



The Truth About Hack Saws

We guarantee that Simonds Hack Saws will do ten per cent. more cutting than any others, under the same conditions. That guarantee is solid and unrestricted. We are all the time making tests, and we have never found another brand that would do 90 per cent. of the work a Simonds will—many of them do only 50 to 75 per cent.

Simonds Hack Saw Blades

If you use blades in a power machine, we make you a **Free Trial Offer.**

We will send you some blades. Test them against any others either by timing cuts with a watch or counting the strokes needed to cut through the same bar. Then see how many cuts each blade will make before it is worn out.

The reason for this superiority is our Simonds Special Crucible Steel, which we make ourselves for this particular work. It is a wonderful metal for cutting tools.

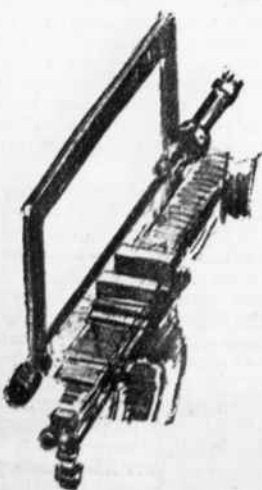
Simonds Files were awarded the Gold Medal at the Alaska-Yukon Exposition. Simonds Crescent Ground Cross-Cut Saws have more than double the sales of other makes. We make all kinds of saws and wood-working machine knives.

Send for "Simonds Saw Guide Book"

Simonds Manufacturing Company
(FOUNDED 1882)

Fitchburg, Massachusetts

Chicago Portland San Francisco New Orleans
New York Seattle Montreal Lockport, N. Y.



lucid and admirable statement seems to be the last word in the matter. There is one sentence in it, however; namely, "I protest strongly against the insufferable and entirely dogmatic assertion that each separate *id* is a microcosm possessed of an historical architecture elaborated slowly through the series of generations." Have you no desire in view of later research to modify this statement? Do you not think that it is overaccentuated? With your permission, I would ask the favor of an interview, as I feel strongly upon the subject and have certain suggestions which I could elaborate only in a personal conversation. With your consent, I trust to have the honor of calling at eleven o'clock the day after tomorrow (Wednesday) morning.

I remain, Sir, with assurances of profound respect,

Yours very truly, EDWARD D. MALONE.

"How's that?" I asked triumphantly.

"Well, if your conscience can stand it—"

"It never failed me yet."

"But what do you mean to do?"

"To get there. Once I am in his room, I may see some opening. I may even go the length of open confession. If he is a sportsman, he will be tickled."

"Tickled, indeed! He's much more likely to do the tickling. Chain mail, or an American football suit, that's what you'll want. Well, good-by. I'll have the answer for you here on Wednesday morning—if he ever deigns to answer you. He is a violent, dangerous, cantankerous character, hated by everyone who comes across him, and the butt of the students so far as they dare take a liberty with him. Perhaps it would be best for you if you never heard from the fellow at all."

To be continued next Sunday

TERRESTRIAL ELECTRICITY

BY LAWRENCE HODGES

TELEGRAPH lines have revealed a peculiar condition of affairs underground,—nothing more nor less than independent currents of electricity in the earth. Sometimes these are of such magnitude as to put telegraph lines temporarily out of business by causing a current counter to the desired one, due to the counter electromotive force of that particular part of the earth. A queer thing noticed in this connection is that lines running north and south are hardly ever disturbed: only those going east and west seem to be affected to any great extent. The earth current as a general thing runs from east to west, thus following the sun and helping along currents in that direction and retarding them in the opposite direction.

It has been ascertained that one general cause produces these currents, and that cause is no doubt the sun itself. The earth has been known as a magnet for a long time, and the possibility of its being an electromagnet, or one caused by electric currents, was broached some years ago. There is no doubt as to the nature of its magnetism in the light of the discovery of these currents, as currents flowing round a body from east to west tend to make it an electromagnet, with the two poles situated as are the earth's poles.

The electromotive force corresponding to the currents is usually only about three-hundredths of a volt to the mile, which is so small that ordinarily no variation is observed. In 1881, however, there was a general disturbance on the face of the sun, and this in some unaccountable manner raised this force on the earth to half a volt a mile, or sixteen times its ordinary value. The highest it has ever been observed was six volts a mile. This was during a big magnetic storm when the sun was full of spots.

This effect is not noticed in cables under the sea, due no doubt to the wonderful conducting power of sea water, which offers practically no resistance to an electric current, while the earth material does. The greatest effects are noticed to take place at ten o'clock A. M. and four P. M.; the smallest at sunrise.

There is no doubt that the position of the moon relative to the earth has an important bearing on these earth currents also, as shown by Adams some years ago.

Now, besides this terrestrial electricity, there exists what is known as atmospheric electricity. It is a well known fact that the rapid evaporation of water produces electricity; also the friction of air and water particles blown about in the atmosphere produces it. Another effect is what is known as "induced" electricity, on account of the earth's charge. As air in its general state is a nonconductor, the electricity has to remain in these sundry parts of the atmosphere until it either gets strong enough to discharge itself to the earth or to another part of the atmosphere, or else be blown away with the wind.

Of course we are all familiar with how Franklin proved that electricity existed in the atmosphere by showing lightning to be electricity; but most of us are prone to think that this effect is confined to the higher regions. Some experiments concluded not long ago disclose quite a charge

very close to the earth. The way this was determined by Sir W. Thomson was to insulate a living plant, such as grass, from the earth, place it at these different heights, and connect one wire of his measuring instrument to it and the other wire to the earth. His results were rather astounding at first. At a height of nine feet he found a difference of four hundred and thirty volts, or approximately fifty volts to the foot, at the Isle of Arran. Other places of course showed slight variations.

A peculiar thing about this atmospheric electricity is that it also varies with the time of day, being at its greatest at about eight A. M., and from eight to nine P. M., in summer, and ten A. M. and six P. M. in winter, and lowest about three P. M. and midnight. This indicates that it is highest just when we have the greatest change of temperature and when the evaporation and fall of dew are greatest. Some interesting points were discovered in making these observations. An east wind always raised the positive or plus electrification; while when raining the potential of the atmosphere was always observed to be negative or minus.

In Italy, Professor Palmieri found that the condition was plus or positive when no rain, hail, or snow was falling within ninety-five miles of the place of observation. Also, if minus was found in the atmosphere, although there was a clear sky, downfall of some description was sure to be found near. All the phenomena point to the earth and atmosphere as constituting a huge Leyden jar, the earth taking the place of one of the tinfoil plates, the higher atmosphere of the other, while the intervening comparatively dry air is analogous to the glass jar. Large sparks have been obtained by sending several wires up to collect the electricity in the air and then bringing them almost in contact with a wire from the earth.

It has been noticed that powerful electric discharges attend volcanic eruptions and earthquakes. These are no doubt due to the enormous amount of mechanical energy expended and to the chemical action of water upon heated and molten rocks. Instruments called microphones, if buried in the earth, give warning of these eruptions before they occur.

One historical incident brought this discovery about. During one of the great eruptions, that of Mount Krakatua in 1883, the telephones in Singapore, which is over five hundred miles away, were rendered useless for talking, a great roar similar to that of a waterfall being heard, occasionally punctuated with sharp pistol like reports. This effect was traced as having its origin in a short length of cable submerged and affected by the tremors of the earth.

It is thought now that cyclones and water-spouts are also electrical in character. Professor Douglas, of Michigan, has produced an imitation cyclone in his laboratory by suspending a large circular disk of copper to silk threads and then charging the copper with electricity. The result is rather startling. As the plate is carried over the table it whirls rapidly (while the threads take on the well known funnel shape) and picks up all loose objects in its path.



Little Babies Can't Live On Milk They Can't Digest

Cows' milk at best is too heavy a food for a little baby's frail stomach. Even when you change it with great care, it still holds curds which only a calf's stomach was intended to digest.

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