ous, apparently the inverted shadows of cumuli upon a very remote horizon. In this, on the contrary, the serrations are large, as if caused by the intervention of cloud-masses upon a near horizon.

It seems evident that the reflecting stratum of haze in these late glows was very low down as compared with the Krakatoa haze. The shadow of the horizon was projected upon a haze-canopy quite close at hand. Hence also the early production of the primary glow, and the rapid following of the secondary. For the same reason, the extent of lower atmosphere traversed by the sun's rays during the repeated reflections was greatly reduced; less of red was consequently shown, the other colors being only partially intercepted. Again, the twice reflected rays still retained force for a slight but definite third reflection, in which a pure though faint red appears.

We have as yet no cable, though in strong hope of one soon. No foreign mail has reached us since the 6th instant. One is due to-morrow, and we hope to hear of some adequate cause to which this remarkable phenomenon may be owing.

SERENO E. BISHOP.

Honolulu, July 25.

"Suggestion."

A FEW evenings ago I went to a friend's house to hear the phonograph. It was reproducing with fidelity the music of a band. To promote the illusion, I closed my eyes. Presently an air was played that sounded familiar, though I failed to recognize it. Neither did I strive to, for my attention was concentrated on the quality of the sound. As I listened, however, I became conscious of a set of surroundings: a pair of eucalyptus trees opposite, a large domed building to my left, a street of white flat-roofed houses on which I looked down, even a familiar sign-board caught my eye (the inscription ought to have been "Biblioteca Pública"), the strains of the military band in the plaza coming through the star-lit night. Involuntarily my eyes opened, and I caught my breath at sight of the lamps and assembled company of a drawing-room; for I had been listening, from the *azotea*, or roof, of my former residence in the little Mexican city, to a favorite *danza* air played by the regimental band in the neighboring plaza. The change was so very startling that it made my heart pump. I closed my eyes, and though I did not again lose consciousness of where I was, the Tepic picture materialized again as vividly, and with all the detail that could have been present to the eye of sense. I requested that the air (the *danza*) might be again put through the instrument, and while it played, I still held the picture, and had wandered off into a brown study, a thousand Mexican images and incidents rising of their own accord and passing before the imagination. While this was going on, and without my becoming conscious of any change in the source of suggestion, the picture became blurred, faded, and indistinct, and the train or procession of incidents broken and desultory. This led to my consciousness that a different air — a German one — that I had never heard from a Mexican band, was now proceeding from the apparatus. W.

San Francisco, Cal., Aug. 10.

Minute Aeronauts.

DURING the year 1875, while engaged in some scientific investigations in Contra Costa County, Cal., my attention was attracted to the numerous webs floating in the air. Some were wound together so as to resemble small pledgets of cotton, others were long streamers. After having made several inquiries as to their cause but gaining no satisfaction, I sat about an investigation. I started up a high hill from which all these webs seemed to have their origin. During my ascent I noticed that my hat and clothing began to be covered with webs, and finally I discovered a small spider spinning a web from my hat brim to the ground. When it reached *terra firma* I sat down to watch it and to study its movements. It immediately searched out a slender stalk of a weed and made its way to the top. It remained there for a few moments perfectly still, as if it was taking observations. Then it began spinning web, and by a peculiar motion of its legs it would roll or gather the web in a mass, and when enough had been accumulated in this manner to carry the little creature, it would let the flaky mass flow out to the winds. When it had thus formed a little parachute, or balloon, it would swing itself out in the air and sail in obedience to the winds. Continuing my journey up the hill I noticed scores of these spiders rigging their aerial ships preparatory to visiting some distant place. When near the top of the hill I was surprised to see webs sailing hundreds of feet above the summit. I turned my field glass in a direction toward the sun, where I could best discern them, and as far as my aided eye could reach I could still see them. They probably came from a great distance, as they were five or six hundred feet above the crest of the hill. When these little aeronauts came near the ground in their travels, they would descend on a web and abandon their balloon. I watched these spiders for hours, and none of them ever made a mistake as to the quantity of the web that would carry them. They could in this way travel hundreds of miles in a day.

R. I. BROMLEY, M.D.

Queries.

47. WHAT BIRDS ARE THESE? — (1) Head and back, black; breast and belly, rich reddish brown; length, seven inches; from tip to tip of extended wings, ten inches; sides of bill, slate; legs, black; Insessorial; bird seen in orchard. (2) Breast, yellow; back, yellowish olive-green; throat of male, black; male larger than female; bill, conical; length, medium or rather long; size of bird described above or smaller; song similar to bird described above. Nests in orchard, top of tree; nest composed of grass, not placed in fork of branches, but suspended, — in which it deposits three cream-colored eggs, black-blotched at the larger end; food, worms. (3) Breast of male, yellowish with black spot; back, dark brown and white; striped or mottled; bill rather large, short, conical. Of two nests seen, one was in a meadow, about eight inches from the ground, supported by the grass, and the other three feet high, in a roadside hedge: both contained four blue-green eggs. Size of wood-pewee; song, short; seen in fields; female rather smaller and duller colored, and lacking the black spot on breast. There is a yellowish stripe above the eye. L. W. N.

Answers.

47. THE first and second birds described are orchard orioles (*Icterus spurius*), the brown and black one being an old male; the yellow olive one with black throat the male in its first year. The last bird is the black-throated bunting or dichcissel (*Spiza americana*.

INDUSTRIAL NOTES.

The Union Electric Car Company.

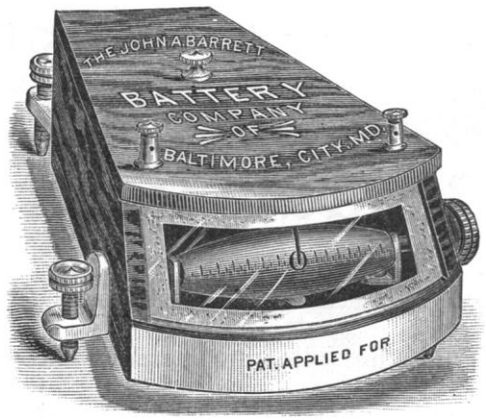
CARS operated on the system controlled by the Union Electric Car Company of Boston, Mass., will soon be running between the towns of Beverly and Danvers, Mass. One of this company's cars was run on the West End Railroad in Boston for eighteen months, never failing to do what was expected of it. This company uses dynamos and motors of the United States Electric Light Company's make, and intend to use either the storage, overhead, or conduit system, or a combination of all three, as may be found expedient. One of the peculiar features of the Union company's system, for which they hold a patent, is the charging back, while using a series motor, into the battery or line, while stopping the car or holding it back in going down grade, the motor being converted into a dynamo for the time, deriving its power from the momentum of the car.

Another feature of this system, also patented, is the use of a peculiarly formed cut gearing for transmitting motion from the motor to the wheel-axle. The gearing is inclosed in a dust-proof case, partly filled with oil, so that the gearing runs in an oil-bath, insuring thorough lubrication and decreasing the friction and wear of the gear-teeth. The company claims that this one feature saves a large percentage of power besides greatly increasing the life of the gearing.

The Barrett Mil-Ammeter.

The mil-ammeter shown in the accompanying sketch has been designed especially to meet the wants of the medical practitioner, and, with this end in view, has been made as compact and uncomplicated as is consistent with accuracy.

The question of accuracy has to be carefully considered in instruments of this kind, for the present tendency in the application of electricity to medicine and surgery is to obtain results based upon such systems of measurement as shall be comparable at any locality.



THE BARTLETT MIL-AMMETER.

The John A. Barrett Battery Company's mil-ammeter is believed to be an important improvement over most instruments of its class, and it embodies in its construction several features which are entirely novel.

Of these, the most important is the manner of rendering the metre capable of measuring currents of very great differences in value. This is secured by a system of shunts which are automatically thrown into circuit simultaneously with a corresponding change of the scale. The instrument is provided with three independent scales, whose ranges are respectively 0-5, 0-25, and 0-250 milli-ampères. By turning a screw at the side of the case, these scales are made visible one after the other, and at the same time the corresponding shunt is put in action, so that correct readings may be taken at once.

The metre is also provided with a screw-clamp, which removes the pivoted needle (the needle having a jewel pivot) from its bearing; and when this is adjusted, the instrument can be carried around with little care and with almost perfect safety.

Recently the range of these metres has been extended, so that they now read up to 1,000 milli-ampères.

Electrical Train Heating.

The Burton Electric Company, of Richmond, Va., have recently been making some experiments with their electric heaters for railway cars, a Sprague electric car being used for the purpose. An 80 volt current was used. Each heater had a resistence of 35 ohms, and required 2⅛ ampères of current to raise the temperature 200 degrees Fahrenheit. The heater is composed of a resistance coil, inclosed in a cast iron case provided with projections for increasing the radiating surface. The wires of the resistance coil are covered with powdered clay, to absorb the heat and prevent the wires from being burnt out. In the experiments mentioned fourteen heaters were used, absorbing three and a half electrical horse-power. The heaters were connected in multiple arc. In practice it is proposed to generate currents on trains under way by means of dynamos driven from the car-axles, the cars to be heated before starting out by currents from stationary dynamos at the stations.