SACK HOLDERS AND LIFTERS AT THE EXHIBITION.

"So much sack."—SHAKESPEARE.

The uses of convenient implements are spreading into all the industrial occupations, as we in the United States know better than any other people, for we have more inventions of that character than are to be found elsewhere.

Fig. 1.—ROSE'S SACK LIFTER.

Churns of curious design, washing machines, egg beaters, apple parers, and scores of other conveniences for domestic uses and ordinary occupations are advertised and labeled as "American."

The word "sack" is said to be the only one that is the same in all languages. Here is one thing in common between the Hebrew, Irish, Greek, Cornish, French, Latin, English, Hungarian, Icelandic, and Gothic; here they unite. How this came about it is hard to say, but the legend goes that when tongues were confused at the Tower of Babel, the workmen finding that something was going wrong, each called for his sack to carry home his tools in, and that was the only word they all remembered.

The sack lifter of Messrs. Rose Frères, Fig. 1, is similar to Marshall's sack elevator, Fig. 2, but has a standing frame which is portable, but not designed to be used as a truck. The sliding bag holder is lifted by cord from a winch on the frame, and held by a click in a ratchet wheel on the crank shaft.

Marshall's sack elevator, Fig. 2, is a truck, with stay rod to hold it upright, and a winch by which the sliding frame holding the bag is elevated so that a person can take it upon his shoulder and carry it off without the assistance of a second person in lifting. It is specially intended for a person in attendance upon a thrashing machine; one man to tie the bags as they are filled, lift them, shoulder, and carry them off to the granary.

Romaine's sack filler and weigher, Fig. 3, requires but little description to elucidate it. A spout with sliding door admits the grain, flour, or whatnot from the floor above. The bag is clipped by a ring to the funnel, which is suspended from a crotch on the end of the weigh beam. The latter is upheld by a tripod. Price from 150 to 325 francs; weighing from 200 to 100 kilos.

The small army mill, Fig. 4, stands upon three legs and grinds into a sack which is suspended beneath. It is worked by two men, grinds 20 kilogrammes per hour, costs 200 francs; four of them, packed in two boxes, are the load for a mule on the march.

The sack lifter and emptier, by Rose Frères, Fig. 5, enables one person to lift and to transfer the contents of one sack into another. It acts by means of a winch and rope, but the sliding frame is guided in such a manner that after attaining a certain elevation it tips over and brings the mouth of the sack to the open end of the bag ready to receive it.

The French sack holder of Bodin is so much like the Gilbert, Fig. 8, with the addition of wheels, that it needs but to say, in addition to giving the illustration, Fig. 6, page 20, that its weight is 28 kilos, and its price 50 francs.

John the Baptist Normand fits the handles of the truck with notches, so that the spreading frame for the sack mouth may be adjusted in height for the length of the sack. The frame has four hooks on to which the hem of the bag is caught (Fig. 7). Price 35 francs.

The Gilbert (English) sack holder (Fig. 8) is a slanting frame, with a strut to support it, and a clip ring at top to spread the mouth of the sack. To state its purpose would be merely to make a list of things that can be put into a sack, which is needless. It dispenses with a man to hold the sack, and furnishes a rest for the measure in emptying. Its price is £1 3s.; with wheels, £1 12s. EDWARD H. KNIGHT.

Paris, October 5, 1878.

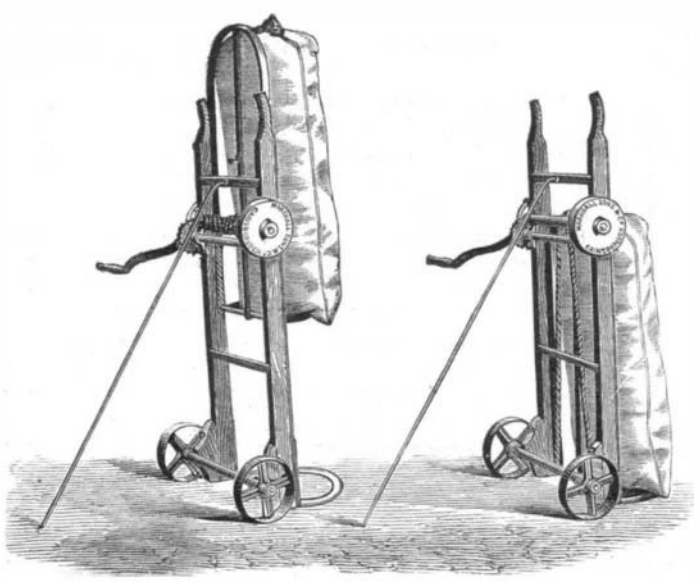

Fig. 2.—MARSHALL'S (ENGLISH) SACK ELEVATOR.

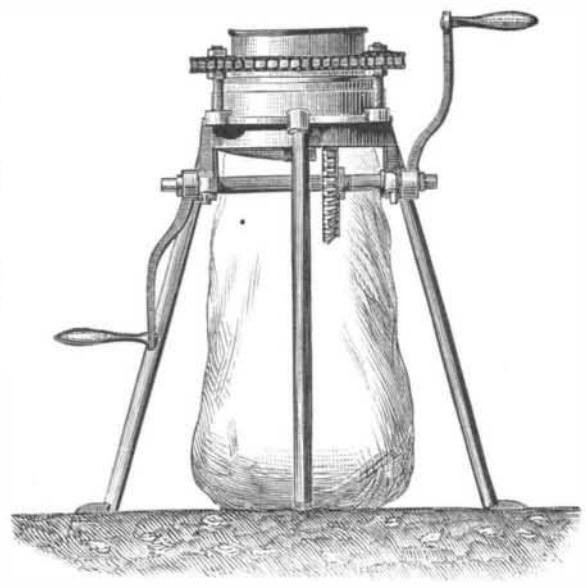

Fig. 4.—ARMY MILL.

Amateur Inventors.

The Philadelphia *Ledger* takes to task those papers which have sneered at Miss Hosmer's electric light invention on the ground that "amateurs rarely discover anything worth patenting." Of course, an amateur who knows nothing about mechanics, adds the writer, is not likely to make valuable contributions to mechanical progress; but there are many amateurs self-educated in science and mechanics, and from this class some of the most original inventions have come. Miss Hosmer's profession—art—has furnished the world with at least two great inventors, who, though amateurs in one sense, led the way for "scientifically educated and practically experienced mechanicians." Robert Fulton and Professor Morse were both American painters, and both became distinguished American inventors, although they were amateurs in their particular fields of investigation. The history of invention points to the fact that entirely novel ways of doing things are likely to first suggest themselves to those who, being amateurs, have not become set in their ways of doing every-day work. Watt, although a mathematical instrument maker, did not stick to his trade, but invented many essential parts of the steam engine; Corliss was a country storekeeper; Elias Howe was more of a farmer than a mechanic when he made his first sewing machine, and Edison has "picked up" all that he knows about electricity, mechanics, and magnetism. Education and practical experience are very desirable things, but because an inventor's calling seems to show that he has neither one nor the other is no reason for throwing discredit on his invention in advance of experiment with it, and particularly before it has been described.

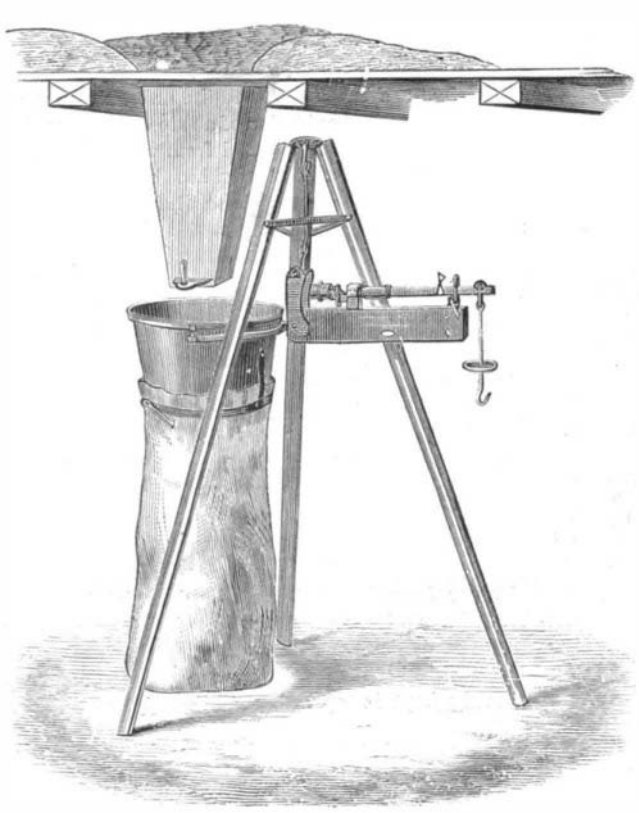

Fig. 3.—ROMAINE'S SACK FILLER AND WEIGHER.

Paper for Preventing Fraud.

Mr. A. Nesbit, of Gracechurch street, London, is the manufacturer of a paper for checks, bank notes, deeds, law documents, or other instruments of a similar character, so as to prevent alterations by the use of chemicals, including acids and cyanide of potassium. For this purpose he mixes with the paper pulp or passes the manufactured paper through an alkaline solution of peroxide of iron (or any salt of peroxide of iron) and ferrocyanide of potassium, or other base, in which the iron is kept from precipitating by the addition to the solution of tartaric acid, citric acid, sugar tartrates or citrates, or other organic substances having the power of preventing the precipitation of oxide of iron by an alkali, or sulphocyanide may be substituted for ferrocyanide, or ferricyanide may be substituted for ferrocyanide, and the salt of protoxide of iron for one of peroxide of iron. Upon the application of a chemical to paper manufactured or treated according to the invention a color or stain will be produced, whether the chemical be applied over ink or not.

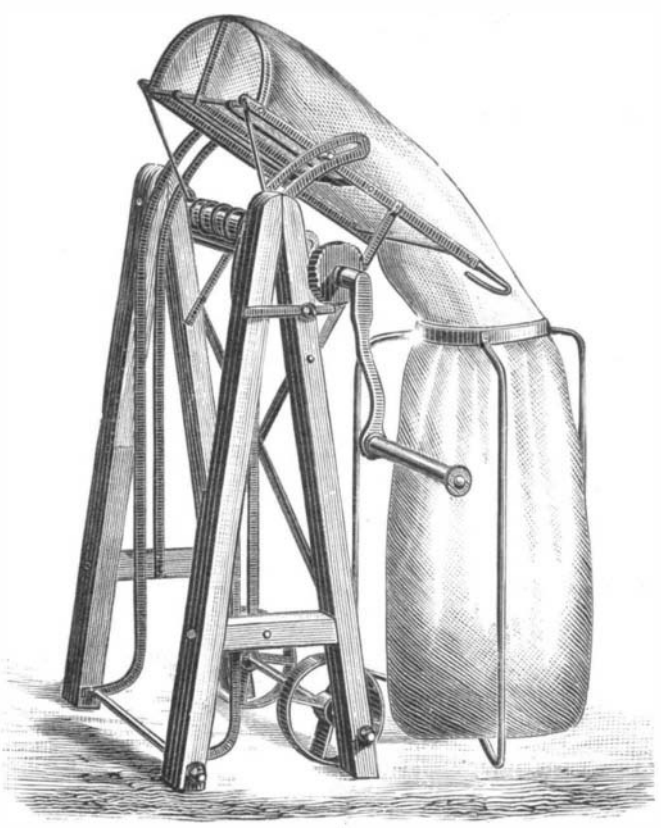

Fig. 5.—ROSE'S SACK LIFTER AND EMPTIER.

Erin go Bragh.

A fictitious cable dispatch of inordinate length, purporting to emanate from a staff correspondent who has, says the New York *Tribune*, been sent across the seas to find Mr. Edison, is an amusing *jeu d'esprit* in *Saunders Irish News*.

When the correspondent landed in New York, President Hayes went tearing down Broadway to the Battery in an open carriage drawn by six cream colored horses, and preceded by a number of outriders in scarlet and gold, and a squadron of siege artillery in full gallop. As they approached, the President descended from his carriage, saluted the correspondent on both cheeks, and immediately raised a cheer, which was at once taken up by his party, and repeated from the Battery to the Central Park. The President carried his guest off to the White House, where they had bird's-nest soup, bluefish, bread fruit, pilaff, and oysters in every style. After lunch the President drove the correspondent out (without the artillery) to see the sights in the immediate neighborhood—the Falls of Niagara, the prairies, the Yosemite Valley, and giant trees in Mariposa County. When he learned that the Irishman had crossed the seas to talk with Mr. Edison, the President urged him to do nothing of the

sort. He remarked that the inventor was hardly ever at home, being generally in the Patent Office registering some new discovery, and besides he was so highly charged with electricity that it was dangerous to approach him. The President remarked that the inventor was frequently seen with a regular nimbus around his head, a sort of domesticated aurora borealis, and one man who shook hands with him in a casual way, went home, took to his bed, and was prostrated by the violence of the electrical shock.

Anhydrous Sulphuric Acid.

The well known oil of vitriol, as our readers know, is a compound of sulphur, oxygen, and hydrogen, in the proportion of 16, 32, 1; and has received the formula H_2SO_4, or $H_2O.SO_3$. Although we are not able to remove from this any water, as the last formula seems to indicate, yet a compound is known which will combine with water to produce the oil of vitriol, or common sulphuric acid, and hence it was called anhydrous sulphuric acid, or sulphuric anhydride, and supposed to have the formula SO_3. It is a white, silky solid, forming long needles like asbestos, and can be obtained in two or three different ways, usually by distilling so-called Nordhausen or fuming sulphuric acid at a moderate heat. It is also made by oxidizing sulphurous anhydride, SO_2.

Weber's investigations have proven that these crystals are not anhydrous, but mixed with a hydrate. By repeated distillations, fractional distillations, and recrystallization, he obtained the pure anhydride, which is, at common temperatures, a mobile, colorless liquid, which solidifies on cooling strongly to long transparent crystals, resembling those of saltpeter, but totally unlike those white, opaque, silky crystals formerly mistaken for sulphuric anhydride. The pure anhydride melts at 14·8° C. (58·6° Fah.) and boils at 46·2° C. (115° F.). The slightest trace of moisture converts it into the well known silky crystals. Weber succeeded in separating two hydrates, one having the composition $H_2SO_4.3SO_3 = H_2S_4O_{13}$, and the other, $H_2SO_4.SO_3 = H_2S_2O_7$.

He also investigated the blue compound produced when sulphur and anhydrous sulphuric acid are brought into contact, and first described by Vogel in 1812, and finds that it has the composition S_2O_3. When dry flowers of sulphur are thrown into freshly prepared liquid sulphuric anhydride (SO_3) the sulphur melts to blue drops, which sink below and soon solidify. When a sufficient amount has collected the liquid anhydride is poured off, and the residue then removed by gently warming. It forms a crystalline crust which looks like malachite and decomposes, slowly at common temperatures, faster if heated, into sulphurous acid and sulphur ($2S_2O_3 = S + 3SO_2$). It dissolves with a blue color in so-called fuming, or Nordhausen, sulphuric acid. Water decomposes it, setting free sulphur and sulphuric and sulphurous acid and thiosulphuric acid. This blue color was made by Bucholz in 1804, by heating sulphur in fuming sulphuric acid.

This adds another to the already long list of oxygen compounds of sulphur, to which Berthelot not long since (*Comp. Rendus*, 86, 20) added persulphuric acid S_2O_7, so that to all the oxides and acids of chromium there are corresponding oxides of sulphur, and it only remains to find more oxides and acids of chromium to correspond to those of sulphur.

Crystallized Javelle Water and Chlorozone.

This absurdly contradictory name, eau de Javelle cristallisée, is given to a commercial article made in France, which is intended to take the place of chloride of lime or bleaching powder for washing and bleaching cotton, linen, and paper stuff. The claims made for it are its perfect solubility in water, uniform and certain action upon the fiber without injury to it, saving of cost by lessening the number of operations in the bleaching process, and, finally, more convenient and cheaper to transport. We have no details as to what it really will do, but it seems probable that if rightly made and used, it may, in many cases, surpass chloride of lime, provided its present high price be somewhat reduced. The well known Javelle water is merely a solution of hypochlorite of potash, and much used as a bleaching agent, as is also the corresponding salt of soda, eau de Labarraque. Neither of these are crystallizable, so that there can be no such thing in reality as crystallized Javelle water. The product under discussion has the following composition: 80 per cent crystallized carbonate of soda, 8·5 per cent chloride of sodium (salt), 11·5 per cent hypochlorite of soda. The best name for it is sal soda impregnated with hypochlorite of soda. The manufacturers claim for it the power of cleaning and bleaching in one operation, without previously having put the stuff through an alkaline lye for the purpose of cleaning it perfectly. The carbonate of soda, they claim, is the cleansing principle, and the hypochlorite destroys the coloring matter. The two act simultaneously, which of course saves time. We are not aware whether in practice this is true, but it is possible.

Particular emphasis is also put upon the assertion that the stuff to be bleached is not injured by this salt, as it is frequently enough when chloride of lime is used: first, because the action is slow and regular; next, the total absence of lime renders the formation of any injurious lime precipitation in the goods impossible; finally, the solution is not totally worthless after the bleaching is done, but can always, owing to the relatively high percentage of soda in it, be employed for washing either immediately or after it has been rendered caustic by heating it with quicklime. The salt, as it is sent to market, is quite well crystallized, resembling sal soda. It possesses the characteristic odor of chloride of lime, dissolves perfectly in water to a clear solution, which should not be underrated for practical purposes, as no decantation or letting it settle is necessary, and a solution of any desired strength can be made at once. It must be kept in a dry place, as it absorbs moisture readily and would soon become wet through. The manufacturers claim that it keeps well, which we doubt, for the analysis of a specimen kept in a closed glass gave only 1·33 per cent of active chlorine.

Fig. 6.—BODIN'S SACK-HOLDING TRUCK.

Chlorozone is another new commercial article. It is made by saturating a cold solution of the caustic or carbonated alkali with a current of hypochlorous acid mixed with air. The hypochlorite indicates nearly 40° Baumé, and 100° to 120° chlorimetry. By the addition of calcined soda it forms solid chlorozone, as a compact mass that can be broken up, but melts at 68° Fah. The price is not much above that of chloride of lime.—*Schweizer Gewerbeblatt.*

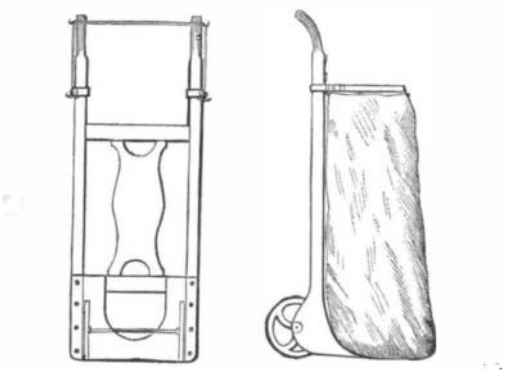

Fig. 7.—NORMAND'S SACK-HOLDING TRUCK.

Chemistry in Schools and Colleges.

It is scarce a century since chemistry began to exist as a science, yet few sciences have contributed so much to the happiness and pleasure of mankind. The problems before her are infinite, but one after another are slowly being solved. So many are the fields for her labor and so varied her work, that we cannot wonder that many people have very strange, contradictory, and absurd notions of what chemistry is. One thinks it consists chiefly in concocting unpalatable potions, another in making awful stenches; some confound the chemist with the magician, others think he must be an apothecary or a physician. But chemistry moves on in spite of opposition or ridicule, and even gains in public popularity. Although the grand fundamental laws of the science, the great underlying principles which are to explain all its phenomena—as Newton's law does those in astronomy—have not yet been discovered or evolved, and the accepted theories of to-day may be overturned to-morrow, yet chemistry is no longer what it once was—an accumulation of facts, of disconnected phenomena, with which the memory may be overloaded without profit. Its facts have been reduced to system, some of its laws are understood, and the harmony of its several parts are known. For this reason, as well as for its practical and economical uses, it has taken its place in the list of subjects which constitute a liberal education. Hence we find few schools for either sex where two or three hours a week are not devoted to this subject, and even in private and preparatory schools it is taught by experiments and lectures, not as dry text-book catechism, and the mind is at least incited to know something of this world about us.

Fig. 8.—GILBERT'S SACK HOLDER.

At a period when the value of natural and physical sciences as a source of mental discipline is beginning to be acknowledged, and science itself to be respected and honored here as elsewhere, it is somewhat remarkable to see one of our oldest colleges abolish the study of chemistry in her regular course. Yet this is what Columbia College has really done. True, the name of chemistry still appears in her list of studies, but it is studied no longer. It is but an outward pretense, a sham, an empty name, a skeleton without flesh, a shell without contents.

One of her youngest classes assemble once a week to listen to lectures upon chemistry by one of her best and ablest professors; but what can the greatest of chemists teach in 25 hours to a class who have had no preparation for his teaching? Chemistry is there made to precede physics, the larger fundamental science of which it is itself one of the larger subdivisions. Hence the lecturer must either prepare the soil himself or have the seed fall upon hardground. To lecture upon the spectroscope to men who know nothing about light, or upon gases to men who know nothing of the laws of mechanics and pneumatics, is to waste half the labor. To assume that the students have learned, before they entered college, subjects too abstruse to be taught them while in college, is the height of absurdity, and yet strangely enough the Columbia Grammar School teaches more chemistry, and teaches it more thoroughly, than does the college. The senior class may, if they choose, attend a few lectures upon advanced chemistry along with students of the School of Mines who have devoted one or two years to this branch, and not having had any preparation at all sufficient, are again unprepared to profit by it. Let us ask why this change has been made and the amount of chemistry reduced to one fourth of what was already too little. Columbia is about to erect new buildings and wants to save the expense of a chemical lecture room. She also wants to economize on the salaries of her professors in science to enable her to employ more instructors in law and in history. To this the welfare of her students and her own good reputation are subservient. Let her seek concealment as she may, truth must prevail.

Salicylic Acid with Boracic Acid.

Both of the above acids are extensively employed as antiseptics in foods, as neither of them alone imparts any unpleasant flavor, but if both are used together a decidedly bitter taste results. This fact was first noticed by Dr. Hager, who examined a milk with a bitter taste, but failed to find any particular bitter substance in it. On further examination it was found that borax had been added to protect it against the heat of summer, and afterward a little salicylic acid was added for its preservation during transportation.

Another case was where a mixture of 2 parts salicylic acid, 2 of borax, 30 of alcohol, and 200 of water had an exceptionally bitter taste. In both cases the bitter taste was produced by this combination of salicylic acid with borax. That it was due to the acid and not to the soda, was proved by the bitterness being imparted at once to a solution of salicylic acid on putting in some boracic acid.

Consequently the use of both antiseptics at once must be avoided, and only one employed at a time. To test the truth of Dr. Hager's assertion, our readers need only to dissolve a grain or two of boracic acid in alcohol on a watch-glass and then add a crystal of salicylic acid; in a few seconds the taste will be almost as bitter as that of sulphate of quinine. Perhaps salicylic acid can be employed as a quick and certain test for boracic acid in food, especially canned meats.

Methyl Aldehyd.

Aldehyd is a name given to the first substance produced by the slight oxidation of an alcohol. It contains less hydrogen than the alcohol from which it is made, hence its name. Methyl alcohol has the formula CH_4O, but the aldehyd is CH_2O. The difficulty in its preparation consists in its passing rapidly into another and more permanent form of oxidation, known as formic acid CH_2O_2. When a piece of hot platinum wire or foil is suspended above a vessel of alcohol it continues to glow, owing to the slow oxidation of the alcohol. Professor A. W. Hofmann has condensed the liquid given off in this form of glow-lamp, or lamp without flame, and finds it never contains more than 1 per cent of aldehyd.

The amount of aldehyd was determined quantitatively by converting it into the sulphur compound. The experiment was changed in many ways to obtain a more concentrated solution of the aldehyd. The most successful results were obtained by passing a suitable mixture of air and methylic alcohol vapor through a platinum tube, in which is a bundle of thin platinum wire, and gently heated. On condensing the escaping vapors it contains on the average not less than 5 per cent of alcohol. If suitably mounted such an apparatus can be kept in operation without interruption for months.

If the undecomposed alcohol be removed by distillation (when some aldehyd escapes also) and the residue frozen several times to remove the water, the aldehyd can be concentrated to 10 per cent and upward.