Correspondence.

Typesetting on an Ordinary Typewriter.

To the Editor of the SCIENTIFIC AMERICAN:

A correspondent inquires in your last week's issue why a typewriting machine could not be invented that would write matrices suitable for casting printing surfaces, and thus do away with hand composition and expensive typesetting machinery.

If your correspondent were a printer, he would see at once that the lines would have to be justified, or made of equal length. If he thinks that can be done on a typewriter without running it through the machine twice, let him try it. At any rate, a letter-by-letter impression in any sort of matrix must be a failure, from the impinging of the "shoulder" upon the neighboring letter; in other words, the impression of each letter would spoil the preceding one, and each succeeding line would crowd the one before it out of shape. In matrix-making, the entire impression must be made at once, and it is not likely that this condition can ever be changed.

I think, however, that the gentleman is near the right track. The days of high-priced type-setting machinery are numbered. The subject is an important and fascinating one. Let me suggest a line for inventors to work upon.

Some years ago a machine called a "printing typewriter" was invented. The lines written by this machine look as though printed from types, being sharp, clear, black, spaced according to size of letter, and by means of a system of rewriting are perfectly justified as in ordinary typework. (I am in no way pecuniarily interested in this invention, and now have no idea where the machine could be found.) Cannot a cheap and rapid process of photo-engraving be devised for forming printing surfaces by reproducing this machine typography? A special adaptation of the halftone process to plain black-and-white effects, and there is the whole secret. The successful exploitation of this idea would bring about a great reduction in the cost of printing. Half a dozen such typewriters, with the necessary accompanying materials, could "write up" the SCIENTIFIC AMERICAN each week, the whole typographical outfit costing probably a few hundreds of dollars.

Let the inventors go to work.

LINDSAY S. PERKINS.

Department of the Interior,
Washington, D. C., December 20, 1902.

Why Typesetting Cannot be Accomplished on an Ordinary Typewriter.

To the Editor of the SCIENTIFIC AMERICAN:

Mr. L. A. Bonnet's suggestion, in your last issue, that plates for printing be prepared from plastic sheets on a machine analogous to and costing but little, if any, more than a typewriter, would deserve serious consideration were it not for the fact (to which he himself alludes in the course of his remarks) that it is practically impossible to produce in that way plates having an even type surface. If I am not greatly mistaken, it was the National Typographic and Printing Company that exhibited at the Centennial Exposition in 1876, at Philadelphia, a machine intended to do this very thing, and which it failed to do. The company afterward submitted it in its crude state to Ottmar Mergenthaler for a solution of the difficulty. This he admitted his inability to accomplish; but assured them that while he could not make *that* machine work, he could make a machine that would. From that moment commenced a series of experiments that will ever be memorable in the history of mechanical achievements. I was present at the small shop in Baltimore when Mergenthaler's first machine was tested, and have yet a line of type cast from my own manipulation of the keyboard. It is hardly necessary to say that it bore scarcely any resemblance to the present machine, beyond also having a keyboard. In it the letter faces or matrices were sunk by steel dies into the edges of a series of brass rules or strips tapering in thickness from a capital W to the thinness of a period. Those were arranged to hang vertically, side by side, by fine chains (regular jewelers' fine chain, for want of time to make anything better) over a series of grooved pulleys, the thick and the thin ends alternating, and each provided with a suitable counterpoise. When, by working the keyboard, these rules or strips had been some raised, some lowered, so as to bring the line-forming letters in line, the whole series was firmly clamped together so as to form one compact mass, and then lowered to a close contact with the mold, of which it then formed the sixth side. A touch of the lever admitted the fluid metal, and the line was cast. No distributing mechanism was required, each rule automatically returning to its proper position on being released. This was the acme of simplicity, and had it been possible with it to secure that exact evenness of type surface without which good printing cannot be done, Mergenthaler need probably have gone no further, and millions of dollars would have been saved to the company. But it was not; and the inventor reluctantly abandoned the continuous for the separate matrix, only succeeding after years of most patient effort and intelligent research.

From the very nature of the plan suggested by Mr. Bonnet it is evident there would be a twofold difficulty at the outset. The impressibility of the matrix material would hardly be constant, hence the same stroke would not twice in a hundred times produce the exact depth of impression; and the varying surfaces of the type would require each a different force of impact. Now, these are the very obstacles which millions have been spent to remove, and spent in vain. One may then be pardoned for a little skepticism in regard to the typewriter system of printing plates.

WILLIAM GIUSTA.

Washington, December 21, 1902.

Another Method of Killing Hawks.

To the Editor of the SCIENTIFIC AMERICAN:

In your November 1 issue appears an article, "Novel Method of Killing Hawks," attributed to the Yankee ingenuity of a north Louisiana farmer, whose method is rather unique, and suggests to my mind a more successful experience by a Jefferson County, Tenn., farmer, residing eight miles from Morristown, Tenn., who, desiring to protect his birds and poultry from ravages of the hawk, conceived the idea of using a steel trap instead of a scythe blade set upon a pole, such a trap as is used by fur hunters in taking small animals, such as the muskrat. The pole supporting the trap on its top was set up at the end of a hedge, with the result that during the summer of 1901 he caught twenty-eight hawks and owls. While I do not remember the exact number of each kind caught, nor the time in which they were all taken, should any reader of the SCIENTIFIC AMERICAN desire exact and authenticated data in substantiation of the foregoing, it will be furnished upon application to the undersigned. He was no "Yankee," either.

J. E. HICKMAN.

Knoxville, Tenn., November 5, 1902.

Do Mussels Move?

To the Editor of the SCIENTIFIC AMERICAN:

In your paper of November 1, I notice an article with the heading "Do Mussels Move?" I had an opportunity some years ago to observe the fresh-water mussel (*Unio margaratiferus*) in a small lake in Maine. The water of the lake was being quite rapidly drawn down, and I came upon a little strip of sandy beach upon which were several grooves leading down into the water. On examination I found them to be about half an inch deep, possibly three-quarters of an inch wide, and in the lower end of every one was a mussel standing on edge, with the hinge uppermost; and careful observation, continued for half an hour or more, convinced me beyond a doubt that the furrows were plowed by the mussels in their endeavor to keep themselves submerged. Some of these furrows were a foot in length, and I calculated that the rate at which the animal advanced could not be much, if any, more than an inch per hour, though possibly it may have been slightly more rapid.

I have seen the scallop, which is very common on the coast of Massachusetts, throw itself up from the bottom, and with a lateral, side-to-side motion, swim a foot or more, going over a low tuft of seaweed or eelgrass in the way.

J. O. THOMPSON.

November 18. 1902.

THE HEAVENS IN JANUARY.

BY HENRY NORRIS RUSSELL, PH D.

The magnificent group of the winter constellations appears to great advantage in January. At the usual time of our survey—nine o'clock in the evening, in the middle of the month—Orion, the finest of them all, is nearly due south, about half way up to the zenith.

Those who are familiar with this group of stars will notice that the great red star Betelgeuse (or Alpha Orionis) is much brighter than it was last year. This star has long been known to be irregularly variable, but it rarely changes as markedly as at present.

A few years ago it was about as bright as Aldebaran, and last year, though somewhat brighter, it was distinctly fainter than its neighbor Regel. But now it is fully equal to Regel, if not to Capella—which would make it the brighest star, next to Sirius, in all our sky—and is more than twice as bright as it was a few years ago.

The line of Orion's belt points upward toward Aldebaran, and downward to Sirius. Above the latter is Procyon, and Castor and Pollux are higher still east of the zenith, while Capella is almost exactly overhead.

Perseus lies to the northwest of Capella, with Andromeda below, extending down toward Pegasus, which is low in the west. Aries is southwest of Perseus, and Cetus and Eridanus fill up the great region below.

The only conspicuous constellation in the east is Leo, which has not yet fully risen. Cancer and the head of Hydra lie between this and Procyon. Ursa Major is coming up in the northeast. Draco and Ursa Minor are below the pole-star, and Cassiopeia above it on the west.

The stars shine brilliantly enough on these clear winter nights, but it is probably not generally known that they are actually so bright as to cast shadows.

To be sure, we cannot see such shadows in the open air, but the reason for this is that the diffused light of the other stars, the Milky Way, and the general background of the sky (which is far from dark), completely drowns out the shadow cast by any particular star.

We can, however, easily get rid of most of this diffused light by going indoors. By closing all the windows of a room except one, and blocking up its aperture so that only a square foot or so is left clear, we may cut off almost all the diffused light. Under these conditions, the light of Sirius can be easily distinguished. If a sheet of white paper is placed in the path of the star's rays, the shadow of any object may be cast upon it and examined. It is advisable to have the screen as far as possible from the window, in order to diminish the diffused light. It is also well to have the window open, as the glass cuts off a considerable percentage of the light. The room must, of course, be quite dark, and as little light as possible should enter from the terrestrial sources. A street-lamp outside, or a light in an adjacent house, may make it quite impossible to see the faint light of the stars. One other precaution should be mentioned. The observer should remain in the darkened room for ten or fifteen minutes, so that his eyes may attain their greatest sensitiveness.

Though the light of other stars is naturally much fainter than that of Sirius, it is easy with a little practice to distinguish shadows cast by Capella, Regel, Procyon, and similar stars. Certain interesting features of these observations may be discussed in our next article.

THE PLANETS.

There are now four planets at once in the evening sky—Mercury, Venus, Jupiter, and Saturn—and several conjunctions take place during the month, though unfortunately some of them are too near the sun to be observed.

Mercury is evening star throughout the month. He is at his greatest elongation on the 17th—rather nearer the sun than usual, but correspondingly bright—and should be clearly visible in the southwest, shortly after sunset.

He is in conjunction with Saturn on the 5th, but both planets are too near the sun to be well seen. The conditions are better at the time of his conjunction with Venus on the 25th. He is 3½ degrees north of Venus, and Jupiter is only about 7 degrees away to the eastward. The three planets should make a fine group, best visible at about 5:15 P. M.

Venus is also evening star, but is too near the sun to be well seen till near the end of January, at which time she sets about an hour and a half after sunset.

She is in conjunction with Saturn on the 9th, with Mercury on the 25th, as already noticed, and with Jupiter on the 30th. On this last occasion the two brightest planets of our system are within a degree of one another, and the combination will be worth looking at, especially as the crescent moon will be near by.

Mars is in Virgo, and is rapidly becoming brighter as the earth overtakes him. On the 10th he passes near the star Gamma Virginis, at a distance of about a quarter of a degree. At this time he is due south a little after 5 A. M.

Jupiter is evening star in Capricornus. Saturn is too near the sun to be seen, passing through conjunction on the 21st, and becoming a morning star.

Uranus is morning star in Ophiuchus, and Neptune is in Gemini, visible all night, though not without a good telescope. His position on the 15th is right ascension, 6 hours, 7 minutes, 23 seconds; declination, 22 degrees, 18 minutes, north. Unless one has a very good star map he can only be identified by his motion.

THE MOON.

First quarter occurs at 5 P. M. on the 6th, full moon at 9 A. M. on the 13th, last quarter at 7 A. M. on the 20th, and new moon at 11 A. M. on the 28th. The moon is nearest us on the 12th, and farthest away on the 25th. She is in conjunction with Jupiter on the 2d, Neptune on the 14th, Mars on the 18th, Uranus on the 24th, Saturn on the 27th, Mercury on the morning of the 29th, and Venus and Jupiter on the evening of the same day.

Under the pressure of heavy orders, all records were broken during the month of October at the works of the Pressed Steel Car works, when 3,000 cars were turned out, the average for the 27 working days in the month being 111. The daily average for the past four months has been 107 cars. This company is having a plant built at McKee's Rocks for the manufacture of car trucks.