The Lick Observatory Astronomers.

At a recent meeting of the Board of Regents of the University of California, the special committee appointed to consider the resolution accepting the resignation of Edward S. Holden as president of the university, and resolutions appointing the director of and the astronomers in the Lick Observatory, and resolutions appointing a secretary and librarian, and also a machinist, a laborer, and a janitor, reported through A. L. Rhodes.

The resolutions, as adopted, are as follows:

That the resignation of Edward S. Holden as president of the university be accepted.

That Edward S. Holden be, and he hereby is, appointed as director and astronomer of the Lick Observatory, subject to the control of the Board of Regents.

That S. W. Burnham, A.M., be, and he hereby is, appointed as astronomer, with a salary of $3,000 per annum. That J. M. Schaeberle, A.M., be, and hereby is, appointed astronomer with a salary of $2,000 per annum.

That J. E. Keeler, A.B., be, and he hereby is, appointed astronomer with a salary of $1,400 per annum.

That E. E. Barnard be appointed astronomer at $1,200 per annum.

That the following be appointed: John McDonald, machinist, $700 per annum; Chris. McGuire, laborer, $720; and Charles Harcort, janitor, $720.

That a secretary and librarian be appointed.

That a committee of three regents be appointed, who shall be authorized to make necessary arrangements for the conveyance and delivery of the Lick Observatory, the lands upon which it stands, and the property and money in the hands of the Lick trustees, which are required by the deed of trust to be turned over and delivered to the Board of Regents.

The committee to which was referred the orders of the board relating to the Lick Observatory submitted the following report, which was adopted:

That the official designation of the Lick Observatory and telescope on Mount Hamilton shall be "The Lick Astronomical Department of the University of California." The balance of the $700,000 given by Mr. Lick for the foundation and endowment of the observatory, and such other sums as may from time to time be given, shall be known as the Endowment Fund of the Lick Astronomical Department of the University of California. That students who are graduates of the university and colleges of like standing shall be received at the observatory as students to pursue a higher course of astronomy.

The resignation of the president of the university is to take effect when the observatory is formally turned over to the regents. Prof. Holden's salary is $5,000 per annum.

Calcareous Water.

The Weavers' School of Aix-la-Chapelle writes as follows to the *Centralblatt f. d. Textil-Industrie:*

"The reply by another correspondent published by you compels us to again take up the subject. The writer advises to soften the water by an addition of milk of lime. We, however, would most seriously warn parties against doing it. It is true that carbonate of lime in water can be precipitated by milk of lime, because the excess of carbonic acid, without which the lime cannot remain in solution, becomes fixed. But the vital question in the matter is, How much milk of lime is to be added? The operator would have to know to a nicety how much carbonate of lime is contained in the water, and how much caustic lime is contained in the milk of lime.

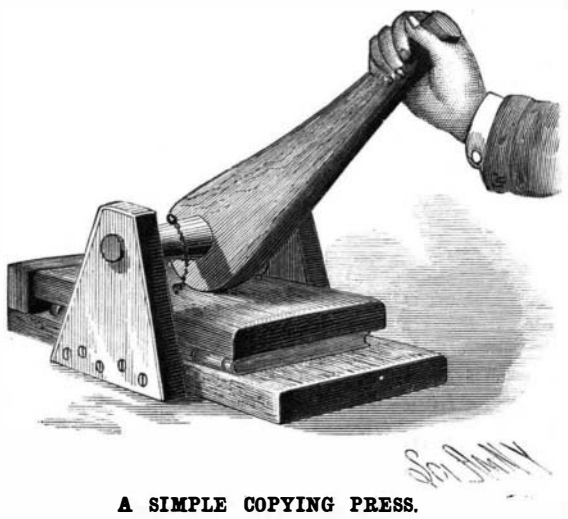
"But can this be established with precision in every case? To be added to this difficulty is the fact that milk of lime cannot be kept in the open air, because the caustic lime will change into carbonate of lime, whereby the entire solution loses its strength. The greatest danger, however, is that the operator will add too much milk of lime to the water, which addition, in place of making the latter softer, will make it very hard; and if he uses it at once, when the reaction of the water containing an excess of milk of lime is still alkaline, he may experience a number of undesirable accidents, both in washing and dyeing.

"The main point of the question, however, has not been touched upon at all by the respondent. The hardness of the water is most generally due, not to carbonate of lime, but to sulphate of lime (gypsum). Can this also be precipitated with milk of lime? As we stated in our answer, nothing is good except the addition of solution of soda to the boiling water, which process has time and again shown its efficacy, and has therefore stood the test of experience. The gypsum is thereby at once converted into carbonate of lime, and since all excess of carbonic acid has been expelled by boiling, it is precipitated at once."

MOISTURE-PROOF glue is made by dissolving 16 oz. of glue in 3 pints of skim milk. If a still stronger glue be wanted, add powdered lime.

A SIMPLE COPYING PRESS.

We illustrate in the present issue a very simply constructed copying press. Its construction is so clear that little description is required. It was devised by Mr. O'Rourke, one of the constructing engineers of the Poughkeepsie bridge. A wooden cam rotates in suitable bearings, and when turned, by pulling forward the lever, forces the platen downward upon the copying book. When the lever is pushed backward, it not only relieves the platen from pressure, but also raises it. This it does by a short chain or wire attachment which

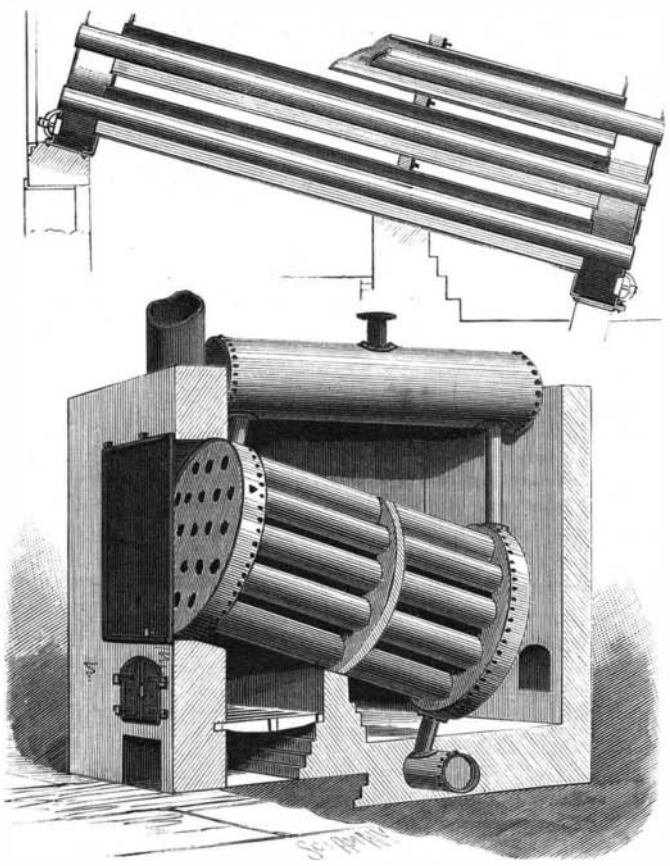


A SIMPLE COPYING PRESS.

is wound around the axle or drum to which the cam is attached. It is all made of wood, except as regards the nails or bolts and the chain.

AN IMPROVED STEAM BOILER.

A steam boiler designed to give a maximum amount of heating surface, in order that steam can be generated with the smallest possible amount of fuel, has been patented by Mr. Oliver H. Gentry, of Opelousas, La., and is represented in the accompanying illustration. The boiler is preferably set at an inclination, as shown in the view in perspective, and each of its ends consists of a circular drum, through which extend flue tubes, passing through both front and rear drums, these flue tubes being surrounded by water tubes, opening into the interior water spaces of the drums. A mud drum is arranged transversely under the lower side of the rear drum, with which it communicates through a short vertical pipe, and a steam drum arranged horizontally over the boiler is in communication with the top portion of the water drums at both ends by vertical pipes. The tubes are expanded in the tube sheets, and the setting shown is designed to represent about the proper angle to insure the best circulation. When the boiler is filled, the water in the drums and tubes entirely surrounds the flues, and the products of combustion, after circulating around the tubes until they reach the rear drum, are deflected downward to its rear side,



GENTRY'S STEAM BOILER.

thence passing forward through the flues to the stack at the front, up which they escape.

IODIZED starch has been recommended as a substitute for iodoform, on the ground that iodoform owes its power to the iodine given off from it.

A New Departure in Brazing and Welding.

Mr. Thomas Fletcher, the well known gas engineer, writes to the *Journal of the Society of Arts*, London, as follows:

"The cheapening of oxygen by Brin's process of manufacture has put into the hands of metal workers a new power. I have recently made a few experiments with the compressed oxygen and coal gas, and found that with ½ inch gas supply a joint could be brazed in a 2 inch wrought iron pipe in about one minute, the heat being very short, the redness not extending over 1 inch on each side of the joint. The appearance of the surface after brazing led me to experiment further with welding—a process which is not possible with ordinary coal gas and air, owing to the formation of magnetic oxide on the surfaces. Contrary to my expectation, a good weld was obtained on an iron wire ⅛ inch diameter with a very small blowpipe, having an air jet about $\frac{1}{32}$ inch diameter.

"This matter requires to be taken up and tried on a large scale for such work as welding boiler plates, which, it appears to me, can be done perfectly with far less trouble than would be required to braze an ordinary joint. The great advantage of this would be that the boilers would require no handling, but could be welded with an ordinary large blowpipe in position, and with about one-tenth the labor at present necessary. The cost of the oxygen is trifling, and it is evident from the results obtained in brazing that the consumption of gas would be considerably less than one-fourth that necessary with an air blast, irrespective of the fact that welding is possible with an oxygen blast, whereas it is not possible if air is used. The surface of iron heated to welding heat by this means comes out singularly clean and free from scale, and a small bottle of compressed oxygen with a blowpipe and a moderate gas supply would make the repairs of machinery, boilers, brewing coppers, and other unwieldy apparatus a very simple matter. The trouble and difficulty of making good boiler crowns, which so frequently come down, would be very small indeed when the workman has an unlimited source of heat at command, under perfect and instant control."

The Manufacture of Aluminum.

Works for the manufacture of sodium by the Castner process and its conversion into aluminum under the process of Mr. James Webster are now being erected by the Aluminum Company, of St. Mary Axe, London, at Oldbury, near Birmingham, which, it is expected, will bring an important trade to the district. The process of sodium production, which has been invented by Mr. H. Y. Castner, New York, has already been described.

By this process the cost of sodium is reduced from 4s. to 1s. per lb., and of aluminum from 60s. to less than 20s. per lb. The aluminum is produced in pigs of 4 lb. weight. The same sized pig of the alloy known as aluminum bronze, copper and aluminum, weighs 12 lb. —a fact which strongly illustrates the relative lightness of aluminum. Its value is further increased by its tensile strength and its non-liability to oxidize. It is obvious that the manufacture of this reliable metal upon an extensive commercial scale at a much lower cost than hitherto involves important consequences to English metallurgical industry.

The new works at Oldbury occupy 4½ acres of ground, and they will be capable of producing £300 worth of aluminum per day. The number of men to be employed is not yet definitely decided upon, and in aluminum manufacture extent of production is indicated more by the amount of machinery plant than the number of workmen engaged. At Oldbury there will be four furnaces, each with five chambers, for the manufacture of sodium, and a number of other furnaces which have yet to be erected will be used for making chloride of aluminum and the aluminum itself. The furnaces will be fired by eight Wilson gas producers. The gas from these will be carried to the furnaces through pipes, and as there will be a separate valve to each furnace, the supply of heat will be regulated without difficulty. All the coal consumed at the works will be brought by canal. There is a special creek running into the works. On the other side of the works runs the line of the Great Western Railway Company. Just opposite the works, on the other side of the canal, is a manufactory of chemicals, and from this establishment will come the soda and certain of the other materials used in the production of aluminum. At the Solihull works of the company the co-metal is already being turned out, and is being received with considerable favor. Many metal-working firms are using an alloy of aluminum and copper—90 per cent of the latter to 10 per cent of the former—and express much satisfaction with its qualities. The new works are being rapidly erected, and it is expected that full work will be begun in March. One of the chimneys, which is 150 feet high, with an internal diameter of 6 feet, is already completed; and another, 180 feet in height and 8 feet across at the top, is already about half built.—*Iron.*

Winter Care of Poultry in a Nutshell.

I notice that much interest is shown in the matter of winter laying of hens. As I have had good success in that line this year, your readers may be interested to know what has been done.

1. Stock. My brood consists of eight pure Brahma hens, two years old; ten Plymouth Rocks, and ten of a cross between a pure Brown Leghorn cockerel and White Brahma hens, of which twelve are eight and the balance six months old; one Plymouth Rock and one Brown Leghorn cockerel.

2. Feed. First thing in the morning a medium feed of three parts wheat and one of corn. In the middle of the morning the table scraps from breakfast warmed up and a tablespoonful of concentrated chicken feed from the grocer's stirred in. In the middle of the afternoon the dinner scraps are fed as they run. We give no feed at night. Water given in an open iron baking pan every morning.

3. House. Moderate size, wood floor, two small windows, floor raised a foot from the ground, shelter shed on one side. No artificial heat. Well ventilated.

4. The Run. Since the middle of October they have been free to forage in lawn and garden.

5. General Care. House cleaned weekly in summer, and once a month white-washed with carbolic acid in *very thin* lime wash, fresh hay in nests and roosts rubbed with kerosene. The run spaded up twice in the year.

6. Results. But two chickens or hens lost from sickness in two years. Pullets began to lay at six months of age, the cross-bred laying first—nine to twelve eggs a day through December and January, thus far.

Essex, Conn. E. W. W.

—*Rural New-Yorker.*

The Future of Great Cities.

At Toynbee Hall, London, a lecture was lately delivered upon the subject of the future of great cities by Mr. Frederic Harrison. London, he said, presented the hugest assemblage of buildings ever piled upon the earth, and for three centuries men had been thinking how its enormous growth could be dealt with. In this century the population of London had increased fourfold and its area about fifteenfold. Every year some 70,000 fresh souls were added to the population by immigration or birth. Every ten years there was added to London by immigration alone the population of a city as large as Lisbon or Bristol, and by immigration and birth together there was added a population as large as that of St. Petersburg or Vienna. The abnormal and spasmodic increase of London defied adaptation and adjustment. The new comers poured in before London had time to think what she would do with them. From Charing Cross or the Royal Exchange a man must walk five miles before he could breathe country air. We lived in smoked-contaminated air in which trees would not develop to their full size. The Thames was but a muddy receptacle of refuse, the water which we drank was at times very near being dangerous to health, and our sewers poured forth 5,500,000 tons of sewage every week. An immense portion of the working population lived in comfortless houses, not a few of which were miserable dens or squalid cabins unfit for human dwelling places.

Was this monster city still to increase, its dreariness to grow vaster and its smoke ever thicker? It might sound paradoxical, but it was nevertheless true, that while those who had means were perpetually trying to get away from London, those who were destitute were always trying to find their way to it. It should be noted, however, that there was nothing exceptional in the increase of London. The vast increase of great cities was a feature of modern civilization, and was equally to be seen in countries where there was a peasant proprietary and in those where there was a system of great domains. It was found not only in Europe, but in Asia, Africa, and America. The problems which the consideration of these facts brought to mind were very serious. There was first the problem of water supply. Our water in London was meager in quantity, inconveniently supplied, various and doubtful in quality, and exposed to immense risk of pollution. The present house cistern system was a survival of barbarism and ought to be done away with, together with all the abominations of bungling plumbing.

There was next the problem of fire, and we ought to realize that we were behindhand with mechanical appliances for the prevention of this great calamity. Hitherto London had relied on the energy of its fire brigade, its peculiar mode of construction, the prevalent methods of heating, and the general habits of the people, all of which lessened the likelihood of a great conflagration. But a great fire was not impossible, and should it come, our means of dealing with it were ridiculously inadequate, our fire brigade being actually less in numbers than those of Paris, Berlin, New York, and St. Petersburg. Either our friends abroad were foolishly timid, or we were criminally negligent.

Then we had graveyards in scores endangering health, and all our arrangements with respect to interment and for checking contagion were behind our science. Now, he would ask them to consider what our great cities ought to be, and what they would be, if we in this generation and our successors in the next could only be brought in time to know our duty, our urgent necessities, and most imminent dangers. It was little that Parliament could do in the matter. It was a thing for society, for the rich and the poor, for the municipalities, and for the reformers who cried out for them. All the contests between Radicals and Tories were of infinitesimally small importance as compared with the question of the preservation of the lives of the people. In considering the city as it ought to be, the first point that required attention was the death rate. The death rate of London was remarkably low, but it ought to be lower still. One of our greatest sanitary reformers (Sir Spencer Wells) had declared that the death rate of our cities ought to be reduced to something like 12 per 1,000 per annum, which would be a reduction of the present rate by about 10 per 1,000. If the death rate were reduced to 12 per 1,000, it would mean 30,000 lives saved each year in London alone, and this great result might be achieved with the money which was now spent lightly on an African war.

Some ten years of engineering labor would be necessary, and then we might have absolutely wholesome water to drink and plenty of it to wash in, a rational and healthy drainage system, pure milk, air without sulphurous fumes in it, cemeteries wholly away from the living, systematic precautions against contagion, hospitals reconstructed on scientific methods, so that they would no longer be nests of pyæmia, no overcrowding, no ill-ventilated factories, less drink, less brutal treatment of women and children, more civilization, more real charity, more true religion. He knew that the death rate of London was already much lower than that of many large towns, and only half that of some Russian and many Eastern cities, but why should we not go further? Why should we not save annually the 30,000 lives which sanitary reformers told us were still sacrificed to our ignorance, folly, and crime? Before glancing at the steps that ought to be taken to arrive at that result, he might say that there were some things to which he would not consent, even for the sake of the health of the community. He would not, for example, allow policemen to wash people against their will, and he would not let the state take the place of parent. Pure water was our first want. He often thought that but for the conservative powers of *medicatrix natura* we should all be dead men in consequence of the impurity of our water supply. There were two or three ways in which London could be supplied at moderate cost with wholesome water. At first he should prefer to try the plan of drawing it from the chalk in the north and south of London, but he believed that ultimately a vast aqueduct must be built down the center of England from Bala Lake or Ullswater.

Water, like the roadway, was a public and not a private concern. Air, water, and soil were not manufactures as bread and gas were, and men should be no more charged by a company for their water than be asked to pay toll for walking in Hyde Park. It concerned the health of us all that no family should stint itself in its water supply. The free use of water and roadways ought to be secured by public bodies under public control, deriving the necessary funds out of common rates and taxes. Then some day we should have to see to our rivers. There was no positive reason why the Thames, as it flowed by Westminster Palace, should not be as clear as it was at Hampton Court. Factories must no longer pollute its stream with their refuse. Its southern side ought to be embanked like its northern, and the sewage of the town must no longer be discharged into it. Another matter which must be faced was the great problem of death as affecting the health of the living, and the problem would be solved by the adoption of the system of cremation, which afforded the only safe means of disposing of the thousands of corpses which each year are cast upon our hands. Most of the objections to the system were but the melancholy remnants of a childish superstition. Urn burial was one of the most ancient, most beautiful, and most religious ways of disposing of the dead. It was pure, solemn, and dignified. Cremation destroyed every deleterious germ in a dead body, leaving the harmless ashes for preservation. When it should be adopted as a system, the ashes of the greater dead might rest in solemn, sacred chapels in the very heart of our city, while the funeral urns of the many would be placed in *columbaria* around the cloisters which could be added to our churches.

Another change which must be effected was the reformation of our dwelling system. Some day it would be necessary to rebuild London in accordance with the plan of block dwellings. If the town was built on this tenement plan, as Paris and New York were, an enormous amount of area would be saved. There ought to be detached blocks, five or six stories high, each house containing some twenty or thirty families, with common appliances for cooking, baking, exercise, recreation, etc. Each block should contain some sort of infirmary, a spare room for the treatment of serious disease, and one for the disposal of the dead. The homes of our workers ought, in short, to be constructed on the collective system. He was anxious to have a good general, central government for London, but decentralization and local organization were needed as well. By preparing the ground for such organization, the great reform which divided London into sixty parliamentary boroughs was a step of great improvement.

Mr. Harrison concluded his lecture with the following description of his ideal of London: It must be a city where our noble river will flow so bright and clear that the young people can swim in it with pleasure; where we shall again see the blessed sun and clear blue sky, and the towers and steeples rising aloft in the bright air—a city which at night will be made as light as day with electric lamps, and in whose midst fountains will pour forth water from the hills of Snowden or Helvellyn; a city where noxious refuse will be unknown, and where no deadly exhalations will be pumped into homes; a city where typhus and typhoid and smallpox and fevers will be as rare as the plague and as much a matter of history as the leprosy; a city where the dead shall no longer be a terror to the living, where preventable disease will be a crime chargeable to some one and an opprobrium to the district in which it breaks out; a city where no child shall go untaught because it has no suitable school at hand; a city where no man shall go without recreation, or society, or religion, because there are no libraries or museums near his abode, no galleries of pictures to visit on Sunday, no parks within easy reach, and no free seats in the church which he cares to enter.—*Architect.*

Children's Winter Dress.

There is a tolerably general impression in many quarters that in order to promote the health of children it is advisable to subject them to a "hardening" process. The meaning of this term it is needless to explain further than to say that its aim is to encourage native energy by opposition, to engender strength of mind and body by early participation in the struggle for existence. The principle is in itself a wholesome one, and is not without its parallel in the history of nature's processes. Care is most necessary, however, in its application. Without such care it may be, and frequently has been, overdone. In particular must it be remembered that all success in the adoption of this plan in education depends on the possession by a child thus trained of a basis of sturdy physical vigor. A delicate child, if treated after the same method, would languish and probably succumb. We have been led into this train of observation by noting the frequency with which one finds children of both sexes and of different ages, constitutions, and positions in life treated after one uniform prescription of hardy training. We would now concern ourselves particularly with that aspect of the question which has to do with clothing during such inclement weather as prevails at present. That considerable variation of opinion should obtain among parents with regard to this subject is only to be expected. Here, it may be said with truth, is room for the wise exercise of private judgment, and here we may in many cases find occasion to apply the maxims of the hardening system. So much may safely be granted, but we must not forget that certain essentials cannot be dispensed with under any plan adopted. Among these the maintenance of bodily heat and dryness is all-important, and certain of the most prevalent customs of domestic life incline us to believe that the fact is but slightly understood. The hat, for example, is often, in the case of girls, far too light and too cool. Instead of straw, we would substitute some form of woolen material, just as boys, with few exceptions, are commonly provided with hats of wool or felt, which are at once light, comfortable, and suitably protective against weather. Underclothing is another matter which does not as yet receive adequate attention. We still find the linen shirt or chemise worn very commonly next the skin. This is an error in personal hygiene which cannot under any system be excused. Summer and winter, indeed, present no material difference as regards the choice of an undergarment. Lighter or heavier, the material certainly should vary in accordance with the degree of external cold; but throughout the year no other substance is so wholesome or so preventive of chill as a woolen fabric. Of the feet we need, perhaps, hardly speak. For them, as for the rest of the body, a casing of wool is the prime requisite; and, indeed, the use of this material as a general investment for the skin will be allowed by members of the profession generally to be the great regulating principle in arranging the dress of children, whatever the view most approved in their physical education.—*The Lancet.*

Trade Mark Decision.

The United States Circuit Court for the District of Massachusetts lately held, in the case of Evans vs. Van Laer, that the plaintiff, in the absence of fraud, was not entitled to the exclusive use of the word "Montserrat" as a designation for lime juice, Montserrat being the name of an island from which both parties imported lime juice.