

The Cost of Making Stoves.

At the late semi-annual meeting of the National Association of Stove Manufacturers, Mr. John T. Perry, of Albany, who probably knows as much about stove manufacture as any one, made the following statement of the estimated cost per ton of making stoves in the United States in 1884:

Foundry Cost.	
Iron.....	\$20.00
Mounting material (nickel panels, rails, etc., not included)	8.00
Fuel for all purposes.....	2.75
Moulding sand and clay.....	.40
Facing.....	.25
Patterns, flasks, and lumber material.....	.75
Shipping material.....	.10
Freight and expressage.....	1.25
Machinery and tools.....	1.75
Repairs.....	.40
Gas and oil.....	.30
Stationery and books.....	.10
Rent.....	1.00
Insurance.....	.40
Taxes.....	.25
Miscellaneous and pilferings.....	.40
Castings broken and discarded that have been paid for....	1.00
Total.....	\$39.00
Labor.	
Moulding.....	\$24.00
Mounting.....	8.00
Pattern making.....	1.45
Pattern fitting and repairs.....	1.50
Pattern moulding.....	.25
Carpenters.....	1.25
Cupola men, breaking iron, etc.....	.75
Cleaning and filing.....	2.00
Engineer.....	.30
Shipping.....	1.05
General labor.....	1.00
Watchman.....	.20
Foreman, moulding, and mounting.....	.50
Clerk.....	.50
Trucking.....	.75
Miscellaneous and pilferings.....	.50
Total.....	\$45.00
Selling Expenses.	
Allowances, various kinds.....	\$1.25
Attorney's fees.....	.25
Advertising, circulars, etc.....	1.75
Bad debts.....	2.00
Clerks.....	1.60
Freight on stoves delivered.....	1.00
Gas and oil.....	.10
Insurance.....	.20
Interest.....	2.00
Discount for cash.....	2.50
Miscellaneous and pilferings.....	.50
Postage stamps and telegrams.....	1.00
Rent.....	1.00
Stationery.....	.15
Traveler's wages.....	2.75
Traveler's expenses and general traveling.....	3.25
Taxes.....	.20
President and Secretary.....	1.50
Total.....	\$23.00
Grand total.....	\$107.00

In connection with the above, Mr. Perry said: "Gentlemen, everything in this world is imperfect, and so is this statement. Many of the items, I know, and you well know, are too low; for example, \$5.20 per ton, or \$15,600 for the year, for patterns and flasks, on a product of 3,000 tons, should be put down at twice that sum. Some items may be too high, and in many cases should be excluded altogether from the list, yet I believe the average cost on the basis named, taking one year with another, will reach \$107, and generally more than that sum."

Properties of Quicksilver.

One of the most curious properties of quicksilver is its capability of dissolving or of forming amalgams with other metals. A sheet of gold foil, dropped into quicksilver, disappears almost as quickly as a snow flake when it drops into water. It has the power of separating or of readily dissolving those refractory metals which are not acted upon by our most powerful acids. The gold and silver miners pour it into their machines holding the gold bearing quartz; and, although no human eye can detect a trace of the precious substance, so fine are the particles, yet the liquid metal will hunt them out, and incorporate it into its mass. By subsequent distillation it yields it into the hands of the miners, in a state of virgin purity. Several years ago, while lecturing before a class of ladies on chemistry, we had occasion to purify some quicksilver by forcing it through chamois leather. The scrap remained on the table after the lecture, and an old lady, thinking it would be very nice to wrap her gold spectacles in, accordingly appropriated it to that purpose. The next morning she came to us in great alarm, stating that the gold had mysteriously disappeared, and nothing was left in the parcel but the glasses. Sure enough, the metal remaining in the pores of the leather had amalgamated with the gold, and entirely destroyed the spectacles. It was a mystery which we never could explain to her satisfaction.—*Fireside Science.*

PUSCHER, in the *Chemiker Zeitung*, states that the following cement resists kerosene, and is useful for cementing the brass collars to glass lamps. One part of caustic soda, three parts of resin, and five parts of water are boiled together; the resin soap thus produced is mixed and well kneaded with half its weight of plaster of Paris. It hardens in about three-quarters of an hour. If zinc white or dry white lead is used, it hardens more slowly

THE OCARINA.

For a few years past the fairs of Paris and its environs have been offering to amateurs of music a charming little instrument called the ocarina. Its name and those of the manufacturers affixed to it (Girola, Donizetti, etc.) tell us plainly enough that it is of Italian origin. The mountaineer who is said to have devised it, not only for his diversion but also a means of defense (since it may serve to give a blow with), scarcely thought that his rough invention would be patented, have the run of public places, enter parlors, and even figure in the midst of philharmonic societies.

It is, then, not only a new plaything, but a genuine musical instrument that we desire to extol in enumerating the advantages that will everywhere cause it to be preferred to the wooden flageolet or the tin flute.

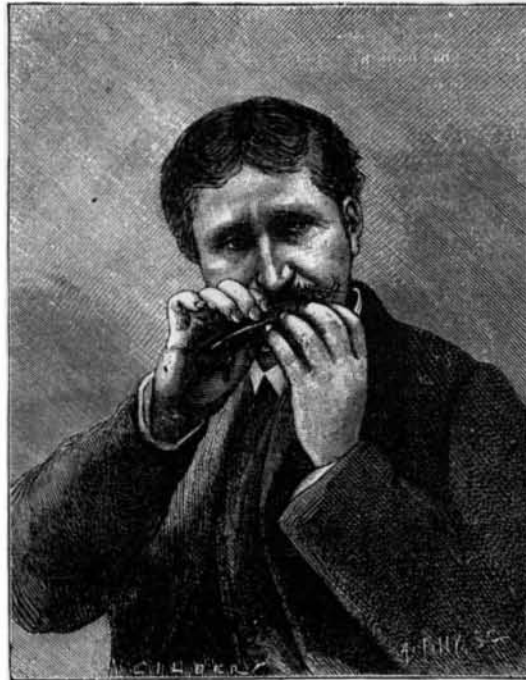


Fig. 1.—MODE OF USING THE OCARINA.

At its debut the ocarina was merely a little glazed baked clay, having the form of a black radish externally, but hollow internally, provided at the side with a mouth piece, and having nine or ten little apertures along it in place of keys (Fig. 2, No. I.). Its sonorous power ranged from *ut* natural to *fa* of the octave, passing through all the notes of the chromatic scale. It remained as primitive as this for a long time, and more than one amateur was enabled to draw from it lullabies and other music of the kind; but the programme that could then be got from its circumscribed range had its limit there.

A certain band of minstrels once passed through our northern towns, and their presence there has not been forgotten. This little troop had put aside the harp, the mandolin, and the violin, in order to give delightful serenades with well tuned ocarinas. It was original and delightful. But although in harmony, their scores, since they varied only from the melody to the third of the same octave, did not have the same interest as if they had been rendered from a grave to a sharp tone; and this gave rise to the idea of manufacturing the instrument in different sizes. So there soon appeared the soprano ocarina, which was smaller than an ordinary carrot and clearer than a small flute, and the double bass ocarina, larger than a pumpkin and graver than the alto. The principle remained the same. But the

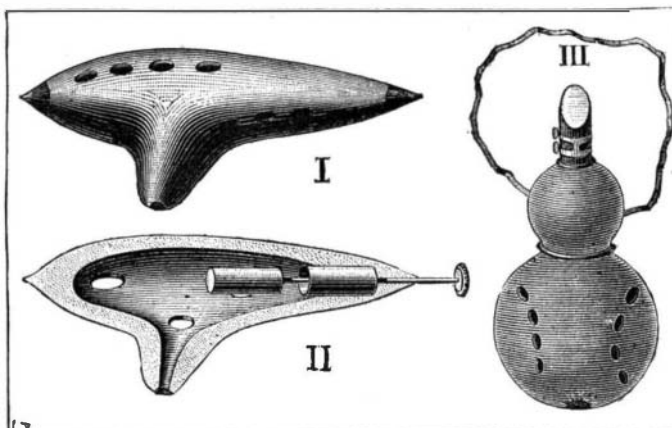


Fig. 2.—THE OCARINA IN PERSPECTIVE AND SECTION.

ocarina still had one drawback, and that was that it could not accord with the piano or the flute, from which it sometimes differed by one note. To obviate this, the instrument was provided with a piston, which, when drawn out or pushed in, raised or lowered the sounds by one note (Fig. 2, No. II.).

Finally, as a last improvement, a series of keys was added, symmetrical with the row of holes on the left side, thus giving a second complete scale.

The idea embodied in this simple instrument has caused us to make an experiment that has proved quite successful. We took a pilgrim's gourd, and first made some minute apertures in it, arranged something like those of the ocarina. For a mouth piece we affixed to it with wax

an old one from a clarinet that was provided with a reed. In order to obtain notes—perfect gamuts—we enlarged each of the apertures with a knife until it gave the tone, and we now have a sordine that in no wise cedes to the hautboy for solos which are not very complicated. The sounds thus obtained are preferable to those given by the ocarina, since they emanate from wood, and not from clay. The instrument thus modified is shown in Fig. 2, No. III.—*La Nature.*

Need of Improvements in Marine Signals.

Commander Gorrington has written a letter in regard to ships' lights, called forth by the Tallapoosa disaster, which contains valuable suggestions. He shows that not only are the red and green side lights now carried by vessels frequently mistaken one for another, even by men who are not color blind, but that the position in which they are placed is such that in certain circumstances it is possible for a vessel to alter her course sixty degrees without giving any indication of the alteration by the appearance of her lights. In other words, the present system of lights is miserably defective, as is shown by the fact that it has failed in hundreds of instances to prevent collisions at sea. In the place of the red and green side lights it is proposed that every vessel shall carry four range lights. Two of these should be placed forward, and two aft. Of the forward lights one should be a white light and the other a red light, the latter to be placed somewhat higher than the other and some distance aft of it. The after lights should be arranged in a similar manner, except that the red light should be lower than the white light. This arrangement would render it possible to ascertain from the appearance of a vessel's lights the course steered by her, and the direction and amount of the slightest deviation from that course. It would also enable a steamer to avoid running directly into the stern of a slower vessel where both are steering the same course, and no one on board the slower vessel has the forethought or opportunity to display a "flare." One objection to this plan is the fact that most persons who are to any extent color blind are unable to see the red ray. Were a blue light to be substituted for the red light, and were range lights to take the place of side lights, nothing except the grossest stupidity could bring about a collision between two vessels on a clear night.

Ear Diseases.

Dr. K. Buskner in a very elaborate paper in *Archiv für Ohrenheilkunde* gives the results of his clinical observations and those of twenty other aural surgeons. From these he finds that on an average out of every three individuals in middle life one does not hear so well in one ear as in the other, while from an examination of five thousand nine hundred and five school children twenty-three per cent presented objective pathological symptoms of ear disease, and thirty-two per cent a diminution of hearing power. The following general conclusions are drawn from this immense mass of detail:

1. The most frequent causes of diseases of the ears would seem to be attacks of cold, affections of the nasal and pharyngeal cavities, and acute infectious diseases.
2. The liability to disease, of the ear increases from birth to the fortieth year, and decreases from thence to old age.
3. Men are more subject to affections of the ear than women, as three to two.
4. The external ear is affected in twenty-five per cent, the middle ear in sixty-seven per cent, and the inner ear in eight per cent of the total number of diseases of the ear.
5. The left ear is more frequently affected than the right, as five to four.
6. The acute affections of the middle ear occur less frequently in the summer and autumn than in spring and winter.
7. Of the total number of cases of ear disease in the outpatient clinics about fifty-three per cent are cured, about thirty per cent are improved, seven per cent are unimproved and three-tenths of one per cent terminate fatally.

Safe Lubricating Oils.

The standard of a perfectly safe lubricating oil, free from spontaneous combustion, which was established by the experiments of the Boston Manufacturers' Mutual Fire Insurance Company, is as follows: A mineral or "paraffine" oil, so called, bearing:

- 1st. A fire test of 300° or more.
- 2d. An evaporation of 5 per cent or less in twelve hours, at a constant heat of 140°.
- 3d. The greatest degree of fluidity consistent with keeping the oil upon the bearing.

There are now few or no oils offered to the members of the mutual companies by oil manufacturers of repute which do not meet this standard; but there are some of the members who prefer an admixture of fine animal oil to give more body to the lubricant.

To this end high-grade neatsfoot oil is sometimes mixed with mineral oil, and so long as the oils remain thoroughly mixed as much as 25 per cent of neatsfoot oil may be safely used. But five recent cases of spontaneous combustion (fortunately all extinguished without loss) have called attention to a tendency in these oils to separate, so that the neatsfoot oil has apparently been applied nearly free from mineral oil, and in such cases fire has ensued. Great care should therefore be taken that mixed oils are kept in safe condition by frequent agitation or stirring.

Anomalies of the Sewing Machine Business.

In an editorial in a recent issue of the SCIENTIFIC AMERICAN, under the above title, the following paragraphs appeared, to which we have received a reply from a lady subscriber from Michigan.

"A psychological fact, possibly new, which has come to light in this sewing machine business is that a woman will rather pay \$50 for a machine in monthly installments of five dollars than \$25 outright, although able to do so.

"The curious processes of reasoning by which the feminine mind is led to regard the lapse of time as a cheaper and a hundred per cent interest as of no consequence, have not yet, we believe, been discovered."

Our correspondent replies: "She does it from policy, for if she says, 'Husband, I wish \$25 to buy a sewing machine with,' she expects a shrug of the shoulders, and is unable to obtain the money; but if she says, 'I can buy a sewing machine, and pay for it in monthly installments, only \$5 each month,' perhaps she can get the coveted machine. A psychological fact, but is it masculine or feminine?"

Protection and Free Trade To-day.

An interesting paper under the above title was lately read before the Arkwright Club, Boston, Mass., by Robert P. Potter. The paper in full has been published by Jas. R. Osgood & Co., Boston. It is full of valuable facts. We make a few extracts:

The abandonment of protection will in no way help the farmer, as the free-traders claim. It will stop immigration, and hence lessen the ever-increasing demand for food at home, while it will leave him in a much worse position than he now is in, in the matter of Indian and Russian competition. In the words of Judge Kelley, of Pennsylvania:

"The primary want of the American farmer is a quick, remunerative home market. When our mills, forges, furnaces, and factories were busy, and our operatives were well paid, we consumed nine-tenths of all the cereals we could grow; but with idleness prevailing in industrial centers, with the reduction of wages and the power to consume, and with great branches of industry expelled from the country, we cannot look to an increase in the home demand or the maintenance of past prices."

The American farmer must not forget that, besides the direct benefit he receives from the protective tariff in the duty on wool and all agricultural products, and the indirect benefits in the increase, as I have shown, in the value of his land and the price of its product, and the continued cheapening of his manufactured goods, there is yet another advantage in this system too often overlooked by our farmers. The protective tariff prevents direct taxation. Abolish your custom houses, as the more fanatical free-trader proposes, and annually over \$200,000,000 must be raised by direct taxation.

The farmers of Michigan have been looking into this question of direct taxation, and the curious results they have reached will be of interest to farmers throughout the country. The statistician has discovered that the despised custom houses produced, in 1882, \$213,000,000; that this amount, distributed among the several States of the Union, according to population, as the free-traders propose, would add the snug sum of \$6,956,982 to the annual tax roll of Michigan, an amount equivalent to 8½ mills on the dollar. To distribute this tax on the assessed returns would in some cases double, and in others treble, the present State and county taxes. For example, the State and county tax of Wayne County, Michigan, was \$367,578 in 1880, and the United States tax, by direct taxation, would be \$1,116,700—more than threefold the State and county tax combined. In some agricultural counties of Michigan such a tax would exceed the State and county tax fivefold. A farmer assessed at \$10,000 would have to pay \$85 a year, and one assessed at \$20,000, \$170 a year, an amount about equal to the total store expenditures of many well-to-do farmers.

Before our farmers vote to abolish the toll that foreign manufacturers pay for the privilege of selling their goods in the American market, it might be well for them to decide in their own minds whether they pay the bulk of the import duties, or the wealthy class who consume imported goods; and whether in the direct taxation scheme the farmer's land, or the bonds and stocks of the capitalist, would be most likely to escape the United States assessor. Any farmer can figure out this simple problem for himself. Under the new order of things he can even ascertain exactly his proportion of the tax. It is a phase of the tariff question that must not be overlooked.

How does this question affect the men and women engaged in manufacturing, mechanical, and mining industries and transportation in the United States? The time has come for this army of 4,400,000 persons to examine free trade and protection for themselves. Our imported manufactured goods come chiefly from Great Britain, France, Germany, Austria, Italy, Spain, Portugal, Belgium, Holland, and Scandinavia. In these countries over 31,000,000 men and women are engaged in manufacturing and mining pursuits. The average annual income of these millions is less than \$4 a week, or \$200 a year. Unless they emigrate to the United States, they have no hope to rise from the condition to which they were born.

The official returns of these countries bring out the astonishing fact that over 8,000,000 persons, a number exceeding one-fourth of the industrial population, are returned as paupers, and that annually the taxpayers, already burdened with the immense cost of imperial armies, have to pay the enormous

sum of \$150,000,000 to prevent these people from dying of starvation. Of this amount free trade Great Britain alone contributes over one-third, or \$50,200,000. So terrible has the fight for existence become in these countries, that every year thousands who can scrape together a few dollars leave their homes in the old world and cast their lot with us on this side of the Atlantic. From the British Isles alone, during the last ten years, have come 1,333,247, and from the other nations of Europe 2,359,468, making a total of 3,892,715, equaling almost, in point of number, the population of Holland. With the same environments, with the same institutions to bring out their higher manhood, the citizens of the republic extend a welcome hand to this tremendous army of emigrants.

But we are not ready to extend this same privilege of competition to those who still remain in other nations; to men who are living in different surroundings, who have not been educated up to the plane of the American workman; but who are content to slave on through life as their ancestors have done before them; who are chained to the forge, the mine, the loom, and the despotic ruler; without hope and without future. Yet this is what free trade, or the denationalization of the United States, demands of the American workmen. To support this demand, the workman is made the victim of the most extravagant statements; he is told that the purchasing power of his wages will increase the moment he begins to compete even-handed with the 30,000,000 poorly paid workers of Europe. He is told the "pauper labor cry" is a myth, and yet before him troops the gaunt host of 8,000,000 men and women dependent on charity. With wages varying from 50 to 150 per cent higher in the United States than in Europe, the workman pays less for his necessaries of life.

I cannot do better than quote from Mr. Ellis Robert's recent lectures before Cornell University, as he makes this point remarkably clear. He said: "Beef, pork, and poultry are cheaper with us, and so, the country through, are tea, coffee, and even sugar at retail. The Liverpool market fixes the price, not of grain in general, as is often said, but of our surplus. Our own price determines whether there will be any surplus or not. The American buys his cotton fabrics as cheaply as anybody. Anything made of wood which is higher here than elsewhere must be a curiosity or something which takes value from age. We are constantly exporting leather and many of its products. In many of the products of iron we excel other nations, and in steel we are at the forefront. In iron our progress is the most rapid. Many of our tools are cheaper than the English. Tea and coffee are sold in this country cheaper than anywhere in Europe, and certainly much more so than under the heavy British duties. Sugar pays a very high duty in the United States, and yet such are the facilities for refining here that our retail prices are as low as those of Britain. At an equal distance from the mines, coal is sold as cheaply in this country as in Britain. The most careful study will prove that all articles of prime necessity, including food in the essential varieties and the comforts of life, are cheaper here, not only in their relation to wages, but in money, than in any other country.

"When a family starts to set up a home in this country, it will find that for furniture and cutlery, and the miscellaneous articles necessary, it will be charged as low rates as in any part of Britain or Europe. Plain pottery is as cheap, glassware twenty per cent cheaper, coarse carpets and blankets are as cheap here as elsewhere. A like equipment for a house is to be bought for as little here as in Britain. The savings here on food will pay for the small share of the earnings appropriated to silks and woollens, of which the prices are higher. Rent is not more here than in Britain or Europe, under like conditions, though our people demand better accommodation, and naturally have to pay for it. Our studies show that for three-fourths of the usual expenditures of a family, the prices are in favor of the United States. The money cost is actually less here than in the land of lower wages, and with like comforts the expense is on the whole lower in this country. Even the exceptional articles tend downward in the United States as nowhere else."

Our experience vindicates the policy of protection; its strength lies in the prosperity it has given the nation; in the great industrial cities it has built up; in the prosperous and diversified industries it has founded; in the profitable home market it has given our farmers; in the varied employment it has given the men and youths of the country; in the homes and profitable work it has offered our kin beyond the sea.

In all that goes to make a nation strong and prosperous; in all that goes to make a country great and independent; in all that goes to broaden the horizon of the laborer, increase his earnings, cheapen the cost of what he buys, and improve his condition—in all this lies the strength of the protective system. Firm in the convictions of our leading thinkers, deeply seated in the experience of the country, strong in the hearts of the majority of people, and laden with evidences of its rich fruit, it is not likely the American system, shaped by the same hands that built the republic, is to be wiped out for a system which in the earlier days of our national existence was known as the "Colonial Policy," and to-day as the "Manchester School," or "Free Trade."

The cause of protection is the people's cause; it affects the vast masses of the people, and they must and will understand it. It cannot alone be studied in the lecture room. It can be studied in the light of the experiences of other nations, and in the experience of our own country. In this

way I have attempted to present the facts, which must speak for themselves. As an inquirer after the truth, I have traveled thousands of miles through the industrial regions of Europe and our own country, and in this spirit of inquiry, and with no pretensions to political economy, I submit this address, earnestly believing with Henry Clay that, "The cause is the cause of the country, and it must and will prevail. It is founded on the interests and affections of the people. It is as native as the granite deeply embosomed in our mountains."

WAGES AT HOME AND ABROAD IN SOME TEXTILE INDUSTRIES.

OCCUPATION.	AVERAGE WEEKLY RATE OF WAGES PAID IN WOOLLEN FACTORIES.			
	United States—Massachusetts District.*	France—Rhinoc. District.†	England—Yorkshire District.†	Germany—Rhensish District.†
WOOL SORTERS.				
Men.....	\$9.43	\$5.82	\$5.76	\$5.50
Women.....		2.70	2.40	2.50
Young persons.....	5.12	2.80	1.80	1.90
SPINNERS.				
Men (overseers).....	12.60	6.50	6.00	6.60
Spinners.....	9.05	6.00	5.00	5.25
Women.....	6.18	3.00	3.00	3.00
Young persons.....	4.81	2.00	1.80	1.90
Piercers.....	5.00	3.00	2.50	2.40
WEAVERS.				
Men.....	8.53	4.67	4.80	4.25
Women.....	7.45	4.00	3.48	4.00
Mechanics.....	13.43	6.25	5.50	5.00
Laborers.....	8.58	3.75	3.25	3.00

* Report of Bureau of Statistics, Massachusetts, 1882.
 † Compiled by Consul Frisbie, from books of manufacturers, 1882.
 ‡ Report of Robert Giffen, Statistical Department, Board of Trade, 1882.
 § Compiled by Consul Du Bois, from books of manufacturers, 1882.

We have a table here, founded on the careful work of four responsible authorities. If they tell the truth, the fact is established that in the important woollen districts the wages of England and the Continent are alike; that protective France and Germany, with their new tariffs, have increased the well-being of their workpeople, while Great Britain has done the reverse by opening her ports. The table establishes that wages are about 100 per cent greater in this industry in the United States than in any of the European countries. To abolish the duties that secure this to the workman of the United States would result as it has done in England—in a leveling of wages.

AVERAGE WAGES HERE AND IN GREAT BRITAIN.

Below I print what Mr. Carroll D. Wright, of the Bureau of Statistics of Massachusetts, calls the general average weekly wages paid to all employes in Massachusetts and Great Britain in 1883:

INDUSTRIES.	GENERAL AVERAGE WEEKLY WAGES PAID TO ALL EMPLOYEES.	
	Massachusetts.	Gt. Britain.*
Agricultural implements.....	\$10.25	\$8.85
Artisans' tools.....	11.80	4.89
Boots and shoes.....	11.63	4.37
Brick.....	8.63	4.16
Building trades.....	14.99	7.21
Carpetings.....	6.08	4.11
Carriages and wagons.....	13.89	4.89
Clothing.....	10.01	6.71
Cotton goods.....	6.45	4.66
Flax and jute goods.....	6.46	2.84
Food preparations.....	9.81	2.72
Furniture.....	11.04	7.96
Grass.....	12.28	6.91
Hats—fur, wool, and silk.....	11.01	5.54
Hosiery.....	6.49	4.67
Liquors—malt and distilled.....	12.87	12.66
Machines and machinery.....	11.75	6.93
Metals and metallic goods.....	11.25	7.40
Printing and publishing.....	11.37	5.52
Printing, dyeing, bleaching, and finishing cotton textiles.....	8.67	4.94
Stone.....	14.39	8.58
Wooden goods.....	12.19	5.67
Woolen goods.....	6.90	4.86
Worsted goods.....	7.32	3.60
All industries.....	\$10.31	\$5.86

* "Average" instead of "high" wages rates for Great Britain.

It will be seen from this table that the average wages to all employes for the twenty-four industries considered in Massachusetts was \$10.31 a week, while that for Great Britain is \$5.86 a week—the wages in Massachusetts thus being nearly double the average weekly wages paid in the same industries and to the same class of employes in Great Britain.

SOME genius has been calculating values as related to human energy in various departments of life, and cites the following illustrations: "The British Poet Laureate can take a worthless sheet of paper, and by writing a poem on it can make it worth \$65,000; that's genius. Vanderbilt can write a few words on a sheet of paper and make it worth \$5,000,000; that's capital. The United States can take an ounce and a quarter of gold and stamp on it an eagle bird, and make it worth \$20; that's money. The mechanic can take the material worth \$5 and make it into a watch worth \$100; that's skill. The merchant can take an article worth 25 cents and sell it for \$1; that's business."