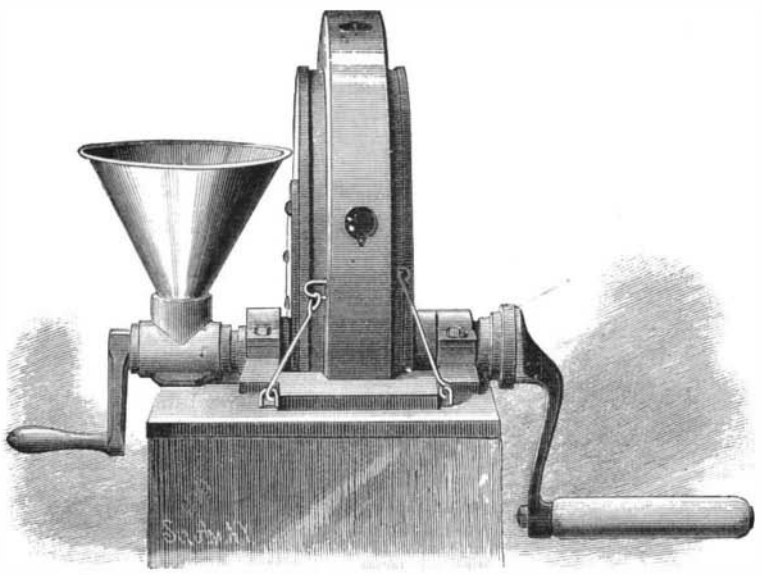
NEW POLISHING MACHINE.

We give an engraving of an improved machine for polishing knives and other similar articles, recently patented by Mr. M. R. Chase, of Warren, R. I. The machine consists of two disks of yielding material having radial grooves in their adjacent faces for conveying the polishing powder from the tubular shaft outward. These disks are inclosed by a circular casing having openings through which the articles to be polished are thrust. On one side of the machine there is a crank for turning the polishing disks, and upon the opposite side there is a smaller crank for turning a worm which carries the polishing material from the hopper into the shaft, whence it passes through lateral holes to the radial grooves in the polishing disks. To render the grooves more effective in feeding the polishing material they are slightly curved, and the grooves of one disk alternate with the grooves of the other. By this arrangement all of the polishing surface is utilized and the best distribution of the polishing powder is insured.

The polishing material used with this machine consists of any suitable polishing powder mixed with cork sawdust and moistened with soap and water. The powder thus prepared, when dry and evenly distributed on the polishing disks, forms a soft pliable surface, which is very effective in polishing all parts of the surface being operated on.

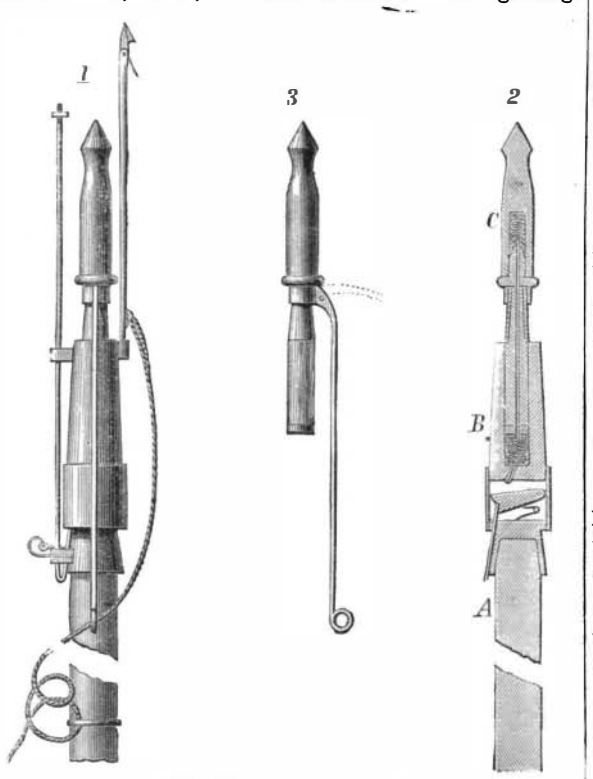
The pressure between the disks may be easily regulated, and only a few turns of the machine are required to give a knife a fine polish. The machine may be run by hand or foot or by any other convenient power.



CHASE'S POLISHING MACHINE.

IMPROVED BOMB LANCE.

An improved bomb lance, patented by Mr. E. Pierce, of New Bedford, Mass., is shown in the annexed engraving.



PIERCE'S BOMB LANCE.

Fig. 1 is a side elevation, Fig. 2 is a longitudinal section, and Fig. 3 shows the bomb lance detached from the gun.

The invention consists of a gun mounted on a suitable shaft and adapted to the bomb lance shown in Fig. 3. The gun has a lock which is operated by impact against the body of the whale. The bomb lance has a cavity for receiving a charge of powder, and is provided with a wooden staff through which a fuse passes. The staff of the lance is received by the gun barrel. On throwing the lance the lock of the gun is released and the gun discharged as the point of the lance touches the body of the whale; the fuse of the lance is at the same time ignited, so that immediately after the lance enters the body of the whale its charge of powder is exploded, killing or injuring the whale. The bomb lance is provided with a rod having an eye in the end for receiving the line.

The Rarity of Food Adulterations.

In awarding the prizes offered by the National Board of Trade a year ago, for essays in relation to the adulteration of food, the committee makes the gratifying announcement that none of the competing essayists produce any definite or satisfactory evidence as to the widespread existence of very dangerous adulterations in this country. Such dangerous adulterations appear to be mainly in the form of poisonous colors or coloring matters, as, for instance, in confectionery, and even these are rare. The question of the adulteration of food, with, perhaps, the exception of milk, should therefore be considered not so much from a sanitary standpoint as from that of commercial interests, as being in the nature of a fraud, in aiding the sale of articles which are not what they are represented to be. The committee is of the opinion that there is much more danger to health and life in this country from adulterated drugs than from adulterated food, and that any legislation which is to deal with the one should also deal with the other. A Board of Health is recommended for each State, and both State and national legislation on the subject of adulteration is deemed desirable. The committee will endeavor to prepare and place in the hands of the President of the National Board of Trade, as soon as possible, drafts of acts prepared in accordance with the general principles contained in its report.

NEW CISTERN FILTER.

The engraving shows a filter designed to secure in any given cistern space a more thorough removal of suspended matter than is effected in the ordinary cistern filters, to eliminate from the water matters harmful to health by a process which depends mainly on the concentration of atmospheric oxygen and in part by oxygen dissolved in water.

The process of oxidation is carried on during the passage of the water through a finely divided and aerated filter bed, the aeration of which takes place during fair weather.

The filter bed in which the oxidation and aeration take place is not constantly submerged, as are those now used, but is open to air pressure, to the action of light and heat in summer, and to the disinfecting, cleansing, and healthful influence of cold and frost in winter, agencies essential to secure good water.

A tonic or mineral quality can be given to the water by the introduction of iron filings or small scraps of iron in the filter bed, when desirable.

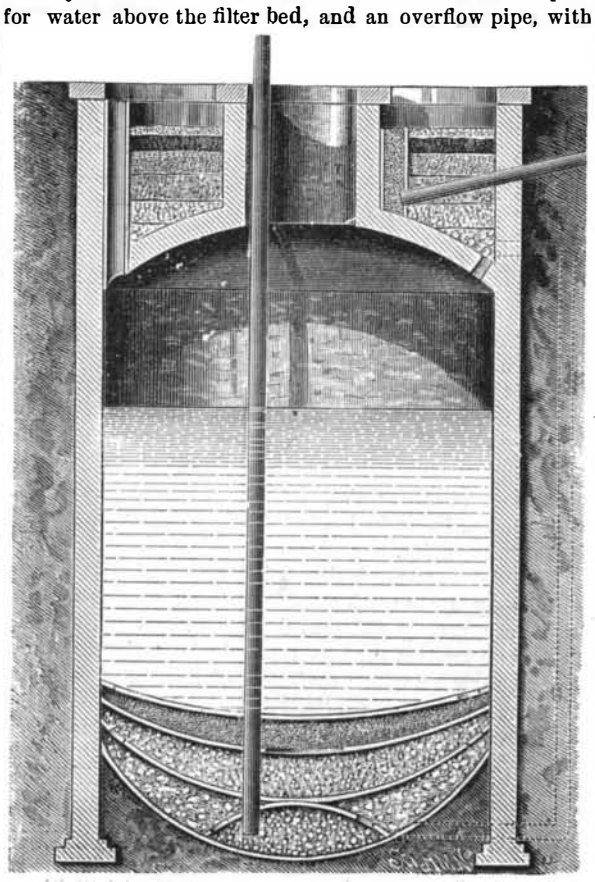
The engraving is a vertical section of the filter, with its walls extending from base of arch to ground surface. It has on its arch a main aerated filter bed, and on its bottom four more filter beds. In the main aerated filter bed there are six layers, as follows: First, gravel stones or pebbles at the bottom, to allow free drainage; second, a layer of coarse gravel; third, one of finer gravel; fourth, one of sand; fifth, one of coarsely granulated charcoal and fine sand; sixth, one of small pebbles on top, to keep charcoal in place and allow it to dry out between showers in fair weather. There is a space for water above the filter bed, and an overflow pipe, with top below outer cistern wall, is provided to take water not passing through the main filter by a direct passage into the cistern; there is also a pipe to allow water discharged from conduit pipe, to come from main aerated filter bed to its surface, and then spread over it. Through the arch there is an opening to carry the water into the cistern after it has passed through the filter bed in a circuit around the man-hole.

The arrangement and composition of the four filter beds on the bottom of the cistern are as follows:

The hemispheroidal filter on bottom of cistern is composed of granulated granite, or limestone, or cleanly-washed pebble stones. This is gravel concreted an inch thick, and perforated, before concrete sets, with twenty-five to fifty small holes midway between its base and top. Around this there is a filter bed made of coarse gravel and gravel concreted in form of an inverted arch, with fifty to seventy-five small holes near its outer edge, and above this there is a filter bed made of fine gravel and gravel concreted in form of an inverted arch, with a twelve inch opening at the center. The upper filter bed is made of closely compacted clean and sharp sand, and concreted with gravel an inch or more in thickness, with fifty to seventy-five small holes near its outer edge.

It will be noticed that the water is filtered as it enters the cistern, and filtered again as it is pumped out.

This invention was lately patented by Mr. Samuel Day, of Ann Arbor, Mich.



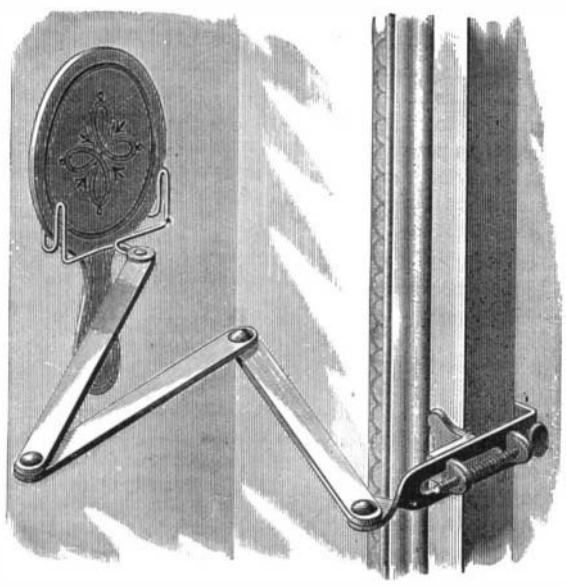
DAY'S CISTERN FILTER.

A Steel Steamboat for Venezuela.

A steel steamboat in sections was recently sent from this port to Lake Maracaibo, to be used in the transportation of coffee and other products of Northern Venezuela. The Zulia and other rivers of that fertile basin are apt to be very shallow during the dry season, making transportation by the river craft there in use not only uncertain but expensive. The design is to substitute therefor a fleet of steamboats, of which the one lately sent is a pioneer.

HAND MIRROR HOLDER.

The engraving shows a simple and very convenient device for holding a hand mirror when it is desirable to use both hands in making the toilet. The bracket is readily clamped to the frame of the mirror, and may be extended sufficiently for ordinary purposes.



HAND MIRROR HOLDER

This invention was recently patented by Messrs. Webb & Myrick, of Stockton, Cal.

AGRICULTURAL INVENTIONS.

A check row corn planter, so constructed as to drop the seed at uniform distances apart, and at the same time mark the position of the hills, so that the planting can be done in accurate check row, has been patented by Messrs. Alfred A. McIntosh and Lysander J. Lisbness, of Pontiac, Ill.

Mr. Edson M. Gaskill, of Edenton, Ohio, has patented a churning machine so constructed that it will be operated by giving oscillating movements to the chair upon which the operator sits.

An improved manure fork has been patented by Mr. George P. Ruble, of Swengel, Pa. This invention relates to certain improvements on the combined scraper and fork for which Letters Patent No. 223,390 were granted to the same inventor January 6, 1880, and it has particular reference to the construction of the fork.

An improved check row corn dropper, or device for automatically planting corn in perfect check rows, has been patented by Mr. Alonzo J. Simmons, of Pana, Ill. It comprises the following features: Means for rendering the distance between the hills dropped uniform and independent of the rough character of the surface of the soil; in a peculiar mechanism for converting the rotary movement of the driving shaft into the reciprocating movement of the seed slide; and in the peculiar construction and arrangement of the marking devices.

How Bandannas are Dyed.

For a long time the once fashionable bandanna handkerchiefs imported from India were a great puzzle to Western dyers. The white spots on a uniformly dyed red ground were produced by tying up the cloth at those parts so tightly that when the handkerchiefs were dipped into the dye, the latter could not penetrate the protected parts. When the cloth was dyed and the tyings loosed, the white spots revealed themselves.

When the "discharge process" of figuring dyed cloth was invented by Koechlin it was at once adopted by a Glasgow house, and so successfully worked as to produce goods exceeding in beauty the famous bandannas of India. Several other Glasgow firms turned their attention to the production of bandannas, and the city and its neighborhood has since enjoyed almost a monopoly of this branch of manufacture. The cloth intended for bandannas is dyed of a uniform color—most commonly red or blue—and a dozen pieces are laid one over another and wound upon a roller. This roller is placed upon bearings behind a press of peculiar construction. The press consists of a bed plate mounted on hydraulic gear, and an upper plate or "platen." The printing, if we may so call it, is done by means of two stout plates of lead fixed to the upper and lower plates of the press respectively. If the design is to consist of, say, white spots on the colored ground, the exposed surfaces of the lead plates have cut into them a series of depressions corresponding to the size and number of the spots desired. These have to be securely placed, so that when the two plates are brought together the depressions in the one shall fall exactly over those of the other. All being ready, the pressman takes hold of the end of the twelve-fold web of cloth and lays it on the lower plate. The plates are then brought together with a pressure of two or three hundred tons. It will be noted that now the whole body of the cloth is tightly pinched, except those parts which come between the depressions in the plates. Communicating with each of these depressions are openings through the upper plate, and channels leading thereto. When the pressure is fully on, a tap is opened, and a stream of bleaching liquid flows along the channels in the upper plate, and finds its way by the aperture to the cloth, through which it passes, and makes its exit by openings in the depressions of the lower plate. To quicken the action of the liquid and cause it to penetrate the exposed parts of the cloth thoroughly, a force pump is employed. As the liquid passes through the cloth it dissolves the connection between the mordant and the coloring matter, and carries off the latter, leaving the parts it has come into contact with purely white. A press attended to by one man is capable of producing 700 handkerchiefs per day. There is no limit to the variety of forms that may be given to the cleared spaces, and many beautiful effects are produced by printing various colors into these. The effect of the adoption of this process of producing bandannas was (it need scarcely be said) to reduce the cost enormously, and consequently bring them into greatly extended use.

The Mikania Guaco as a Remedy for Snake Bite.

In South America, under the name of "guaco," several plants enjoy a considerable reputation as remedies against snake bites. Most of them are species of *Aristolochia*, but one, the *Mikania guaco*, is a composite plant. Notwithstanding this reputation, very little trustworthy evidence has been published as to the real efficacy of any of them, and an attempt made by Dr. Schomburk a few years since to introduce the *Mikania guaco* into South Australia, with a view of clearing up the doubt, does not appear to have led to a definite result. In a letter, however, recently received by the Director of the Royal Gardens at Kew, from Mr. Robert B. White, of La Salada, New Granada, the writer gives his personal testimony as to the value of the remedy, and some other information which, by the courtesy of Mr. Thiselton Dyer, are made available for the readers of this journal.

Mr. White says the *Mikania guaco* is the true "guaco," and forms the basis of all the preparations of the snake bite doctors of the district. There are two varieties, one with green stems, the other, called "morado," with purple, the latter being the most prized. There are several species of snakes in the country whose bite is deemed mortal, some of them killing in a very few hours, but Mr. White, who has lived in the Choco and other snake infested regions many years, testifies that the guaco, properly and promptly administered, is a cure for the bite of the most venomous.

In cases of snake bite, when the guaco leaves can be obtained fresh, an infusion in sugar water is made, in the proportion of one leaf to a large cupful, and this quantity is given hot every hour. It is said to stop the vomiting usually occurring. The leaves are also preserved by bruising and placing them in alcohol, and of the tincture thus formed a teaspoonful is administered every half hour for one hour and a half, and then every hour, and afterward the dose is gradually diminished. Hot poultices of the bruised leaves and stem of the plant are applied to the wound, taking care not to use sufficient heat to drive off the volatile principle of the plant. If there be swelling and pain the limb is fomented with hot water to which some tincture of guaco has been added.

The *Mikania guaco* is described as growing from seed in any good soil where there is a temperature of 24° to 25° C., and would appear to be a plant deserving of physiological and chemical experiments to determine its true character. It is worthy of note that it was at one time said to be the source of condurango.—*Pharmaceutical Journal.*

Oil Lubricants.

The experimental investigations undertaken two years ago by the Boston Manufacturers' Mutual Insurance Company, with a view to the abatement of the losses from fires occasioned through oils, has been attended with much success. Mr. Edward Atkinson, the president, in a recent circular estimates a saving already of $180,000 a year. Much new and useful information has also been gained. He says:

Another result of this work has been the invention of the machine on which we can now ascertain the anti-frictional properties of any oil with absolute certainty, and by the use of which we have obtained measurements of the coefficient of friction with an accuracy and uniformity that have never been approached before. The results of Mr. Woodbury's experiments presented by him at the recent meeting of the American Association for the Advancement of Science have been accepted as a long step in advance of anything ever attained before.

One issue of these experiments may perhaps be to settle some points in respect to the power required or power saved by the use of the different kinds of spindles and bobbins now in use. Our machine having been adjusted in velocity and other conditions to those of a Sawyer spindle operating at 7,600 turns per minute, under a band tension of four pounds, it appeared that the difference in power required to overcome the resistance of the parts varied as follows:

The resistance or power required to operate the frictional machine at 100° Fah., when lubricated with Downer Oil Company 32° extra machinery oil, amounted to 750; and under the same conditions, with the exception of the substitution of neatsfoot oil as a lubricant, the resistance amounted to 2,427, or three and twenty-one hundredths times as much.

In respect to the same oil at different degrees of temperature in the bearing, the resistance at 50° is about 75 per cent in excess of that at 75° Fah.

In respect to the best oil and the poorest lubricant at 100° Fah., the difference is 321 per cent.

In respect to a difference of pressure varying from 1 lb. to 5 lb., the difference is 229 per cent.

By means of experiments applied to a small Sawyer spindle frame, which could not be reduced to such precise accuracy, but which marked the great variations in power, according to the greater or less tension of the bands, other results were reached of the same general character, fully confirming the above conclusions.

The general conclusions reached are, therefore, that although as a matter of course there must be a marked difference in power needed between a well planned and constructed and a badly planned and constructed spinning frame, yet, when it is a question between two well constructed frames, varying only in the weight of the spindles within the ordinary limits of modern practice, or in the length of the spindles and the position of the bearings, or in the solid or open construction of the bobbin, or in the presence or absence of a chamber at the top of the bobbin—the greatest differences in these details do not make as much difference in the power required as may be made in the adjustment and tension of the bands, or in the quality and condition of the oil; and hardly as much as may be made by variations in the temperature and condition of the atmosphere and of the machine, or in the quality and condition of the stock in use. The uniform tension of the band appears to be the factor of the greatest importance, and the structure of the bobbin of the least, provided the spindle is long enough and heavy or stiff enough to keep the bobbin true, and to prevent it from springing under the varying conditions of the atmosphere.

In respect to the best quality of oil to be used on spindles—that is to say, the best oil to be used on light bearings at very high velocity—a few simple rules may now be laid down dogmatically, so far as rules are to be made by experiments on a single machine, or from laboratory experiments:

1. A mineral oil that flashes at less than 300° Fah., does not possess the best qualities for lubrication, and is unsafe in proportion to the lesser degree at which it flashes.

2. A mineral oil that evaporates more than five per cent in ten hours, at a heat of 140° Fah., is hazardous in proportion to the increased percentage of volatile matter, and is also more unfit to be used as a lubricant the more rapidly it evaporates; because the remainder will either become thick and viscous, requiring a high heat in the bearing to make it operate at all, or else, if the oil does not contain such a residuum liable to become thick and heavy, it will leave the bearing dry.

3. All the mineral oils—and also sperm, lard, and neatsfoot oils—appear to reach a nearly uniform coefficient of friction at very greatly different degrees of heat in the bearings. Several kinds of the best mineral oils, and sperm and lard oils, show a uniform coefficient of friction at the following degrees of heat:

Temperature at which the coefficient of friction is the same.

Downer Oil Co., 32° Machinery (an exceedingly fluid oil)	76° F.
" " Light Spindle	105° F.
" " Heavy Spindle	125° F.
Various samples of Sperms	96 to 114° F.
Leonard & Ellis Valvoline Spindle	127° F.
" " White Valvoline Spindle	122° F.
" " White Loom	111° F.
Olney Bros. German Spindle	112° F.
" " A Spindle	107° F.
Neatsfoot	170° F.
Lard Oil	180° F.

4. Lubrication seems to be effective in inverse ratio to viscosity—that is, the most fluid oil that will stay in its place is the best to use. Lard oil heated to 130° lubricates as well as sperm at 70°, or the best mineral oil at 50°. But of course it is a great waste of machinery to work oil of any kind up to an excessive heat; and there must be the least wear in the use of oil that shows the least coefficient of friction at the lowest degree of heat.

5. The quantity of oil used is a matter of much less importance than the quality. The mill that saves gallons of oil at the cost of tons of coal, or dollars of repairs, plays a losing game. Mr. Waite's experiments on very heavy bearings at Manchester go far to prove that a considerable quantity of thin, fine oil keeps the bearing much cooler, and requires less power, than a smaller quantity of thick, viscous oil. Here let it be observed, that a superstition that prevails in favor of using castor oil to cool a hot bearing, is without any warrant. No vegetable oil is fit to use as a lubricant; and castor oil is the worst of all, because the most viscous. If used, it will surely set the mill on fire, as it did in the only case of which we have a record.

6. The rule of best lubrication is to use an oil that has the greatest adhesiveness to metal surfaces, and the least adherence as to its own particles. Fine mineral oils stand first in this respect, sperm second, neatsfoot third, lard fourth.

7. Cast iron holds oil better than any other metal or any alloy, and is the best metal to use for light bearings, perhaps for heavy.

8. It has been proved by Mr. Waite's experiments that a highly polished bearing is more liable to friction than a surface finely lined by filling. The lines left by the file serve as reservoirs for the oil, while the high polish leaves no room for the particles between the metal surfaces.

So far as laboratory experiments may serve as a guide in practice, it therefore appears that fine mineral oils may be made to serve all the purposes of a cotton mill, and such is the practice in some of the mills that show the very best results in point of economy.

Next, that the best animal oil to mix with a fine mineral oil, in order to give it more body, is sperm oil; this, again accords with the practice of many of the mills in which the greatest economy is attained.

Lard and neatsfoot oil are used to give body to mineral oil in some of the best mills; but the results of our work seem not to warrant this practice, unless there is some peculiarity in the machinery that makes it more difficult to keep a less viscous or tenacious oil on the bearings.

All the mixed oils sold under fancy names we believe must of necessity consist of certain proportions of the oils heretofore named, as none of the vegetable or fish oils are fit to be used, and there are no other animal oils that can be had in any quantity.

It appears that all varieties of mineral oils are or have been used in print cloth mills, and are all removed in the process of bleaching, as practiced in print works.

All mineral oils stain more or less, and give more or less difficulty to the bleacher when dropped upon thick cloth, or cloth of a close texture. On this point we have been able to establish no positive rule; but as very many kinds are and have been used in mills working on such cloths and are removed, we are inclined to the belief that this question is not of as great importance as it has been assumed to be.

Getting Rich at the Rate of $2,300,000 a Day.

That the people of this country are relatively well off, notwithstanding their expensive ways of living, is pretty well known. Just how rich we are, and whether we are rapidly growing richer, or merely holding our own, probably few can tell. Mr. T. M. Coan has been looking up the statistics of these matters at home and abroad, and offers the following figures in *Harper's Magazine*. In answer to the question, Where do we stand as to total valuation of the national wealth? he replies:

We stand near the head of the list—third on the list of all the Western nations. The United Kingdom of Great Britain and Ireland heads the list with a capital valuation of $44,400,000,000; then comes France with $36,700,000,000; the United States with $32,000,000,000; Germany with $22,000,000,000; Russia with $15,000,000,000 and the Low Countries with $11,150,000,000 of capital collectively. These are the valuations made by those countries of their entire resources. What is the average annual income per inhabitant in various countries? We come to the front in this comparison. The average annual income in the United Kingdom is $165; in the United States, $165 also; in the Low Countries, $130; in France, $125; in the British Colonies, $90; in Germany, and also in Scandinavia, $85. In this reckoning Russia, with her ninety millions of people, is out of sight as yet; she will not be very long.

On the score of annual accumulation our case is even better, relatively far better. The annual accumulation of wealth in Germany is $200,000,000; it is $325,000,000 in the United Kingdom; $375,000,000 in France; in the United States it is $825,000,000! Our increase of national wealth since 1850, says a good English authority, would be enough to purchase "the whole German Empire, with its farms, cities, banks, shipping, manufactures, etc. The annual accumulation has been $825,000,000, and therefore each decade adds more to the wealth of the United States than the capital value of Italy or Spain. Every day that the sun rises upon the American people it sees an addition of $2,300,000 to the wealth of the Republic."