

**THE AMERICAN SCIENTIFIC MONTHLY;  
FROM JULY TO DECEMBER, 1870;  
VOL. I; THE PRINCIPLES OF PURE  
CRYSTALLOGRAPHY: A LECTURE-  
GUIDE**

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**GUSTAVUS HINRICHS**

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EDITED AND PUBLISHED

BY

PROF. GUSTAVUS HINRICHS.

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THE PAST AND THE PRESENT.

FOUR thousand years before the Christian era, one of the mighty of this earth erected a gigantic funeral monument for himself. It was a pyramid, one hundred and forty-six meters high, and two hundred and thirty meters each side of the base; and, in order to pile up these eleven thousand cubic meters of stones which were to perpetuate his memory, Cheops forced one hundred thousand men to work thirty years. The workmen were exchanged against others every three years.

Two great nations, friends of the arts and sciences, will soon applaud the completion of the Mont Cenis Tunnel, which has a length of three leagues (lieues), and a cross-section of forty-eight square meters. Thus, half a million of cubic meters will be taken from the natural barrier which separates those two nations, and for this work, the exertions of five hundred workmen, relieved three times a day, have been sufficient in the course of ten years.

Do not these figures speak volumes?

These are the significant words wherewith Monsieur A. Cazin closes a most interesting lecture, delivered this winter at the Sorbonne, in Paris.\* We put these words at the head of our new SCIENTIFIC MONTHLY, because this striking contrast between the Past and the Present *is due to the progress of science*, and to nothing else.

Not only is the contrast a striking one in the results attained, but also in the motives which lead to the great enterprises mentioned.

In the *Past*, we have the one man compelling the masses to toil for years upon an utterly useless structure, merely to gratify the pride and vanity of the despot. In the *Present*, we see the nations break down one of the great barriers opposing their friendly intercourse, not at the command of a despot, but of their own free will and accord; and this stupendous barrier yields not to the united efforts of hordes of slaves, which are scarcely above the level of the brute, but it literally crumbles before the breath of modern science! For, before commencing the work at all, the geologist has accurately and correctly predicted what kind of rocks would be encountered on the way through the mountain. Thereupon, the practical philosopher catches the brook running down the mountain sides, forces it to condense the air, and, finally, makes this air move the drills, before which the solid rock yields so rapidly that, in a few weeks from the present moment, the entire barrier will have crumbled down. Thus, the tunnel is literally blown through the mountain—the very Alps crumbling before the breathing of modern science.

But so, also, the Alps of ignorance, superstition, and barbarism are yielding before the gentle breath of this same progressive modern science. It has made almost the entire humanity one living being, wherein the great cities and towns are gangliæ connected by telegraphic nerves, and nourished by railroad arteries and canal veins; and, as if to make up for the immense size of this organized body, the telegraphic nervous excitement is transmitted thousands of times faster

\* *Revue des Cours Scientifiques*, 1870, p. 189.

than the nervous excitement in our own bodies. If telegraphic communication were only "*as quick as thought*" we should deem it exceedingly slow; for, in air lines, the telegraphic dispatch travels more than a *million* times as fast as thought, and, even through the oceanic cable, it passes some two hundred thousand times as fast as in the nerves of our body!

But let us turn once more to the case presented to us by M. Cazin, merely to contrast the *power* which *modern science* enables the freed man to exert with that of the ancient slave erecting the pyramid.

A very simple reduction of the above given numbers will show that *the power of each one of the workmen, freed and directed by modern science, is equivalent to the power of thirty thousand of the slaves who reared the pyramid!*

Our "SCIENTIFIC MONTHLY" is to be an exponent of this modern science. We trust that it will find so many active friends that it may grow in *size* and *fullness*, so as to become more and more worthy of being an exponent of that spirit which is fashioning the age.

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### FASHIONABLE POISONS.

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THE demand for "*fashionable poisons*" is decidedly on the increase in this country. The trade is, of course, ready to supply this demand, especially since the profits in this business are simply enormous. The customers who call for fashionable poisons do not want any cheap goods; for, to them, the price alone is the standard of value. The manufacturers have learned this lesson thoroughly. They supply the fashionable poisons in elegantly finished vessels, at very high prices, and often even under patriotic names;\* and,

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\* Martha Washington's Hair Restorative. Prepared by Simonds & Co., Fitzwilliam, N. H.



considering the deplorably low state of scientific knowledge of the people, they kindly supply the deficiency of our schools by enclosing in their packages printed directions for the use of the fashionable poisons.

In a great many cases, the retailer — usually a druggist — knows perfectly well that he is selling poisons; but the customers do call for it, and he merely supplies the demand! Besides, our philosophical temperance friends do not yet fight fashionable poisons; we know many who are steadily using these poisons themselves.

However, at times, the manufacturer is too smart for the retailer; and the latter thus may, in good faith, warrant an article as free from poison, when, in reality, it is a strong poison. We have, ourselves, detected great quantities of lead in cosmetics which had been warranted to be free from this poisonous metal.

From what precedes, it will already be understood that we refer to the various *cosmetics* as fashionable poisons. In these preparations lead is very frequently contained in large proportions. Three cases of *lead-palsy*, recently observed and described by Dr. Lewis A. Sayne, of New York city, have led to a chemical investigation of these articles by Professor C. F. Chandler, chemist to the Metropolitan Board of Health. From the official report of this eminent chemist, published in the American supplement to the May number (1870) of the *Chemical News*, we copy the following few facts and conclusions:—

In one fluid ounce of those fashionable poisons which are sold as *Hair Tonics, Restoratives*, etc., Prof. Chandler has found the following amount of *metallic lead*:

	GRAINS.
Clark's Distilled Restorative for the Hair.....	.11
Chevalier's Life for the Hair.....	1.02
Circassian Hair Rejuvenator.....	2.71
Ayer's Hair Vigor.....	2.89
Prof. Wood's Hair Restorative.....	3.08
Dr. O'Brien's Hair Restorer of America.....	3.28
Gray's Celebrated Hair Restorative.....	3.89

Phalon's Vitalis.....	4.60
Ring's Vegetable Ambrosia.....	5.00
Mrs. S. A. Allen's World's Hair Restorer.....	5.57
L. Knittel's Indian Hair Tonique.....	6.29
Hall's Vegetable Sicilian Hair Renewer.....	7.18
Dr. Tebbett's Physiological Hair Regenerator.....	7.44
Martha Washington's Hair Restorative.....	9.80
Singer's Hair Restorative.....	16.89

Indeed, all but one of the restoratives investigated contain *lead* as an essential constituent. The exception is Hoyt's Hiawatha Hair Restorative, which contains silver instead of lead.

The following are Prof. Chandler's final conclusions, which we recommend to all those who are in the habit of buying fashionable poisons:—

"1. The Hair Tonics, Washes, and Restoratives contain lead in considerable quantities; they owe their action to this metal, and are, consequently, highly dangerous to the health of persons using them.

"2. With the single exception of Perry's Moth and Freckle Lotion, containing corrosive sublimate, the *lotions* for the skin are free from lead and other injurious metals.

"3. The *enamels* are composed of either carbonate of lime, oxide of zinc, or carbonate of lead suspended in water. The first two classes of enamels are comparatively harmless—as *harmless as any other white dirt when plastered over the skin, to close the pores and prevent its healthy action.* On the other hand, the enamels composed of carbonate of lead are highly dangerous, and their use is very certain to produce disastrous results to those who patronize them.

"4. The white powders for the skin are harmless, except in so far as their application may interfere with the healthy action of the skin."

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**SOLAR ENGINES.**


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WE copy the following items from a recent paper of M. Cazin, 1870, Nov. 12, *Revue des cours scientifiques*, on the various natural forces used by man for the performance of mechanical work: —

“Even in the earliest ages, the important problem of converting solar heat into mechanical work had attracted the attention of several distinguished men. This question has been again raised in our own time, and to M. Mouchot, Professor in the gymnasium at Tours, has been reserved the honor of first constructing an engine operated exclusively by the sun.

“A complete history of his experiments is contained in his interesting volume entitled ‘Solar Heat,’ from which the following particulars are borrowed: —

\* \* \* \* \*

“The principles on which a solar engine is constructed will be better understood by first considering a simple physical experiment.

“Here are two concave silver mirrors, so situated that their axes coincide. A source of heat is placed in one of the foci; in the other is a small boiler, constructed according to the plan of that used by M. Mouchot. It consists of a vessel of blackened copper-plating, surrounded by glass, and containing ether.

“The rays of light and heat proceeding from the flame in the focus of the first mirror are reflected parallel to one another; striking the second mirror, they are again reflected from its silvered surface and brought to a focus at the boiler. Passing through the glass, the heat rays are absorbed by the blackened copper, causing a rise in the temperature of the contained liquid. At the same time, however, the copper boiler is exposed to a cooling influence, inasmuch as its temperature is higher than that of surrounding objects; it is in order to