SCIENCE:

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

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THE NEW YORK *Evening Post* published, in its issue of Jan. 9, a letter from Cornell University which has a singular tone, and makes most remarkable statements. It asserts that some of the ablest professors in the literary branches of the university are proposing to resign, because, as they state, they are unable to see that progress in their own departments which has for some years past distinguished the technical schools of the university. It is said, that, although the academic departments have been continually strengthened by the addition of new departments and of able men to the staff of professors and instructors, these departments still fall behind the others in their rate of growth. This state of things is attributed to the fact that the price of tuition has been increased, though it is not stated why this increase should affect their departments more than others. In all institutions of learning the cost of the technical instruction has been from the first, both to the institution and to the student, greater than purely literary instruction; and the flocking of students into them, in spite of this disadvantage, is as observable in other colleges as in that from which this curious complaint comes. The real state of the case is, we are confident, that the establishment of technical education meets the need and fulfils the desires of a very large proportion of young men who have no inclination to defer going into business for the purpose of getting an education of the older sort, — a mistake, we think, — but who are keen enough to see that certain branches of business must be most successfully pursued by those who have had the professional preliminary training, not education in the usual sense of that term, which is required to give the novice a good hold upon its principles and practice. The profession of engineering, for example, has become a learned profession; and the graduates of these professional schools are more carefully and remorselessly sorted out from the great mass than are those who desire to enter either of the older, so-called learned professions. Engineering schools often graduate not more than one-third their entering classes. It is not at all likely that acute and learned professors are proposing to leave any such good positions as are held at Cornell, or other great universities, on this account. The fact is, that the state of things noted is perfectly natural and proper; and the result is, that every professor of ability and ambition takes advantage of his good fortune in having smaller classes to prosecute his studies and his researches, and thus to teach the world, as well as his own students, both better and more widely. Any such positions vacated in any of our colleges will be gladly taken by brighter men who seek just this opportunity.

LETTERS TO THE EDITOR.

[Continued from p. 48.]

The Skeleton in Armor.

PROFESSOR ANDERSON was correct in saying that the skeleton, immortalized by Longfellow, was discovered at Fall River, Mass., in 1831; and not in 1837, as Mr. Beauchamp states on p. 26 of your last number (Jan. 9, 1891).

The actual date of the discovery was April 26, 1831, and the earliest account of it was published in *The American Magazine*, vol. iii. p. 434 (August, 1837). This was copied into Barber's "Historical Collections for Massachusetts," p. 123; and from that source Col. Stone transferred it to his "Life of Brant." This may account for Mr. Watson's having omitted Stone from his list of authorities. Subsequently, in 1839, several other skeletons were discovered in about the same locality, near the boundary-line between Fall River and Tiverton, R.I., accompanied by precisely similar objects as the first. The original skeleton, which had been preserved in the Museum of the Troy Athenæum ("Troy" was the old name of Fall River), was destroyed by a fire about the year 1843. Some of the relics discovered with the skeletons disinterred in 1839 are now to be seen at the Redwood Library in Newport. These different discoveries of similar interments, some years apart, have occasioned the confusion of dates.

A few years ago a skeleton was discovered at Centreville, on Cape Cod, with a brass breastplate precisely like the one originally found in 1831. This is described by Henry E. Chase in the "Smithsonian Report," 1883, p. 902.

It is worth noticing, that besides the "flat, triangular arrow-heads of *sheet copper*," to which Mr. Beauchamp refers as having been recently found in the Iroquois district of New York, similar in shape to those made of brass disinterred with the skeleton in 1831, like objects, also made of sheet brass, have not infrequently been met with in other localities (see ABBOTT'S *Primitive Industry*, p. 420; JONES'S *Antiquities of the Southern Indians*, p. 251; *Reports of the Peabody Museum*, ii. p. 732, iii. pp. 35, 195; *Reports of Long Island Historical Society* (1878–81), p. 40; *Smithsonian Report*, 1883, p. 901).

We learn whence the Indians procured the brass of which these arrow-heads were fabricated, from the account given in Underhill's "History of the Pequod War" (*Collections of Massachusetts Historical Society* [3d series], vol. vi. p. 17), who tells us that a Dutch trader was prevented from bartering with the Pequods on the ground that they were to be supplied in part with "kettles, or the like, which make their arrow-heads." Sir Ferdinando Gorges, earlier than this, had complained about "disorderly persons," who sold the savages "arrow-heads and other arms" ("Description of New England," *ibid.* p. 70).

The earliest notices of the Indians often speak of their arrows as being headed with brass. This was the case with those "taken up" and sent to England in the first encounter of the Pilgrims

with them (MOURT'S *Relation*, p. 55 [Dexter's edition]). William Wood (*New England's Prospect*, part ii. chap. xvii. p. 101) speaks of them as made of this material: so does the Rev. Francis Higginson ("New England's Plantation," in YOUNG'S *Chronicles of Massachusetts*, p. 257).

Undoubtedly the Indians found it easier to cut up brass kettles for this purpose than to pound out with their stone hammers pieces of native copper. This they were in the habit of doing, according to Brereton ("Brief and True Relation of the Discovery of the North Part of Virginia," in *Collections of Massachusetts Historical Society* [3d series], vol. viii. p. 91).

HENRY W. HAYNES.

Boston, Jan. 13.

Meteorology and Mathematics.

AT a time when the tide of meteorological controversy in your columns runs high and the general outcry is for revision of the old theories,— all apparently because Dr. Hann last spring made some erroneous deductions from observations in the Alps, which has not convinced anybody (*vide* Hazen),— you may permit me to add my small share to the general conflagration, out of the ashes of which the true Phœnix may some day be expected to rise in all its glory.

What I here wish to sacrifice on the altar of truth is the so-called mathematical treatment of the circulation of the atmosphere; and I take occasion from a letter by William Ferrel in your issue of Jan. 2, wherein the writer complains that Dr. Hann has never attempted to show that his results have been deduced from erroneous principles or processes.

I am not aware that any mathematician has ever attempted to show, on rational mechanical principles, what would be the motion of a body of air moving over the surface of a rotating globe,— not over the free and empty surface, but on the bottom of the air universally enveloping and rotating with this globe, being part and parcel of this air itself,— but I think it can be shown, by looking ever so little into the true nature of this subject, that the problem is far more complicated than Professor Ferrel seems to imagine.

As the speed wherewith places at different latitudes on the earth's surface rotate differ in proportion to their distances from the axis, so it is concluded by Ferrel and others that a particle of air is deflected towards the east when moving towards the poles, and towards the west when moving towards the equator.

In proportion, however, as the speed of rotation of the particle of air changes while it moves from latitude to latitude, so also the centrifugal force to which it is exposed changes; and therefore, if a change in the former should have the effect of deflecting a current of surface air laterally, so also the effect of the latter must be to deflect the current in a vertical direction. The result hereof is that all pole-bound currents should appear as upper currents, and the surface wind should always be directed more or less towards the equator, and never in the opposite direction. This, however, does not agree with observations. There is a continuous current of surface air round the border of any anticyclone, while in strict consequence of Professor Ferrel's theory we should only expect to find this current round one-half the circumference of the high pressure, the other half being deflected into an upper current.

According to the way the writer was taught applied mathematics (a discipline, by the way, incomparably more difficult to master than mathematics itself), it is not admissible to pick out one of the forces acting upon a body in motion, and ignore another of equal importance, simply because it does not suit our purposes.

In a paper, "On the Cause of Trade-Winds," read before the American Society of Civil Engineers Dec. 18, 1889 (see "Transactions," vol. xxiii. August, 1890), the writer allowed himself to suggest how the gyratory motion of the surface air might be accounted for independently of a supposed effect of the earth's rotation, which theory, as we have just seen, doesn't bear closer inspection; and one of America's most eminent engineers, Mr. Charles Macdonald, got up at the meeting, and declared the explanation given the only rational one he had ever heard, and well worth the most careful study. I therefore beg to call the reader's attention to the contents of this paper; and, by comparing my diagrams with the isobaric charts over the North Atlantic for the autumn of 1889, he may see the reason why Dr. Hann found the temperature of the anticyclonic air in the Alps so exceptionally high.

FRANZ A. VELSCHOW, C.E.

Brooklyn, Jan. 7.

The Education of the Deaf.

SPOKEN language is the product of the mind enjoined with the enjoyment of all the senses. Its acquisition is facilitated through the sense of hearing, but the latter is not indispensable to it; and to its reproduction by the deaf (without its musical intonation) a normal throat and mouth are requisite. Dr. Gillett says, "This [intelligence] the deaf-mute has perfectly" (*Science*, Dec. 26, p. 355). As most of the deaf possess these requirements, the question that now arises is this: "Is it expedient to invent an artificial sign-language, which of course presupposes articulate speech, in order to impart the latter to the deaf?" Emphatically, no. The oral schools now in existence in this country prove this fact beyond the shadow of a doubt. One of Dr. Gillett's objections is this: "For, while he [the deaf] may utter distinct articulate sounds for others to receive, he cannot receive them himself, and is consequently thrown back upon the visible movements of the superficial parts of the organs of voice, which are chiefly the lips" (*Science*, Dec. 26, p. 357). The deaf will read from the lips-mouth readily when spoken to without voice, that is, mutely; and it is a phenomenon that they are enabled to recognize even the distinction between being addressed audibly and mutely. They will often converse mutely with each other in the school-room, when desirous of not being overheard by their teacher. Lately one of my patients happened to be a Chinaman. On inquiring of him what he uses at his meals, — a fork and a knife, or chop-sticks,— he said that at home he uses the latter, but when eating at a restaurant he uses the former. Early education and impressions are lasting. The same is applicable to those mutes who are educated by the combined system, where an artificial sign-language forms the basis of instruction. When a mute educated by that system meets a deaf-mute who was taught by the oral system, the former will naturally address the latter by signs. To start the conversation, the first question perhaps will be, "Do you know Mr. P—t?" The sign for "Mr. P—t" is this: closing the thumb and all the fingers except the forefinger, with which he taps himself at the temple. The other repeats the sign for "P—t," shakes his head, and indicates by expressions that he does not know what this sign means; then the former spells with his fingers the words "P—t, teacher;" and such conversations may occur so often that the one learns the meaning of signs from the other. The deaf educated by the oral system become so ambitious that they make efforts when in a small circle of society, by constant watchfulness, to follow the connection of the conversation, and try to hide their infirmity. They are even ashamed to use signs. I would gladly go extensively into the details of Dr. Gillett's article on the education of the deaf, but the pressure of professional duties will not permit me to devote the time necessary. I would like, though, to direct Dr. Gillett's attention to Hon. Gardiner G. Hubbard's article in *Science* of Dec. 19, to which I have to make the one exception only, that the first oral school in this country was established in this city, and was in operation in the fall of 1864 at No. 427 (old number 415) Eighth Avenue, consisting of two boarding and three day pupils.

B. ENGELSMAN.

New York, Jan. 8.

BOOK-REVIEWS.

The Science of Fairy Tales. By EDWIN SIDNEY HARTLAND. New York, Scribner & Welford. 12°. $1.25.

THIS volume is the latest issue in the Contemporary Science Series, and may be described as an attempt to group and classify the various stories of Celtic and Teutonic origin relating to elves and fairies, with illustrations from the stories of other nations. Mr. Hartland opens his work with a few remarks on savage ideas,