, then upon these, paper enough to light the sticks, which should be laid upon, and not under, the coal. Cover the sticks with the cinders remaining from the previous day's fire; these will soon become red hot; the coal below will be warmed sufficiently to make it throw off gas; this, passing through the hot cinders, will be kindled, and will burn with a bright flame, instead of going up the chimney in smoke, as it does when the coals are laid on the top.

The fire thus laid will require no poking, and will burn clear and bright for from six to eight hours without the necessity for more coals to be thrown on.