their mottled German soap shows careful and intelligent at tention of skillful men, and the soap itself, being made by the most approved method and of the best of materials, thorougnly refined under their own supervision, is the very perfection of laundry soap, which water cannot penetrate and weaken, so that the last small piece is as good as a new bar; there are no acids or excess of alkali to injure the skin or clothing; in short, it is what all laundry soap should beeffective, durable, and economical.
A good article that has achieved success is always imitated, so it is but natural that there should be many imitations of Procter \& Gamble's soap. The so-called mottled German soaps are made principally of grease, though some contain a small percentage of red oil, simply as an excuse for calling them "red oil soaps." They owe their mottled appearance to the impurities which are suspended in the soap; they are more or less offensive in odor on account of being made of grease. The process by which many of these so-called mot tled German soaps are made is known as the "cold made" method, that is, the grease and lye are mingled together at the very moderate temperature of $110^{\circ} \mathrm{Fah}$. There is some chemical action, but the result is strong in alkali, and at the same time greasy to the touch, and wiil not produce an abundant lather; the alkali not being thoroughly combined, but " free ". to a great extent, will attack the fiber and burn the skin. Water will easily penetrate them, weaken the alkali, it being "free," and thus render the compound a greasy, putty like mass. There are many soaps of a pale straw color, very clear about the edges, and having the ap pearance of being made of wax. They are really very at tractive in appearance, much more so than mottled German soap, which is, it is true, " homely but honest." Most of these clear soaps are made of tallow, and contain a large percentage of rosin and water. They shrink as they grow older, so, in order to preserve their shape, a considerable quantity of sal-soda is incorporated in :them. The effect of this is that the excess of soda will eat or rot anything that has been wasbed with the soap.
The reader can form no idea of the vast number of compounds that are given to the public under the name of soap. Fully nine-tenths is not what the buyer has a right to expect. The materials used are full of impurities, and are too often made of decayed and putrid matter. Chemical science has shown how the noxious smells may be prevented, by the use of acids, etc., and by a plentiful addition of rosin to cheapen them, and perfume to hide the natural odor, they are passed out upon the unsuspecting purchaser. Fancy having your handkerchiefs, napkins, towels, and clothing washed with these compounds; yet there are many who will pay from ten to seventy-five cents for a small cake of toilet soap, but think anything is good enough for the laundry. A little more attention to the soap used in the laundry would insure greater healthfulness. When the pores of the skin are open by perspiration, the condition is favorable to absorbing into the system any impurities in the soap which the laundress may have failed to thoroughly rinse out of the garment, owing to the greasy and sticky contition of the soap used. Cases of fevers and diphtheria havefrequently been traced to the use of soaps made of unfit materials, and cases of skin iseases without number to the same cause.
Not content with using poor materials, many soap makers use what are known as "make weights;" these are for the purpose of increasing the profit of the manufacturer, with out equivalent value to the consumer. The principal "make weight" is marble dust, which costs but sixteen dollars per ton, or less than one cent per pound, so it is easy to see that the profit of the soap maker is greatly increased; for with three-quarters of a pound of soap a quarter of a pound of marble dust may be incorporated, and the comp.und sold as a pound of soap. Another adulterant is the "magnesiadrier," which, in addition to being a " make weight," will help re tain a large amount of water in the soap, and thus enable the manufacturer to sell water at the price of soap. A large volume might be written upon the adulteration of soap alone, but the brief description of soaps given in this little sketch is sufficient to enable the intelligent buyer to discrimi nate in favor of the best.

## Awards to Workmen for Inventions

The scheme of awards for inventions, instituted in August, 1880, by Messrs. William Denuy \& Brothers, shipbuilders, Dumbarton, and which has been regarded with considerable interest by very many employers of skilled labor, has just been amended and reissued to the workmen in their establishment. The results of the scheme as regards the number of workmen making applications or claims for inventions or improvements have been thoroughly satisfactory. The number of claims found valid, and the important nature of some of the inventions or improvements for which awards have been granted, have been such as to encourage Messrs. Denny to amend their scheme in one or two particulars whereby it may be rendered more effective. The maximum limit of award as laid down in the original scheme was $£ 10$; but it has been thought that the smallness of the sum may deter some from coming forward with ideas or with matured inventions of greater technical importance or value than have yet been elicited. Accordingly, Messrs. Denny and the committee of awards acting between employers and employed in this matter, have made a revised scheme wherein the fixed maximum limit of award is supplemented or superseded by the inducement of either(1) the granting of a greater award than $£ 10$, or, if considered worthy, (2), the award of
£10, together with material assistance in securing letter rules or features of Messrs. Denny's first scheme; 1. Any workman in our employ may claim an award from the committee on the following grounds: (a) That he has either invented or introduced a new machine or hand-tool into the yard. (b). That he has improved any existing machine or hand-tool. (c) That he has applied any existing machine or hand-tool to a new class of work. (d) That he has discovered or introduced any new method of carrying on or arranging work. (e) Or, generally, that he has made any change by which the work of the yard is rendered either superior in quality or more economical in cost. 2. In the case of a workman who is unable to test the merit of his supposed in vention or improvement, either through inability on his own part to make the necessary experiments or to pay for the ame, the firm, on the recommendation of the committee, may agree to bear the whole, or part, of the necessary expense; and if the invention should afterwards prove a prac tical success, an award will be granted accordingly. 3. On the establishment of a claim under the conditions above specified, the committee are to make an award, which is not to fall below $£ 2$, nor to exceed $£ 10$. Between these limits the award will be fixed by the committee according to the opinion they may form of the value of the improvement or invention for which claim has been made.
The clauses in Messrs. Denny's second scheme, embodying the changes in question, are as follows: 2. In the case of a workman who is unable to test the merits of his supposed invention or improvement, either through inability on his own part to make the necessary experiments or to pay or the same, the firm, on the recommendation of the com mittee, may agree to bear the whole, or part, of the neces ary expense; or the committee will be at liberty to grant he free use of tools and appliances in the yard for this purpose, and if the invention should afterwards prove a prac ical success, an award will be granted. 3. On the establishment of a claim under the conditions above specitied, the committee are to make an award, which is not to fall below $£ 2$, nor to exceed $£ 10$. Between these limits the award will be fixed by the committee according to the opinion they may form of the value of the improvement or invention for which claim has been made. But in he case of an invention or improvement being considered by the committee worthy of a greater reward than $£ 10$, they shall submit a report on the same to the firm, who may sanc ion either (1) the granting of such greater award than $£ 10$; or (2) should the invention be considered worthy of being protected by patent, an award of $£ 10$, together with the taking out at the firm's expense of provisional protection at the Patent Office on behalf of the inventor, all with a vic.m to enable him either to dispose of his invention during the period of protection, or to make arrangements for complet. ng the patent at his own or his friend's expense, provided always, that the firm shall have for all time coming the use of any such invention so provisionally protected at their ex pense, free from the payment of any royalty or patent right that may be chargeable on the same, should the patent be ompleted.
Messrs. Denny \& Co. Engineers, Dumbarton, have also, but for the first time, made offer of a wards for invention to their workmen, and the scheme is in all respects similar to that just issued to Messrs. W. Denny \& Brothers' workmen. The results of this renewed effort on the part of Messrs. Denny to quicken the inventive faculties and increase the technical proficiency of their workmen are sure to be waited on with interest. It is to be hoped, says Iron, that such measures may be productive of the good. which, in some quarters, is only hoped for through the increased institution of technical schools; and that the advantages accruing to the business of the firms in which the system has been introduced may speedily be such as to lead to its adoption in other places.

## The Water of a Holy Well

Professor Frankland has recently sent a letter to the Lon don Times on the quality of a well regarded as sacred by Mohammedan pilgrims. The water appears to be even worse than that of many wells net considered sacred, but we hope our readers will take warning from this extreme instance of well pollution, and consider that it does not

American Woolen Manufactures.
Rete Returns of the Tenth Census (1880) of Woolen Manufactures.

Trers, BY Mr. G. W. BoND.-It will be seen that $73,524,812$ pounds foreign, and $220,244,269$ pounds ${ }^{2}$. been in the scoured cards $169,913,007$ pounds, which indicates that of the whole wool consumed, at least ten to twelve million pounds must have been in the scoured co
require contamination seven times worse than sewage to send typhoid and cholera into the houses of Christians, how ever it may be with Mohammedans.
Professor Frankland says: "The well is in Mecca; the water is regarded as holy, and large quantities are annually sent as gifts.to all Mussulman countries. Most of the Mo hammedan princes, especially those of India, have ' keepers of the well,' whose duty it is to send them annually water from the wel.

I have analyzed this water, and find it to be of the most abominable character. In fact, it is sewage more than seven imes as concentrated as London sewage, and contains no less. than 579 grains of solid matter per gallon. Knowing he composition of this water, and the mode of propagation of Asiatic cholera by excrementitious matters, it is not to be wondered at that outbreaks of this disease should often occur among pilgrims to Mecca, while it would scarcely be possible to rrovide a more effective means for the cistribu ion of cholera poison throughout Mohammedan countries.'

## Mutilated Coins.

The Director of the Mint has authorized the purchase t the several mints at Philadelphia, San Francisco, Carson, and New Orleans, of mutilated and uncurrent United States silver coin of standard fineness at the rate of $\$ 1$ per ounce Troy, when presented in sums of $\$ 3$ and upwards.
Coins can be forwarded to those mints by registered mail or by express, charges prepaid, and the value will be re turned at the seller's risk and expense by express, registered mail, check, or draft. Persons sending full weight United States subsidiary silver coins would receive, at the rate authorized, 80 cents per dollar of their face value, but, for mutilated coins, a less amount, proportioned to the deficien cy in legal weight. At the rates paid mutilated silver coins will be worth at the mints: Per ounce troy, $\$ 1$; per ounce avoirdupois, (about) 91 cents; per dollar, face value (approximately), 70 to 76 ennts

## AGRICULTURAL INVENTIONS.

An improved harrow evener has been patented by Mr. Hermann H. Fischer, of Osage, Neb. The object of this invention is to promote convenience in harrows of collected rubbish, and in adjusting them to harrow the ground fine or arse
An improved corn planter and fertilizer distributer has been patented by Mr. William Cassill, of Hamden Junction, O. The object of this invention is to facilitate the simul taneous dropping of corn and distribution of fertilizers.
Mr, Abraham C. Scarr, of Maryborough Township, Ontario, Canada, has patented a harrow having such action that its teeth will not have a tendency to follow the edges of the furrows nor leave narrow unbroken ridges in the soil, but will cut thesoil in all directions, causing complete pulverization of the soiland perfect covering of the seed without the necessity of cross-harrowing the field.
An improved grain header has been patented by Messrs. John W. Jory and Arthur B. Jory, of Salem, Oregon. The object of this invention is to remove the heads of the grain and leave the whole of the stalks standing, however much the said stalks may vary in length.

An improved cotton planter has been patented by Messrs. Anthony W. Byers and James C. Dorser, of Sherman, Texas. The object of this invention is to improve the construction of the cotton planters for which Letters Patent No. 233,725 were issued to the same inventors, October 26, 1880. The invention consists in the combination, with the slotted hopper bottom, of hinged and curved cut-offs and spring, whereby the escape of seed will be prevented, except as forced out by the prongs of the feed wheel.
Mr. William R. Berry, of Easleys Station, S. C., has patented an improved cotton planter and fertilizer distributer. In this machine the bearing wheel has peripheral U -shaped teeth, working in and through a slotted hopper bottom, for feeding the material to be sown.

An improved rocking churn has been patented by Mr. Otto Gentscn, of Souderton, Pa. The invention consists in a box provided with a transverse rack, with ice receiving chambers in opposite corners, and with rockets resting on wheels of a base, permitting the box to be rocked by means of its handles, and if the box is to be locked in a certain po sition a locking pin is passed through an aperture in the rocker into a correspondiug aperture in the base.

The oxyhydrogen Light.-De Khotinsky's Process. naval officer, Drummond, who produced it by heating a piece of quicklime to incandescence in a hydrogen flame fed by a jet of oxygen. The Drummond light is very brilliant and possesses all the physical properties of sunlight, and the reason that it has not hitherto been applied for domestic and industrial purposes is owing to the high price of oxygen and the rapid destruction of the refractory material brought to incandescence in the flame.
It will be remembered that Tessie du Motay invented processes which, according to him, were to insure of a practi cal use of thjs kind of light. He did succeed in devising a mode of manufacturing oxygen economically, and one which allowed that gas to be obtained at quite a moderate cost price; but he did not succeed in solviug the problem as to the preservation of the refractory material heated in the flame.
This scientist, after having made public experiments in the vicinity of the Passage Jouffroy, at Paris, discarded the use of the incandescent material, and contented himself with increasing the whiteness of the flame of illuminating gas and giving it brilliancy by injecting into it a pretty large quantity of oxygen. For this new system of lighting be employed a special burner formed of two concentric tubes, one of which served for conducting the carbureted hydrogen, and the other the oxygen. Some experiments were tried at the Place de l'Hôtel-de. Ville in 1868, but it was soon found that the light produced was not economical, and attempts in this direction were quickly abandoned.
This interesting problem of oxybydrogen lighting has been again taken up within a few years past by Mr. De Khotinsky, a distinguished officer of the Russian navy. We were present not long ago at the experiments made in Paris, and shall describe the arrangements adopted.
De Khotinsky has succeeded in rendering the refractory substance of the Drummond light durable for quite a long use by means of a peculiar burner, which we represent in the accompanying Figs. 1 and 2. The pencil of refractory earth, whatever be the substance employed-lime or magnesia-is quite thin, and is supported at its upper extremity by two metallic pieces, $x$ and $m$, tightened by a screw, so that it hangs vertically in the flame. The refractory material, being wholly immerged, becomes successively heated from bottom to top without there ever being any sudden difference of temperature between its different parts. The entire apparatus is aflixed to a sleeve, $a$, and the burner, properly so called, is fixed to the upper extremity of two tubes, one of which conducts the combustible gas (illuminating gas, for example), and the other the oxygen. These two gases, which enter at the lower part of the apparatus, at $c d$, mix only at the upper part, $i$, of the burner. The flow is regulated by the cock, op. The general arrangement of the different parts of the burner is shown in the section in Fig. 2. The conducting tubes are inclosed within a sleeve, $k$, which is itself fixed to a bent rod, $l$, to whose extremity is attached the crayon holder, $m$. The support, $s s$, is designed for bolding a ground glass globe for dispersing the Juminous rays, and which is not $\mathrm{sh}_{1} \mathrm{w}_{\mathrm{w}}$ in the figures. The mixture of the two gases, when lighted at the upper extremity of the burner, gives a flame of small luminosity, but one whose very high temperature raises the refractory crayon to a white heat, and thus produces a brilliant and constant light. The same crayon will last for about fifteen days, when used every day. The burner consumes about $0 \cdot 014$ of a cubic meter per hour, and the same quantity of illuminating gas, and gives a light equivalent to that of 1.5 Carcels.
Mr. De Khotinsky proposes to prepare oxygen from permanganate of potash (either by the Du Motay process, or by a practical methol that he is now studying), and to deliver it in a condensed state to dwellings by wagons. Each consumer will be provided with a reservoir made specially for the purpose.
We shall have nothing to say regarding the economical aspect of the question, as we have not stuc.ied it from that peint of view ; but we have seen the apparatus in operation, and can say that, as regards the quality of the light emitted, and its steadiness, the results are very satisfactory. $-L a$ Nature.

Reactions for Iron and Copper.
For iron, the author finds the limit of visible reaction with potassium ferrocyanide 1 part in 500,000 ; with potassium sulphocyanide, 1 part in 1,600,000; and with tannic acid, 1 part in 350,000 , the limit in this latter case being indistinct. For copper, with ferrocyanide, the limit is 1 part in 200,000 of water; with ammonia, 1 part in 25,000; and with potassium xanthogenate, 1 part in 900,000 of water. For silver, with posassium xanthogenate the limit is 1 part in 40,000 of water. For mixtures of ferric and cupric salts, with potassium ferrocyanide, the blue reaction was faintly perceptible in a mixture of $31 / 2$ vols. cupric and 1 vol. ferric solution, each containing 1 part metal in 100,000 water. With ammonia the blue reaction was first perceptible in a mixture of 1 vol. cupric and half a vol. ferric solutions, each containing 1 part metal in 10,000 water. If the iron is in larger proportion there appears merely a yellow coloration. On these limits of reaction the author
founds an approximate method for the determination of iron and copper, the procedure being in principle the same as that above described for the determination of nitrates. $-A$. Wayner.

## Detection of Glycerin.

To detect glycerin in the possible presence of sugar, the liquid in question it mixed with powdered slaked lime and an equal bulk of fine quartz sand, and evaporated to a paste on the water bath. When cold the residue forms a hard mass, which is pulverized and extracted with 80 to 100 c. c. of a mixture of equal volumes of absolute alcohol and ether in a small stoppered flask. On allowing the extract to evaporate, the glycerin is obtained free from sugar. If two drops of it are put in a dry test tube with two drops of phenol (previously liquefied), and the same quantity of sulphuric acid, and heated very cautiously over the flame, but so as to reach $120^{\circ}$, the formation of a solid brownish yellow mass is perceived. When cold a little water is added, and a few drops of ammonia, when the brownish yellow solid dissolves with a splendid carmine red color. - E. Donath and J. Mayrhofer.

## The Lick Observatory.

According to a letter recently received in San Francisco by oue of the trustees of the James Lick fund, it is thought that Alvan Clark, of Cambridgeport. Mass., to whom the contract
for the LickObservatory lens was awarded, will complete it in for the Lick Observatory lens was awarded, will complete it in


Fig. 1.-General View of the Oxy-


Fig. 2.-Vertical Section of the Barner.

## Fardy Herbaceous Plants and $\begin{gathered}\text { Culture }\end{gathered}$

The subject for the consideration of the Massachusetts Horticultural Society at a recent meeting, was "Hardy Herbaceous Plants and their Cultivation." The paper was presented by Mr. Warren H. Manning, and he said: It is evident that there is an increasing interest in the cultivation of hardy herbaceous plants. The use of tender plants and annuals for bedding purposes in summer decoration bas been in vogue for about a quarter of a century, and they have almost entirely superseded hardy herbaceous plants for general cultivation; extremely brilliant and beautiful effects are produced by them in beds, ribbon gardening, and mosaic work, and it is not desirable that they should be set aside by ainything less showy. But that hardy herbacecus plants should be used more generally in the place of tender plants and many annuals for general cultivation and to a considerable extent for bedding purposes, is desirable. The yearly renewal of tender plants requires a considerable expense every spring, or means for keeping plants through the winter, and a skill in propagation, preparation of the soil, and after cultivation to insure success, that most persons are unable to give. Hardy herbaceous plants, the first cost of which is but little more than tender plants in good garden soil, will live and blossom without fail year after year, and are continually increasing, so that a persou with little trouble or expense can enlarge his cwn stock of plants e to his ueighbors. With a proper selection of one or two dozen species, flowers will be had from the time the ground is open in the spring until it is closed by the severe frosts. For the lover of flowers there are new beauties every day, and new flowers open for pleasure at short intervals. For the botanist a large collection of herbaceous plants is a valuable field for study and in vestigation; for the horticulturist there is an immense field for the introduction of new species, in the development of this class of plants by hybridization, by selection of the best seeds, and by careful propagation of sprouts and curious seedlings. In recommending and describing plants, Mr. Manning spoke as follows: The variegated day lily is strongly and beautifully marked with yellow, has a fine furred leaf, and stands the sun. The colors in this, as in all variegated herbaceous plants, can be prevented from fading to a great extent by picking the flower buds; the other varieties of the funkia do not stand sun well, but make nice beds in shady spots. The variegated symphium or comfrey has a bright yellow variegation with dark' green, and forms a graceful tuft of large leaves that would be fine for the center of a bed. The Spanish valerian has a light glaucus green foliage and a profusion of carmine flowers through the summer. A bed of phlox amæna, bordered with phlox sublata having some of the choice varieties of common pblox, would furnish flowers from the first of May to the middle of October; the evergreen leaves of the low-growing phlox would
a shorter time than was expected. The contract calls for the $k$ glass to be finished and delivered by November 1,1833 , and it is thought that the lens will be constructed within that time. The price, as agreed upon, is $\$ 50,000, \$ 12,000$ of which was paid in advance on signing the contract. Two of the buildings at the summit of Mount Hamilton, the site of the Lick Observatory, have been completed-the first dome and the transit house. Within the first or small dome stands the twelve-inch telescope of Clark's and a four-iuch comet-seeker, while the transit house, which stands a few
feet east of the small dome, is furnished with time instruments, all in complete working order. The six-inch meridian circle is to stand a short distance east of the transit house. A series of photographs have bee:a taken of the place, show. ing the observatory as it is at the present time, together with a section of the newly-completed road, with the temporary buildings now in use.

Herr P. Volmmann has in the Annalen fur Physik und Chemie compiled the results of experiments by Hagen, Matthiessen, Perre, Kopp, and Jolly, on the expansion of water, and has obtained the following mean results for the volume and density of water at various temperatures:


The increase in the volume per degree of increase of tem perature from the point of greatest density, $4^{\circ}$, is thus very rapid. For a rise of $1^{\circ}$ from this, the volume increases by 0.000008 , while from $99^{\circ}$ to $100^{\circ}$ the increase is about $0 \cdot 000721$.

A ROAD locomotive for war purposes was lately tried before Count Moltke. It weighed $283 / 4$ tons, and drew easily 40 tons weight of guns mounted on their carriages fully equipped. Its maximum traction power is 150 tons, and its cost of maintenance is about 30 cents an hour.
keep it looking well the remainder of the year. Dicentra exemina has beautiful fern-like leaves and clusters of pink. purple flowers that are produced through the summer and into the fall. Dicentra spectabilis would make a fine center for a bed of the foregoing, and if it is cut back as soon as the flowers are developed it will flower from May to September. A bed of lilies having the surface of the ground covered with phlox sublata or other shallow rooting plants is effective, the foliage of the covering plants beautiful all winter, the flowers are their charms in spriug, while the lilies are developing, and, above all, the surface plants keep the root and stem of the lilies cool in summer and protect them in winter. A handful of cold ashes placed about the lily bulbs when planted prevents decay and drives away insects. Grass beds are very graceful, and look well from early in the season until severe frosts. The wild garden is a desirable feature in an estate where there is plenty of room and a suitable place; here fine foreign flowers can be introduced among the already growing natural ones with fine effect. All the plants mentioned here require no special cultivation; they will all succeed in good garden soil, which should be well enriched when they are planted and when the roots are divided and reset, which should be as a rule in the spring and as often as every three or four years, or they will exhaust the soil about them, and begin to die out in the middle, or to disappear altogether. The beds should be kept free from weeds; many of the best plants will need staking: the stake should not be conspicuous, and a care should be had that the form of the plant is not disfigured by tying.

## The End of a Famous Rose Tree.

Recently a high wind destroyed the famous " Gold of Ophir " rose tree, in Grass Valley, California. A Santa Rosa paper says that the stem was 26 inches around, and the shrub itself had grown over and around an oak 50 feet high, ouly stopping in its upward progress from lack of something to climb upon. When in full bloom nothing could be seen but a mass of golden flowers, forming an object of almost indescribable beauly and splendor. It was, as may well be supposed, the pride of its owver, who, when once before a strong wind partially uprooted the supporting oak, went to considerable expense to restore it to its upright position. But the recent injury was irremediable, and lovers of the beautiful in nature regret the loss.

