# SCIENCE

NEW YORK, MAY 20, 1892.

## THE GROWTH OF CHILDREN.—II.

In No. 483 of *Science* I have tried to show that measurements of children of a given age are, as a rule, not distributed symmetrically around the average, but that they are distributed asymmetrically, the curve being expressed by the formula—

$$\frac{(1+cu)}{M\sqrt{2\pi}}e^{-\frac{u^2}{2M^2}}.$$

In this expression $c$ is a small constant, $M$ the mean variation, and $u$ the deviation from that measurement which belongs to the individual which will finally be an average individual in regard to the measurement under consideration and whose development corresponds exactly to that of its age. In this sense the measurement may be called that of the average individual, although it is not the average of all the measurements.

Supposing an extensive series of observations on children of a certain age to be given, the question arises, how to find that value which belongs to the average individual and how to find the mean variation. The number of observations between the limits $a$ and $b$ will be

$$\int_a^b \frac{(1+cu)}{M\sqrt{2\pi}}e^{-\frac{u^2}{2M^2}}du = \int_{\frac{a}{M\sqrt{2}}}^{\frac{b}{M\sqrt{2}}} \frac{1}{\sqrt{\pi}}e^{-t^2}dt - \frac{cM}{\sqrt{2\pi}}\left(e^{-\frac{b^2}{2M^2}} - e^{-\frac{a^2}{2M^2}}\right)$$

Whenever $a$ and $b$ remain the same multiples of $M$, the value of this integral depends solely on $\frac{cM}{\sqrt{2\pi}}$ and a table of the values of the integral may be computed. It is convenient to assume $a = -\infty$ and to compute the integral. Following is a brief table of the integral:—

$$\int_{-\infty}^{\frac{b}{M\sqrt{2}}} \frac{1}{\sqrt{\pi}}e^{-t^2}dt - \frac{cM}{\sqrt{2\pi}}e^{-\frac{b^2}{2M^2}}$$

$$\frac{cu}{\sqrt{2\pi}}$$

| $b$ | −0.10 | −0.08 | −0.06 | −0.04 | −0.02 | 0.00 | +0.02 | +0.04 | +0.06 | +0.08 | +0.10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $-3.0\,M$ | 0.0025 | 0.0023 | 0.0021 | 0.0018 | 0.0016 | 0.0014 | 0.0012 | 0.0010 | 0.0007 | 0.0005 | 0.0003 |
| $-2.5\,M$ | 0.0106 | 0.0097 | 0.0088 | 0.0080 | 0.0071 | 0.0062 | 0.0053 | 0.0044 | 0.0036 | 0.0027 | 0.0018 |
| $-2.0\,M$ | 0.0362 | 0.0335 | 0.0308 | 0.0281 | 0.0254 | 0.0227 | 0.0200 | 0.0173 | 0.0146 | 0.0119 | 0.0091 |
| $-1.5\,M$ | 0.0990 | 0.0925 | 0.0860 | 0.0795 | 0.0731 | 0.0666 | 0.0601 | 0.0537 | 0.0472 | 0.0407 | 0.0342 |
| $-1.0\,M$ | 0.2212 | 0.2091 | 0.1970 | 0.1849 | 0.1727 | 0.1606 | 0.1485 | 0.1363 | 0.1242 | 0.1121 | 0.1000 |
| $-0.5\,M$ | 0.3967 | 0.3791 | 0.3614 | 0.3438 | 0.3261 | 0.3085 | 0.2909 | 0.2732 | 0.2556 | 0.2379 | 0.2203 |
| $0.0\,M$ | 0.6000 | 0.5800 | 0.5600 | 0.5400 | 0.5200 | 0.5000 | 0.4800 | 0.4600 | 0.4400 | 0.4200 | 0.4000 |
| $+0.5\,M$ | 0.7797 | 0.7621 | 0.7444 | 0.7268 | 0.7091 | 0.6915 | 0.6739 | 0.6562 | 0.6386 | 0.6209 | 0.6033 |
| $+1.0\,M$ | 0.9000 | 0.8879 | 0.8758 | 0.8637 | 0.8515 | 0.8394 | 0.8273 | 0.8151 | 0.8030 | 0.7909 | 0.7788 |
| $+1.5\,M$ | 0.9658 | 0.9593 | 0.9528 | 0.9463 | 0.9399 | 0.9334 | 0.9269 | 0.9205 | 0.9140 | 0.9075 | 0.9010 |
| $+2.0\,M$ | 0.9908 | 0.9881 | 0.9854 | 0.9827 | 0.9800 | 0.9773 | 0.9746 | 0.9719 | 0.9692 | 0.9665 | 0.9637 |
| $+2.5\,M$ | 0.9982 | 0.9973 | 0.9964 | 0.9956 | 0.9947 | 0.9938 | 0.9929 | 0.9920 | 0.9912 | 0.9903 | 0.9894 |
| $+3.0\,M$ | 0.9997 | 0.9995 | 0.9993 | 0.9990 | 0.9988 | 0.9986 | 0.9984 | 0.9982 | 0.9979 | 0.9977 | 0.9975 |

The series of actual observations must correspond to one of these theoretical curves. We must find those values of $c$ and $M$ which agree most nearly with the curve of the observations. $c$ and $M$ may be determined from any two values of the integral. The most probable values will be those which are found by taking into consideration all the given values. This may be done in the following way: We will call the value for which $u = 0$, $U$; then, any observed value

$$Y = U + u.$$

The average of all observed values

$$A_1 = \int_{-\infty}^{+\infty} \frac{(U+u)(1+cu)}{M\sqrt{2\pi}}e^{-\frac{u^2}{2M^2}}du$$

$$A_1 = U + cM^2 \tag{1}$$

The average of the squares of all observed values

$$A_2 = \int_{-\infty}^{+\infty} \frac{(U+u)^2(1+cu)}{M\sqrt{2\pi}}e^{-\frac{u^2}{2M^2}}du$$

$$= U^2 + 2UcM^2 + M^2$$

$$A_2 = U^2 + 2U(A_1 - U) + M^2$$

$$A_2 = -U^2 + 2UA_1 + M^2; \text{ and} \tag{2}$$

$$U = A_1 \pm \sqrt{M^2 - (A_2 - A_1^2)}. \tag{3}$$

By substituting this value in (1) we find

$$\frac{cM}{\sqrt{2\pi}} = \frac{\mp\sqrt{M^2 - (A_2 - A_1^2)}}{M\sqrt{2\pi}} \tag{4}$$

By computing the average of the observations and of their squares, we can, therefore, find easily a series of the three values $U_1$, $M$, $c$, and we have to select the one which gives the most satisfactory agreement between the theoretical curve and the actual curve, i.e., the one in which the sum of the squares of the differences between the two curves are a minimum. The actual computation becomes a little simpler by substituting

$$Y = C + y \text{ where } C \text{ is equal or nearly equal } A_1.$$

The average of all $y$ $\quad a_1 = U - C + cM^2 = 0$

The average of all $y^2$ $\quad a_2 = (U-C)^2 + 2(U-C)(A_1 - U) + M$

$$= (C - A_1)^2 - (U - A_1)^2 + M^2$$

$$U = A_1 \pm \sqrt{M^2 - a_2 + (C - A_1)^2}.$$

I will show the application of this method by computing the stature of 12-year-old girls, measured in Worcester, Mass., 1891. 112 observations are available.

$$A_1 = 1446.6;\ C = 1447;\ a_2 = 5365.$$

$$U = 1446.6 \pm \sqrt{M^2 - 5364.84}.$$

We assume various values for $M$, and find the corresponding values for $U$ and $\frac{cM}{\sqrt{2\pi}}$.

| $M$ | $U$ | $\frac{cM}{\sqrt{2\pi}}$ |
|---|---|---|
| 73.8 | 1455.6 | − 0.049 |
| 74.0 | 1457.1 | − 0.057 |
| 74.2 | 1458.5 | − 0.064 |
| 74.4 | 1459.7 | − 0.070 |

Then the number of cases which are required by the theory may be found from the above table, while the observed number of cases are found by computing $U - 3\,M$, $U - 2.5\,M$, etc., and

counting the number of cases below these points. By this process we find the following results: —

| | $M = 73.8$. | | | $M = 74.$ . | | | $M = 74.2$ | | | $M = 74.4$. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Observation. | Theory. | Δ | Observation. | Theory. | Δ | Observation. | Theory. | Δ | Observation. | Theory. | Δ |
| $U - 3.0\,M$ | 0.0 | 0.2 | − 0.2 | 0.0 | 0.2 | − 0.2 | 0 0 | 0.2 | − 0.2 | 0.0 | 0.2 | − 0.2 |
| $U - 2.5\,M$ | 0.0 | 0.8 | − 0.8 | 0.0 | 0.9 | − 0.9 | 0.0 | 0.9 | − 0.9 | 0.0 | 0.9 | − 0.9 |
| $U - 2.0\,M$ | 0.9 | 2.9 | − 2.0 | 1.8 | 3.0 | − 1.2 | 1.8 | 3.1 | − 1.3 | 1.8 | 3.2 | − 1.4 |
| $U - 1.5\,M$ | 6.4 | 8.2 | − 1.8 | 7.3 | 8.5 | − 1.2 | 8.2 | 8.7 | − 0.5 | 9.0 | 8.9 | + 0.1 |
| $U - 1.0\,M$ | 18.9 | 18.9 | − 0.0 | 19.8 | 19.5 | + 0.3 | 19.8 | 20.0 | − 0.2 | 19.8 | 20.3 | − 0.5 |
| $U - 0.5\,M$ | 36.7 | 35.2 | + 1 5 | 37.5 | 36.0 | + 1.5 | 40.2 | 36.5 | + 3.7 | 41.1 | 37.0 | + 4.1 |
| $U$ | 59.0 | 53.9 | + 5.1 | 59.0 | 55.7 | + 3.3 | 59.0 | 56.4 | + 2 6 | 59.0 | 57.0 | + 2.0 |
| $U + 0.5\,M$ | 76.8 | 72.6 | + 4.2 | 76.8 | 74.0 | + 2.8 | 76.8 | 74.8 | + 2.0 | 76.8 | 75.3 | + 1.5 |
| $U + 1.0\,M$ | 84.0 | 86.3 | − 2.3 | 85.0 | 87.3 | − 2.3 | 85.9 | 87.8 | − 1.9 | 85.9 | 88.2 | − 2.3 |
| $U + 1.5\,M$ | 92.9 | 94.6 | − 1.7 | 92.9 | 95.1 | − 2.2 | 92.9 | 95.4 | − 2.5 | 92.9 | 95.6 | − 2.7 |
| $U + 2.0\,M$ | 99.1 | 98.3 | + 0.8 | 99.1 | 98.5 | + 0.6 | 99.1 | 98.6 | + 0.5 | 99.1 | 98.7 | + 0.4 |
| $U + 2.5\,M$ | 99.1 | 99.6 | − .5 | 99.1 | 99.6 | − 0.5 | 99.1 | 99.7 | − 0.6 | 99.1 | 99.7 | − 0.6 |
| $U + 3.0\,M$ | 100.0 | 99.9 | − 0.1 | 100.0 | 99.9 | + 0.1 | 100.0 | 99.9 | + 0.1 | 100.0 | 99.9 | + 0.1 |
| $\Sigma\,\Delta^2$ | | | 62.90 | | | 35.55 | | | 37.76 | | | 39.24 |

We find, therefore, the following series of values corresponding best to the series of observations: —

$$M = 74.0; \quad U = 1457.1; \quad \frac{cM}{\sqrt{2\pi}} = -0.057.$$

It is clear that this method gives the more satisfactory results the greater the number of observations. If the number of observations is small, a slight change in the value of $M$ may change any single value so much, that the regularity of the series $\Sigma\,\Delta^2$ is so much affected that the point where this sum becomes a minimum cannot be determined very accurately, although it may be possible to find it very nearly by assuming a sufficiently long series of $M$ on both sides of the probable value and applying graphical methods for finding the minimum. The differences between the average of all statures and the stature of the average child of a certain age is quite considerable. I have computed these values for the ages of 11, 12, and 13 years, of girls.

| | | | | | | |
|---|---|---|---|---|---|---|
| Girls: | 11 years. | Stature, Average: | 1370.0 | $U = 1386.9$ | $\Delta = +16.9$ |
| " | 12 " | " | " | 1446.6 | 1457.1 | +10.5 |
| " | 13 " | " | " | 1494.2 | 1506.5 | +12.3 |

As might have been expected, the statures during a period when the rate of growth is decreasing, are higher than the averages of all statures. This difference will continue until the adult stage is reached. It becomes also probable that the average individual does not grow as long as the tables of averages seem to indicate.

FRANZ BOAS.

Clark University, Worcester, Mass., April 25.

## THE BROOKLYN INSTITUTE AND POLITICAL SCIENCE.

THE Brooklyn Institute of Arts and Sciences is an institution that has earned a national reputation for its unique and successful educational work. Founded in 1824, it began five or six years ago, under the direction of Professor Franklin W. Hooper, a career of greatly increased usefulness and influence. To-day it has nineteen hundred subscribing members, organized in twenty-five departments of work, a property valued at $250,000, and an annual income from membership fees of upward of $11,000.

The membership of the institute, while it includes a considerable number of distinguished specialists in the various departments, is largely made up of people of general culture, and of young men and women who, without being able to continue their studies in college, are intelligent and thoughtful, and interested in one or more departments of study. The largest and, considering the standing of its members in the community, the most influential of all the departments of the institute is that of political and economic science, organized in December, 1889, with Professor Richmond Mayo-Smith, the specialist in statistical science of Columbia College, as its first president.

This department has already done a most excellent work in Brooklyn, in its department meetings, its courses of lectures upon subjects in political science, and in the addresses of distinguished speakers, given under its auspices, upon occasions of wide popular interest. It is largely to the stimulating influence of this work during the last three years, that the proposition, recently made to the department, to establish a school of political science, is due. Excellent as the lectures and anniversary meetings of the department have been, the members now demand something more systematic and specialized.

The plan proposed contemplates the ultimate establishment of a fully equipped school of political science with elementary and advanced courses in civil government, political economy, social science, and history, at nominal rates for tuition. The proposition to establish such a school was enthusiastically received at the recent annual meeting of the department; the only question now is as to the proper ways and means for putting the plan into practice.

It is evident that there are grave difficulties in the way of the successful carrying out of such a project. The lack of uniformity in the acquirements of the membership of the institute, and the influences tending to interfere with a faithful attendance upon courses once begun are not so great obstacles as the difficulty of finding instructors with the qualifications requisite for this particular work. The executive committee of the department, to whom the whole matter was entrusted with power to act according to their judgment in the matter, will not be likely to move hastily. Should sufficient encouragement be offered in the way of a moderate endowment, the school may be opened in the fall, and courses in some of the above mentioned subjects offered for 1892–93.

## PREPARATION FOR THE STUDY OF MEDICINE.[1]

INCOMPLETE is a discussion of this subject that does not include a consideration of the great value of an elementary knowledge of Latin and Greek.

I here most seriously disclaim any attempt to prove that devotion to Latin and Greek for the purpose of reading the literature of these languages is either requisite or even desirable as a preparation for the study of medicine. The field of modern literature and of modern science has become so vast and important that the average student will find neither time nor relative profit in the attempt to *master* the ancient classics.

I do, however, earnestly advocate the study of the rudiments — I mean simply the rudiments — of Latin and Greek, as most valuable labor-saving instruments in acquiring an English, a scientific and a medical education.

I ask indulgence, if I dwell somewhat at length on this portion of my subject, for I think we are in danger of losing sight of the many and great benefits, which every true student will receive from a judicious study of some things in

[1] Address of President E. L. Holmes Rusk, Medical College, Chicago.

these living dead languages. My argument turns on the word judicious — as applied to the extent and method of the study. The old methods, as unphilosophical as they well could be, and the undue time and labor devoted to the classics are worthy of radical change in the modern system of education.

Consider the vast array of technical terms and of common English words in our general and scientific literature, which are also pure Latin and Greek words. Look at this remarkable series of paradoxes! A young man may never have learned a single word of Latin or Greek, and yet under ordinary circumstances he has learned by hearing and reading English several hundred Latin and Greek words — if he is especially intelligent, at least three thousand. When he receives his degree of Doctor of Medicine, he has learned by the most painful toil several hundred technical terms taken from these languages — and still does not know a single word of Latin or Greek. He can count in Latin and Greek and yet is in ignorant bliss of the fact, for he could not give on demand a single numeral of these languages. He already knows the names of several colors, of several of the elements, and yet cannot tell one of them. He knows the Latin and Greek names of every member of the body, of every organ, tissue, fibre and fluid and of all their diseases, of all the senses and functions, and the words to express writing, describing and measuring. If, however, he was asked to give the Latin and Greek synonyms for any of them he could not give it.

Now for the pith of what I have to say! A rudimentary Latin, as also a Greek, grammar with the readers should be constructed for the primary object of teaching English — secondarily of teaching Latin and Greek.

The Latin grammar, save perhaps fifty connectives and other important words should contain scarcely forty pages of declensions and conjugations with only a very few rules. Every word of this grammar should be a good English word with possibly a slight change of a letter or syllable.

The Latin reader should contain at least a hundred and fifty pages of pure, even elegant Latin from classic prose and from poetry, almost every word of which would be a good English word.

We will present a few examples:

"Labor omnia vincit."

"Poeta nascitur, non fit."

"facilis descensus Averno:
Noctes atquedies patet atri janua Ditis
Sed revocare gradum superasque evadere ad auras.
Hoc opus, hic labor est."

Literae adulescentiam alunt, senectutem oblectant secundas res ornant, adversis perfugium ac solatium praebent, delectant domi, non impediunt foris, pernoctant nobiscum, peregrinantur, rusticantur."

"Homo sum, humani nihil a me alienum puto."

"Pallida Mors aequo pulsat pede pauperum taburnas Regumque turres."

These of course could be preceded by many simpler sentences, such as "Tempus fugit." "Res sacra est miser."

As the multiplication table must be committed to memory before the child can progress in arithmetic, so the few pages of declensions and conjugations must be memorized, that the beginner may become perfectly familiar with Latin terminations. With this preliminary exercise the scholar would then find no perplexities and would read almost at sight all the sentences in the reader.

In the vocabulary at the end of the reader with every principal word should be arranged all cognate words. With the definition of each word should be presented all English words derived from it.

Instead of exercises in transposing English into Latin, I would for the first year direct the energies of the pupil in the discipline of memorizing by easy tasks the classic sentences I have just described.

There seems to be a growing prejudice among educators of recent times against the practice of "learning by heart." I am convinced there is no way by which one can make more rapid progress in learning a language, either ancient or modern, than by committing to memory wisely selected sentences and phrases.

This is the natural method of learning a language. The child, from the time it attempts to utter its first syllable, never speaks that syllable perfectly till it has learned it by heart. In a single year the pupil will learn far more Latin than in two or three years by the methods usually pursued in our public schools.

The same plan should be pursued in teaching the elements of Greek. Thirty pages of grammar, each word of which should be an English word, except fifty connectives and other important words, would suffice.

There would be some difficulty in filling a Greek reader with gems of Greek, which would also be English. A competent Greek scholar, however, with the aid of fifty connective words not English, could compile a few such sentences and paraphrase others. He could arrange simple narrative of facts from history, biography, geography and mythology, in which the several hundred Greek words in our language could be formed into quite long sentences and convey much useful information.

Pardon me for reading a dry list of familiar syllables to call to your minds a multitude of Greek English words which, properly arranged, would fill many pages of instructive reading — words ending in graph, gram, meter, logue, asm, scope, sis; words commencing with dia, a or an, kata, para, apo, hypo, hyper, hydro, phos, sym or syn, phil, peri, tech, tel; words in which the following are important syllables, hepat, soma, stoma, ptoma, tony, pneuma, deme, crat, arch, bion, phon, tone, sarc.

There is a great need of such elementary text-books for the use of professional students, the preparation of which is worthy the attention of any ingenious and thorough Latin and Greek scholar. As far as I am aware, those which have been heretofore arranged do not possess vocabularies sufficiently extensive for the use of the medical student in studying technical terms. The portion devoted to grammatical forms is also inadequate. Moreover, the quotations and other sentences are not selected with reference to their elegance of expression and beauty of sentiment, which render them suitable for memorizing. Nor do they seem to be selected with special reference to the useful knowledge they convey.

The vocabulary should be sufficiently extensive to present not only all words used in our general literature, but also in the sciences. The following examples will illustrate my meaning: —

Tango, tangere, tetigi, tactum (contingo, contingere, contigi) = To touch. Tactus = Sense of touch. Tangent, tangible, intangible, tact, intact, contact, contiguous, contiguity, contingent, contingency (integer, integral ?).

| | |
|---|---|
| σαρκαξω = To tear flesh like dogs. | Sarcasm, sarcastic. |
| σαρκιζω = To play. | Sarcousa, sarcosis. |
| σαρκικος = Fleshy. | Sarcous, sarcocele. |

σαρκοφαγος = Flesh consuming. Anasarca.
σαρξ-κος = Flesh. Sarcophagus.
"κακων πε λαγος"
κακος = Bad, evil. Cacodyle — cachectic, cacexy — cacoethes, cacophony.
πελαγος = The Sea. Archipelago.

After this study of English, Latin, and Greek, the student can understand without difficulty the technical terms of every science in every modern language. He is also able to trace the derivation and meaning of new terms which are constantly formed in every department of knowledge.

He possesses the key by which he can acquire two modern languages in the time otherwise required for one; he enjoys a deeper insight into the spirit of all literature; he has a systematic knowledge of sufficient Latin and Greek to enable him to continue alone his reading of the classics if he has the time and taste so to do; he has increased and perfected the vocabulary of his own language, which, in very great degree, is a measure of mental development, and which possesses an intrinsic value almost beyond estimation.

This course is relatively easy, since the pupil makes use, through every step, of a large vocabulary which he has in great measure already at his command. After he has once learned the inflections, he makes rapid progress in comprehending the simpler forms of construction. He soon recognizes at a glance important "stems" in English words, even when they are disguised, as in microbe and autobiography, in telescope and episcopal, and in chylopoetic and poetry.

A vast majority of pupils in our high schools drop their studies at the end of their second year. They have spent so much time in struggling with an absolutely strange vocabulary and idioms that they have learned very little English and still less Latin and Greek. By the plan here advocated, they will have made progress in their own language and acquired considerable knowledge in the ancient languages — an excellent foundation for further study in any field. They will have stored their minds with many beautiful sentences, epigrams, mottoes, and gems of thought.

This course will not materially conflict with any method which a teacher may prefer.

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## NOTES AND NEWS.

At a meeting of the Botanical Club of Washington, held April 23, 1892, a committee was appointed to consider and report upon the questions of a botanical congress and botanical nomenclature. At a special meeting, called May 7, this committee presented a report, which was unanimously adopted by the Club, to the effect, that, while favoring the final settlement of disputed questions by means of an international congress, they do not regard the present as an opportune time, but that they recommend the reference of the question of plant nomenclature, first, to a representative body of American botanists; they suggest the consideration, by such a body, of the following questions, among others: The law of priority, An initial date for genera, An initial date for species, The principle "once a synonym always a synonym," What constitutes publication? The form of ordinal and tribal names, The method of citing authorities, Capitalization; that they recognize the Botanical Club of the A. A. A. S. as a representative body of American botanists, and commend to that body, for discussion and disposal, the subject of nomenclature as set forth in these resolutions. The report was signed by Lester F. Ward, Geo. Vasey, F. H. Knowlton, B. T. Galloway, Erwin F. Smith, Geo. B. Sudworth, Frederick V. Coville.

—M. Faure has recently invented a process of producing aluminium, according to *Engineering*, by means of which he hopes to reduce its price to about 8d. or 9d. a pound. Briefly speaking, his proposed method consists in obtaining, in a cheap manner, aluminium chloride and decomposing it electrically. This decomposition can be effected with a smaller potential difference than can that of the fluoride most frequently used for preparing aluminium by electrolysis, and at the same time a valuable bye-product is formed in the chlorine liberated. It is said, however, that there are considerable difficulties in the way of making the proposed process a commercial success.

— Opinions are being expressed by scientific workers in India, says *Nature*, in favor of the making of systematic experiments with snake poison. The Committee for the Management of the Calcutta Zoological Gardens are constructing, from private subscriptions a snake-house with the most modern improvements, which will contain specimens of all the principal poisonous snakes in the country. If the necessary funds were available, arrangements could be made to fit up a small laboratory in connection with the snake-house, for the purpose of conducting inquiries of all descriptions bearing upon the pathology of snake-bite and cognate subjects, and in future there would be no difficulty in arranging for the carrying out of any special experiments that might be required. It is understood that Dr. D. D. Cunningham, F.R.S., President of the Committee, would in that case be willing to take an active part in organizing and promoting such inquiries and carrying out such experiments, including the testing of the various alleged remedies for snake-bite, which are from time to time brought to notice.

— Captain Bower of the Indian Staff Corps has arrived at Simla from China, after a very remarkable journey across the Thibet Tableland, according to *Nature*. He had with him Dr. Thorold, a sub-surveyor, one Pathan orderly, a Hindoostani cook, six caravan drivers, and forty-seven ponies and mules. The Calcutta correspondent of the *Times*, who gives an account of the journey, says that Captain Bower, leaving Leh on June 14, crossed the Lanakma Pass on July 3, avoiding the Thibetan outpost placed further south. Journeying due east, he passed a chain of salt lakes, one of which, called Hor-Ba-Too, is probably the highest lake in the world, being 17,930 feet above the sea. Gradually working to the south-east, the explorer saw to the north a magnificent snowy range, with a lofty peak in longitude 83° and latitude 35°. After many weeks' travel over uplands exceeding 15,000 feet in height, where water was scarce and no inhabitants were to be seen, the party on Sept. 3 reached Gya-Kin-Linchin, on the northern shore of Tengri Nor Lake, in longitude 91° and latitude 31°. This is within a few marches of Lhassa, and two officials from the Devi Jong, or temporal governor of Lhassa, met him here and peremptorily ordered him to go back. But he refused to return, and a compromise was effected, guides and ponies being provided on his agreeing to make a detour to the north in order to reach the frontier of Western China. He reached Chiamdo on Dec. 31, only just succeeding in getting off the tableland before winter set in. He struck Bonvalot's route for a few miles when marching to Chiamdo. The country about this town is very fertile and well wooded. Three thousand of the monks of Chiamdo, who lived in fine monasteries, threatened to attack the party, but were deterred on learning that they carried breech-loaders. Captain Bower arrived at Tarchindo, an outpost on the Chinese frontier, on Feb. 10. The distance covered from Lanakma to Tarchindo was over 2,000 miles, all of which, save a few miles, has now been explored for the first time. The route for thirteen consecutive days lay over a tableland 17,000 feet high. Captain Bower is engaged in writing a report and completing his maps.

— "Of late years a considerable, and perhaps a disproportionate, amount of attention," says *Lancet*, "has been devoted to the scientific explanation of the state of unconsciousness. The public, as well as the professional, mind has been treated *ad nauseam* to discussions on hypnotism. The relations of trance and sleep to each other and to various phases of disease have elicited their share of logical ingenuity and of research. Quite recently again an allied condition — that of the numbed sensation consequent upon shock, such as that experienced in falling from a height — has attracted attention, though, beyond the assurances of some who have survived this experience that dread and pain are alike absent, we have no certain proof of the existence or the essential

character of this merciful torpor. According to Professor Heim of Zurich, who has devoted much time and thought to the investigation of the subject, the sensations at such a time of the sufferer, if so he can be termed, resemble somewhat those of drowning persons. In place of pain there is a process of rapid and involuntary mental activity, succeeded by stupor; series of old memories fly past the mind like scenes in some rapid vision, and life is revised, as it were, on the threshold of death. One is naturally tempted to inquire what is the explanation of this extraordinary state, in which the final catastrophe appears to be lost in the dream-slumber preceding it. The preoccupation of rapid cerebration, a species of shock in itself, might furnish a clue to the mystery — at all events, as regards the abolition of pain and fear. We cannot help thinking, however, that other causes must be operating along with this, which at first presents itself as the most obvious. The analogy afforded by drowning is, to our mind, especially suggestive. We may remark that here we have to do with a highly probable alterative of normal brain function in the stimulant-sedative influence of a disturbed circulation. The advent of asphyxia implies the turgescence of all venous channels and capillaries, and the increasing accumulation in these of carbonic acid. It appears to us that the same process must occur in falling. As a rule the fall takes place with head downwards. At the same time there is exerted upon the respiratory passages the suction force of the outer air in rapid transit, acting, we may conclude, in much the same manner as water in a large tube, which draws into its own volume the fluid contents of any small communicating channel. Thus it would seem at least a reasonable hypothesis that the coma of death in the circumstances referred to, like the same condition in various forms of disease, is essentially a process of deoxidation of tissue with accumulation of carbonic acid."

— A preliminary paper "On Drift or Pleistocene Formations of New Jersey," by Professor R. D. Salisbury, has been issued by the Geological Survey of that State. The detailed survey of the Pleistocene (drift) formations of New Jersey was begun about the first of July of last summer. It is the purpose of this survey to prepare maps which shall represent the distribution and the relation of the various types of drift formed by the ice, and by the waters emanating from it, during the glacial or Pleistocene period. It is also the purpose of the survey to prepare maps showing the distribution and relations of such other formations as shall be found to exist within the State, which were made contemporaneously with the drift, or during any part of the Pleistocene period. With each sectional map of the Pleistocene formations it is proposed to publish a descriptive text, explaining and describing the nature of the various formations mapped, the method by which they originated, their relations to each other and to underlying formations, and the notable changes which they have undergone since their formation. Along with such descriptions, which will be adequate to the understanding of the maps, and of the surface formations of the areas represented on the maps, there may be suggestions concerning the economic significance of the formations. Obligations contracted before this work was undertaken have limited the time which has thus far been devoted to it. Of the two months spent in the field, a considerable part was given to a general reconnoissance of that part of the drift-bearing area adjacent to the terminal moraine. Some of the general results of this reconnoissance are embodied in the report. In addition to the work of reconnoissance, the detailed study and mapping of the surface formations has been begun, and has covered that part of Middlesex County, which lies north of the Raritan, most of Union County, and the south-eastern portion of Essex County. Under the circumstances it was deemed advisable to make this report no more than a general discussion of the drift and of the Pleistocene formations in general, with especial reference to the phenomena in New Jersey. This report may therefore be regarded as in some sense a preface to the more detailed reports which will follow when the work which must form their basis is completed.

—The eighth annual meeting of the Conference of State Boards of Health will be held in Lansing, Mich., June 6, 1892. The meeting will convene at 10 A.M., in the Senate Chamber of the State Capitol. Governor Winans will informally receive the members of the Conference in the Executive Rooms in the State Capitol during the day or evening of June 6. The local committee has expressed the hope that the time of the members of the Conference will permit of their visiting the three other State institutions located at Lansing. Headquarters will be at the Hotel Downey, where special rates have been secured. The following questions for the consideration of the Conference have been received by the Secretary: Proposed by the State Board of Health of Connecticut, (*a*) What is the most practicable way of providing a hospital for contagious diseases for a town or community of a population of 5,000, the same to be always ready for the reception of patients? (*b*) What will be the average cost of maintaining it, per annum; the probable number of patients it would be called upon to receive being regarded in the estimate? Discussion opened by Dr. L. F. Salomon of New Orleans, La., and Dr. Louis Balch, Albany, N. Y. Proposed by the State Board of Health of Indiana, How strict should the quarantine be in cases of diphtheria and scarlet-fever? Discussion opened by Dr. Thos. J. Dills, Ft. Wayne, Ind., and a member of the Iowa Board of Health. The Michigan Plan of Sanitary Conventions, by Professor Delos Fall, Albion, Mich. Proposed by the State Board of Health of Louisiana, (*a*) What should be the relations of State and County Boards of Health? (*b*) What should be the relation of State Boards of Health to National Authorities? (*c*) What should be the relation of State Boards of Health to the State? Discussion opened by Dr. C. P. Wilkinson, New Orleans, La. Proposed by the State Board of Health of Pennsylvania, In view of the increasing frequency of communication between the Republic of Mexico and the United States, and of the constant prevalence of typhus fever in the former country, is there such probability of the introduction of that disease into the United States as to make it important for health officers along the southern frontier to use especial vigilance on that account? Discussion opened by Dr. Robert Rutherford, Houston, Tex., and Dr. L. F. Salomon, New Orleans, La. Proposed by the State Board of Health of Ohio, What measures can be enforced to prevent the spread of infectious diseases in rural districts? Discussion opened by Dr. J. T. Reeve, Appleton, Wis., and Dr. J. Berrien Lindsley, Nashville, Tenn. The relation of the Laboratory of Hygiene to the work of the State Board of Health, by Professor Victor C. Vaughan, Director of the State Laboratory of Hygiene, Ann Arbor, Mich. Proposed by the State Board of Health of Kentucky, Should State Boards of Health be charged with the administration of medical practice laws? Discussion opened by Dr. Henry B. Baker, Lansing, Mich., and Dr. Jerome Cochran, Montgomery, Ala. Proposed by the Provincial Board of Health of Ontario, (*a*) Has intra-State, inter-State, and International action to prevent the sewage pollution of streams become a necessity? (*b*) If so, what steps are practicable for bringing about conjoint action? (*c*) What practical methods are available for preventing such pollution? Discussion opened by Dr. Benjamin Lee, Philadelphia, Pa., and Dr. P. H. Bryce, Toronto, Ont. The public health work in Michigan, by Dr. Henry B. Baker, Secretary of State Board of Health, Lansing, Mich. Proposed by the State Board of Health of Tennessee, The practical working of inter-State notification. Discussion opened by Dr. P. H. Bryce, Toronto, Ont., and Dr. J. Berrien Lindsley, Nashville, Tenn. Proposed by the State Board of Health of Vermont, The part played in the spread of tuberculosis by the flesh and milk of tuberculous cattle. Discussion opened by Dr. C. H. Fischer, Providence, R. I., and Dr. Victor C. Vaughan, Ann Arbor, Mich. Proposed by the State Board of Health of Pennsylvania, Is the disinfection of baggage essential to effective quarantine? Discussion opened by Dr. C. H. Hewitt, Red Wing, Minn., and Dr. S. R. Olliphant, New Orleans, La. The "unfinished business" includes, report of the committee to formulate a plan for the creation and organization of county and other local Boards of Health, report of the committee to make a Codification of the Health Laws of the different States and Provinces, report of the committee on the Collective Investigation of Diseases, report of the committee on Vital Statistics, report of the committee on the Prevention of Consumption, report of the committee on the Pollution of Streams, and the Formation of River-Conservancy Commissions.

# SCIENCE:

*A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES.*

PUBLISHED BY

N. D. C. HODGES,

874 BROADWAY, NEW YORK.

SUBSCRIPTIONS.—United States and Canada.....$3.50 a year.
Great Britain and Europe..... 4.50 a year.

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## CURRENT NOTES ON ANTHROPOLOGY. — VI.

[*Edited by D. G. Brinton, M.D., LL.D.*]

### Proto-Historic Ethnology of Asia Minor.

A BEAUTIFUL book, just published in London, Perrot and Chipiez's "History of Art in Phrygia, Lydia, Caria, and Lycia," sums up in an attractive manner the authors' opinions about the ethnology of Asia Minor at the dawn of history. They recognize that the evidence all points to the western origin of the Aryan peoples then dwelling there. The Phrygians, Mysians, Bithynians, Lydians, Carians, Lycians, and Armenians, all spoke languages and dialects belonging to the Aryan stock, and all can be traced back to their ancient seats in Thrace. Of these, the Lycians, whose tongue presents marked analogies to Zend and Sanscrit, were probably the first to cross the Hellespont.

This great Hellenic migration doubtless occupied centuries. It was approximately coincident with two famous events in the history of the country — the fall of the powerful Hittite kingdom, and the Trojan war; in other words, it occurred about twelve hundred years before the Christian era. The Hittites fell beneath the attacks of these Greek invaders and the forces of Ramses III. of the nineteenth dynasty. A number of them took refuge in Cyprus, as it is just at this time that the Hittite influence on Cypriote art becomes visible. Though Perrot and Chipiez do not call attention to this latter fact, it is attested by recent excavations (reported in the *American Journal of Archæology*, Sept., 1891).

A materially different sketch of the subject is that laid before the Anthropological Society of Vienna in January last by Professor W. Tomaschek. He grants that the Phrygians, Armenians, Mæonians, Skaians, and Cabali were of Aryan blood and European origin; but he denies both of these traits for the Carians, Lykaonians, Pisidians, and Lycians. All these and many smaller tribes he would group into a widespread, isolated linguistic stock, along with the Leleges of the Grecian peninsula. Its easternmost branch were the Tiburani, who lived on the western slope of the Cilician Amanus, and whom he identifies with the Tabala of the Assyrian inscriptions and the Tubal of the Book of Genesis. The Alarodi of Lake Van were another member.

Physically, this stock was short and brachycephalic, and succumbed easily to Aryan and Semitic inroads. Fragments of its language can still be collected from the current dialects of Asia Minor, especially in Cappadocia; for instance, six, *lingir;* seven *tŭtli;* eight, *mŭtli;* nine, *danjar* or *tsankar;* woman, *lada;* child, *ŏne;* daughter, *zzemaza;* son, *tedäeme;* etc. These words show no affinity with any other tongue. The frequent locative terminations *assus*, *essus*, and *anda*, occurring throughout Greece and Asia Minor, belong to this ancient speech, and serve to define its limits.

The culture of its members was by no means savage, as the Cyclopean walls of Hellas were Lelegian structures, and the names and worship of Apollo, Artemis, and other Grecian deities were derived from the same source. So, at least, is Professor Tomaschek's opinion, whose article is printed in the last issue of the "Mittheilungen" of the society referred to.

### Ethnography of India.

Dr. Emil Schmidt is docent of anthropology in Leipzig and author of an excellent text-book, "Anthropologische Methoden." In recent numbers of the *Globus* he has given briefly the results of some of his studies on the physical characteristics of the natives of India. The article is illustrated from his own photographs and presents some highly interesting types.

Dr. Schmidt does not quite agree with the observations of Mr. Risley, to which I have alluded in *Science*, April 8. His own classification of the native types is as follows: —

1. Narrow nosed, fair skinned.
2. Broad nosed, fair skinned.
3. Narrow nosed, dark skinned.
4. Broad nosed, dark skinned.

No. 2 he acknowledges is merely a mixed type, resulting from intermarriage of the white Aryan with the Dravidian stock. The real contention comes on No. 3, the narrow nosed, dark skinned type. An example of these are the Klings, day-laborers, constantly seen in the commercial cities of the Straits and the neighboring islands. They are considered of Telugu or Tamil origin, but have fine and regular features, symmetrical bodies and superior beauty; yet their color withal is often that of the darkest shades of the scale. They have been considered of mixed descent, but against this theory their hue and the fixity of the type seem to militate.

In conclusion, Dr. Schmidt expresses himself as opposed to designating the two ground-forms of Indian ethnic types by the terms "Aryan" and "Dravidian;" because these are rather linguistic than ethnographic designations. Better, he thinks, refer to them as light and dark, platyrhinic and leptorhinic types.

### The Identity of Primitive Art-Motives.

It would be well worth while for those who seek to establish ethnic affiliations or prehistoric connections between nations, on the basis of the identity of their art and decorative designs, to peruse carefully the little work of Professor Alois Raimund Hein of Vienna, "Mäander, Kreuze, Hakenkreuze, und Urmotivische Wirbelornamente in Amerika" (Wien, Alfred Holder). It is the result of nearly a score of years' study of stylistic ornament and the development of design.

In this essay the author has confined himself to art-motives found among the native tribes of America, numerous exam-

eles of which he analyzes with a master hand. He reaches the conclusion, which I am convinced can never be overown, that the original and primitive expressions of the artistic sentiment reveal themselves everywhere in a series of motives which display a surprising and almost complete similarity. This practical identity continues high up in the evolution of art-forms. It is not to be attributed to any historic connection between nations, nor to any prehistoric relations or instruction, but solely to the unity of mind and its expressions through all humanity. "Thousands of ethnographic, religious, symbolic and artistic parallels, with which ethnography and archæology are making us familiar, are easily explained by the organic faculties of the mind of man. This is true for all zones and for all lands of the earth where man has slowly developed from simple to complex artistic conditions." Were these maxims fully understood, we should have fewer attempts to trace Greek and Assyrian back to Egyptian, or Central American back to Asiatic art, than has of late been the case.

**Native Fairs in Alaska.**

The early conveyance of articles of Asiatic manufacture far into America is matter of surprise for no one who is acquainted with the commercial and migratory habits of the natives of the Northwest Coast. As slaves are part of their stock in trade, Asian blood and features were introduced without a general or even partial migration of Siberic tribes across Behring Straits, for which, *du reste*, there is no evidence at all.

The times and places of these fairs were recenty stated by Mr. I. Horner from information supplied by Lieut. Miles C. Gorgas, U.S.N., in an address to the Numismatic and Antiquarian Society of Philadelphia, as follows: Beginning at the south, a fair is held in June at Port Clarence, just south of the narrowest part of the Straits. It is numerously attended by the Chukchis of Siberia, the natives of St. Lawrence Island, south of the Straits, and by others from Cape Prince of Wales on the American mainland. The second fair is held at Wotham Inlet on the north shore of Kotzebue Sound. It lasts through July and August, and is attended by about 1,500 people, some Siberians, but mostly natives, especially from Point Hope, these being the principal traders of the coast. A third fair is at Point Lay, and a fourth at Camden Bay, not far from the mouth of the Mackenzie River.

The trading boats make a regular round of these fairs, carrying articles in demand from one to the other; so that some from the far interior of Asia will in a few years be transported along the shores of the Arctic Sea, and southerly indefinitely into the centre of the continent. This has doubtless been going on for centuries, and would explain the presence even of Japanese and Chinese articles in ancient burial places — if such were ever found.

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## NOTES ON LOCAL JASSIDÆ.

AN interesting feature in the study of entomology is the fact that there are still a great many untrodden paths and plenty of work for the discovery of new species. In the Hemiptera there are still many forms unknown to science. In my collection of two or three seasons Professor Edward P. Van Duzee has found several new species; but only those belonging to the *Jassidæ* will be noticed here.

In his admirable paper on the genus *Phlepsius*, recently published by the American Entomological Society of Philadelphia, he enumerates several new species, and groups others under that genus, which to many have been known under other names; for instance, what we have known as *Bythoscopus strobi* Fitch is now to be known as *Phlepsius strobi* Fitch. This decision was rendered by Professor Van Duzee in 1890, and published in *Psyche*.

Our old and well-known species *Jassus irroratus* Say is now to be known as *Phlepsius irroratus* Say; it was at one time known as *Allygus irroratus* Uhler; and Burmeister, Walker, and Uhler knew it as *Jassus testudinarius* Burm.

The genus *Phlepsius* as now arranged by Professor Van Duzee is a step in the right direction, and his "synoptical table" of the species will be a great help to Hemipterists in studying this order of insects; it bespeaks a future for it and a basis for study equal to that projected by our able fellow-townsman, Professor Ezra T. Cresson, in the Hymenoptera.

The species in the Jassidæ taken by me in the locality of New York City number eighteen or more, some of which have as yet not been determined.

*Phlepsius strobi* is, according to our record, quite a rare species. Professor Van Duzee records but five specimens. Mr. Uhler's lot only contained one male from Fitch, and two specimens from Texas, one specimen from D. S. Kellicott, Ohio, and one female from myself. We notice by this the wide distribution of the species, yet but five specimens are recorded in Professor Van Duzee's paper.

It would be interesting and valuable to hear from the Entomological Society of Philadelphia, as well as from Professor Riley for the Government, in regard to this insect; also from Professor Osborn, who would know it, but, if he had had it in his collection, he would probably have sent it to Professor Van Duzee, to assist him in making up the valuable revision of this genus.

*Phlepsius fuscipennis* Van Duzee is a new species found by Professor Uhler and myself, and described from one pair sent him by Professor Uhler and fourteen males and two females sent by myself. Here, again, we have sufficient distribution to warrant the recording of more specimens; and we would like to hear from any source as to their habitat in other States; and this could be soon found out, were those species not known to collectors, and now in their collections, sent to Professor Van Duzee, for identification. With us they seem to be fairly abundant, and are exceedingly interesting, both on account of their rarity and markings.

Professor Van Duzee states, "that the dark colored species may be distinguished by their broad form, short inpressed vertex, and strongly wrinkled pronotum; the brown elytra of the males, spotted with white; some of the males exhibit the pale arcs on the front, and the ocelli may be black."

*Phlepsius fulvidorsum* Fitch has been taken by myself, but in limited numbers. It seems to have quite a wide distribution; but as yet Professor Van Duzee records as known to him but ten (10) specimens, and these from New York, Iowa, Maryland, and Texas. This must be a difficult species to determine, for, as good an Hemipterist as Professor Van Duzee is, he finds great difficulty in distinguishing between two predominant forms, which can only be well done by the study of a large series of specimens from an extended area; and if all who are interested in this order would send specimens to him and assist him, he would no doubt soon solve the problem and explain it to us so we could also know wherein the difficulty lay

Another new species, described by Professor Van Duzee

and taken by myself, is *Phlepsius humidus* Van Duzee. Though not uncommon, this species is recorded but once outside of New York State, by two or three examples labeled Delta R.R. I have taken it quite frequently, and Professor Van Duzee says "it is not uncommon about Buffalo, in low, swampy meadows and other humid situations." He has also taken it near Lake Ontario, and states that this is the "large variety mentioned in his list of Hemiptera from that locality, published in the *Canadian Entomologist*, for 1889, under the name *Allygus irroratus* Say."

*Jassus excultus* Uhler is now to be known as *Phlepsius excultus* Uhler. This species is well recorded from New York, through Texas, to New Mexico. As yet I have not collected this species, nor does Professor J. B. Smith, in his "Catalogue of the Insects of New Jersey," record it from that State. A thorough search will no doubt reveal its whereabouts in this locality also.

Among the Jassidæ collected by me in this locality, and determined by Professor Van Duzee, is *Cicadula 6-notata*. It is very common and easily taken with a sweep-net.

*Jassus subfaciatus* Say is also common, and Professor Smith records *Jassus clittellarius* Say, and *Jassus irroratus*, now known as *Phlepsius irroratus* Say. *Athysanus* (grypotes) is represented in my collection by four species, taken here, *tergatus* Fitch, and *unicolor* Fitch, and two new species named by Professor Van Duzee as *Athysanus galbanatus* Van Duzee and *Athysanus viridius* Van Duzee. None of the species are very abundant; and they are represented in my collection by from three to six specimens, although the former two species are much more abundant that the latter. Professor Smith gives *A. fenestratus* Fitch, *minor* Fitch, *nigrinasi* Fitch, *variabilis* Fitch, *striatulus* Fallen, and *unicolor* Fitch, as *Jassus unicolor* Fitch. No doubt all these species are found here, and as far as Fitch's types are concerned, we believe, belong to this State.

In Deltocephalus I have collected *inimicus* Say, and *Sayi* Fitch, both being quite rare as far as my collecting goes. Professor Smith has *inimicus* Say recorded as *Jassus inimicus* Say. *Scaphaideus* is represented by two species, one of them new to science, and the other *Scaphaideus immistus* Say.

*Athysanus* is represented by *Curtisii* of Fitch, which is not uncommon with me.

In the sub-family TYPHLOCIBINÆ, we have *Typhlocyba rosæ* Fitch, and other species not yet determined, one species being very common on *Ptelea trifoliata, L*, and of a delicate green color. One of the undetermined species may be *trycincta* of Fitch, and recorded by Professor Smith as occurring in New Jersey.

*Erythroneura vitis* Harris is common with us; but I have not as yet found *comes* Say, or *vulnerata* Fitch, both found and recorded from New Jersey, and the latter from New York State also.

In the genus *Empoa*, Professor Smith records *guerci* Fitch, *fabæ* Harris, and *rosæ* Harris, the latter now known as *Typhlocyba rosæ* Fitch, as before noticed.

Professor Smith also records *Cœlidea olitoria* Say, and *C. subbifasciata* Say. I have not as yet collected any of this genus, although, in the present unsettled state of the arrangement in several of the orders, it is quite impossible to state just what one has, until such an arrangement as Professor Van Duzee has given us with the genus *Phlepsius* is worked out for all the families.

It is to be hoped that hemipterists and all entomologists will assist specialists by sending them specimens; and more accurate data should be given, with the material, than, I must confess, I have been able to give in the past, so the distribution and numbers may be determined.

EDMUND B. SOUTHWICK, PH
The Arsenal, Central Park, New York.

## LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

*On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

### Readjustments of the Loup Rivers: Examples of Abstraction Due to Unequal Declivities.

REGRETTING that my article on the "Evolution of the Loup Rivers" has been misunderstood, partly on account of an error in drawing the map, I present herewith a corrected map (Fig. 1), showing the true location of the old channel connecting the head of Wood River with the South Loup at Callaway, also some additional features not shown on the first map.

In responding to the call of Professor Davis for "examples of the lateral abstraction of one stream by another *on a slope of planation*," I must premise that planation is wholly distinct from abstraction. The efficient factor in the former process is latteral corrosion, in the latter headwater erosion. Planation shifts one stream bodily over to another, whereupon both unite in that channel, below the point of contact, which is the lower of the two. In the process of abstraction the capturing stream does not itself shift over to the captured stream, but extends one of its tributaries across the original divide by headwater erosion.

Omitting, therefore, the phrase "on a slope of planation" from the question as propounded by Professor Davis, I will say that the phenomena in the Loup valley are such as to raise a strong presumption at least that some abstractions have occurred. As he remarks, "the slopes are in the proper direction for such abstraction." Moreover, the old empty channels are there as silent witnesses of adjustments already accomplished, and the ravines of greater slope and more vigorous erosion, leading into that stream which lies at a lower level to the north-east, have already captured much more than half of the space between streams, thus threatening further abstractions in the future.

In addition to the one at the head of Wood River I would cite as another example of abandoned channels the depression leading up to the Dismal River in the line of Mud Creek, the approximate position of which is roughly indicated by dotted lines, marked "Old Channel" on the map. Mud Creek is a weak stream in a great valley, itself as eloquent a witness of change as the dry valley above. It must have carried a large volume of water, and have been a worthy mate to the Middle Loup, before it was beheaded by the Dismal, a vigorous tributary of its neighbor on the north-east — the winning side in all these re-adjustments.

To show the actual position of existing divides, as indicating further abstractions, I have traced the water-shed by dotted lines for some distance between the North and Middle Loups, and between Cedar Creek and the North Loup and Calamus River. On the latter line the distances are 13½ miles from the divide to Cedar Creek, and 4½ miles to the Calamus. The eastward stream has already captured three-fourths of the territory. On the former line, at the south-east end, the divide is 12 miles from the North Loup and 6½ miles from the Middle Loup. Here two-thirds of the divide yields allegiance to the eastward stream. At the north-west end of the same line it will be observed that the water-shed is nearer to the North Loup than the Middle Loup. This is because the North Loup is a re-adjusted stream above the mouth of the Calamus. If we measure from the latter, which is the true original head of the North Loup, the divide assumes its normal position nearer to the higher stream lying to the south-west. The larger and longer stream, called the North Loup on account of its size, is really an overgrown tributary, which owes its superior vigor to the fact that it now flows more nearly in the line of maximum gradient than does the Calamus, or the unadjusted North Loup

below the confluence. The energy of westward headwater erosion is unmistakable. All of the Loups bend that way at their heads, and have their most vigorous tributaries on that side.

It is noteworthy that the North Loup, having no large, aggressive eastward neighbor, has retained its original head, the Calamus. It has itself encroached upon the territory of the Middle Loup, but that stream escaped capture by turning aggressor on its own account. Possibly its original head was captured by the North Loup. If so, it was after the Middle Loup had seized so much territory westward, including the head of the large valley in which Mud Creek now flows, that the conquest was a barren one. It was no more serious in its effects upon the Middle Loup

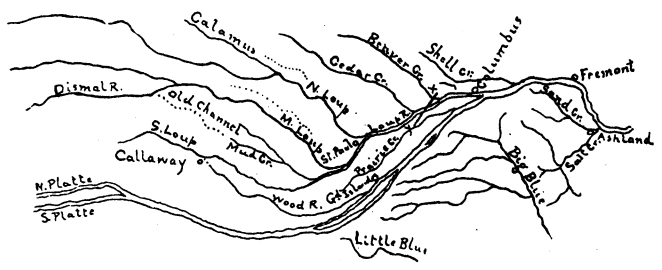


FIG. 1.

Drainage map of Central and Eastern Nebraska. The dotted lines along the Middle and North Loups mark the present water-shed, lying in each case nearer to the higher stream to the south-west. The short stream near $x$ is Lost Creek, so called because it disappears in the sands of the valley. The line $xy$ shows the trend of the buried cliffs of Cretaceous shales bounding the old gorge of the Platte.

than the capture of the Calamus by a tributary of Cedar Creek would now be to the North Loup.

Professor Todd has added some welcome and valuable contributions to this discussion (*Science*, Mar. 11, p. 148), but his objection to the "efficiency of abstraction," on account of the porosity of the strata in this region, does not appear to me to be well taken for two reasons. First, the impression given by his remarks, of the degree and extent of porosity, is exaggerated. It chimes with a widespread popular notion of extensive subterranean flows from one river to another, but the real exceptions to that general hydrographic law which predicates the volume of each river to be the product of rainfall on its own basin, are not much more frequent or striking here than elsewhere. There is no indication that the Blue receives any appreciable increment by subflow from the Platte, or the Salt from the Blue, although both are at a lower level than the larger stream to the west. Each has a volume which may all be accounted for by the size of its basin and the depth of annual precipitation. Those tributaries of the Salt which approach nearest to the Blue are the weakest; if subflow from the Blue were an important factor they should be the strongest. The divide is formed by a moraine of the first glacial epoch, running along the east bank of the Blue, where the words "Big Blue" are written on the map. This moraine is the cause of the peculiar arrangement of the tributaries of Salt Creek, and of the abrupt turn to the south of all the Blue rivers to form the Big Blue. It has the usual composition of a moraine — sand, gravel, and clay. Many examples of morainal lakes held up, and rivers turned aside, by such material, testify to the fact that it is not very porous.

Secondly, headwater erosion would not cease on account of subflow unless the latter absorbed the whole run-off. As long as there are any surface streams, and they are rather numerous in this region, they will erode their channels and, by virtue of the law of unequal declivities, push the divide towards the higher stream, ultimately abstracting the latter. If the subflow does rob them of some part of their volume and eroding power, the process will only be retarded, not prevented.

I leave it to Professor Todd to answer the question of Professor Davis respecting the deflection of rivers by rotation of the earth. He has already adduced the Platte as an example, assuming it to have flowed once in the channel of the main Loup. The accompanying profile (Fig. 2), reduced from one published by Chief Engineer E. S. Nettleton (Irrigation Survey, U. S. Dept. of Agriculture Progress Report, Part II.), will be useful in discussing this assumption. The Loup at St. Paul is 95 feet below the Platte at Grand Island. Since rivers do not shift from lower to higher levels, it is physically impossible that the Platte should have shifted from the Loup channel to its present position, unless there has been a great change of levels. But such change is claimed. Professor Todd thinks the Platte occupied the Loup channel ("the north channel already described" cannot be other than that of the main Loup, since it is said that "the Loups did formerly flow through to the Platte" in that position) "when it was flowing on a level seventy-five to a hundred feet higher, relatively, than at present." Ths would bring it up to the position of the dotted line O. C. Fig. 2, one hundred and ninety-five feet in the air above the present Loup. There are no flood-marks, or other evidences, to show that it ever flowed there. The "alluvian terrace," which is the most significant and interesting feature of Professor Todd's map, in its westward extension along the Loup, is obscured by a range of sand hills, which form a broken and ragged divide between the Loup and Prairie Creek. Its main mass, aside from the dunes blown up on its back, is *below the present channel of the Platte*. It therefore furnishes no evidence that the Platte ever flowed at a higher level between St. Paul and Grand Island. On the contrary, it furnishes distinct evidence that the same relative levels, the same relative gradients (the Loup having less fall than the Platte) and the same relative positions of the two streams existed as far back as the second glacial epoch, substantially as they now exist. Some obstruction at that time in the lower Platte, possibly an ice-dam near Fremont, raised the waters till they overflowed the divide at the head of Sand Creek. It is surprising that this new short cut did not become the permanent channel of the Platte. Possibly the ice-dam extended below Ashland, but with less elevation than at Fremont, thus permitting the new channel to be cut down to its level, but not to the level of the old channel. Hence the longer course by way of Fremont was resumed when the ice retired.

Both the Platte and the Loup are so heavily charged with sediment that a slight reduction of their gradients would cause deposition of silt, and this result of retarded flow would be felt in both streams far above the obstruction, but farther up the latter than the former on account of its lower gradient. The ice-dam ponded the Platte for some miles above it, producing still water, in which sediment rapidly accumulated. Thus was built up the eastern end of the terrace to a level "seventy to ninety feet above the

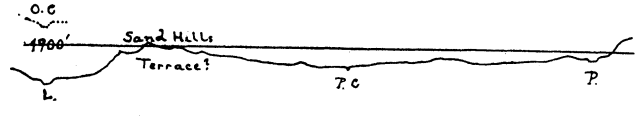


FIG 2.

Profile across the Loup, Prairie Creek, and Platte, running from St. Paul to Grand Island, Neb. Horizontal line 1900 feet above sea-level. *L.*, Loup River, 1775 ft.; *P.C.*, Prairie Creek, 1843 ft.; *P.*, Platte River, 1870 ft. above sea-level; *O.C.*, alleged old channel of the Platte.

Platte." Deposition, induced by retarded flow, an indirect result of the obstruction, extended far up the Loup on account of its low gradient. Professor Todd's map is correct in representing the terrace as following the Loup instead of the Platte above their confluence. From Columbus westward it is a Loup formation. Not only does it draw away from the Platte, but it also sinks below its level. It therefore furnishes no evidence of a change of levels, or of a shifting of waterways, but rather of the persistence of both as they now exist, since it fits well into present conditions.

Another reason for doubting this alleged shifting of waterways is found in the position and trend of the ancient rock trough of the Platte. Its buried bluffs of Cretaceous shales have been just touched by recent erosion sufficiently to reveal their existence near the mouth of Beaver Creek, along Cedar Creek, and in the bed of the main Loup between the mouths of these two creeks. The trend of these ancient bluffs is shown by the line $xy$ on the map. It is oblique to the Loup channel, leaving the mouth of Cedar Creek, and of all three of the Loup rivers, *outside of the Platte valley*. If they ever entered the Platte directly and independently, it must have been as indicated in my article of Jan.

29, 1892. The eastward prolongation of the ancient bluffs is probably not continued in the line *yx*, but bending east about where the turn occurs in the courses of Lost Creek and Shell Creek. The former is a considerable stream so long as it has the impervious Cretaceous shales for a substratum, but soon disappears when it encounters the deep mass of silt in the Platte valley.

There is no evidence, so far as I know, that the Platte has ever shifted out of its old rock bed, except during the transient episode at Sand Creek. The existence of a gorge excavated in Mesozoic and Palæozoic rocks, once five hundred feet deep though now silted up to its brim, is the best reason for its present course. Nor can any inferences respecting the influence of rotation be drawn from the trend of this gorge, for the reason that a considerable part of it was formed by a stream which flowed *west*. When the Platte first stretched across the plains, its several parts of different ages and opposite flow being united in one great river, it found a ready-made channel, to which it has, in the main, steadily adhered. The hypothesis that it once flowed in the channel of the Loup fares badly in the light of the facts, and, looking across to the southward, we find no evidence that it ever flowed in any of the numerous heads of the Blue, as suggested by Professor Davis. None of them has any marked pre-eminence over the rest, and all of them are slight recent furrows, mostly below the level of the Platte, so that it must have shifted up-hill if it once flowed in them.

The suggestion that it once flowed in Prairie Creek falls into a different category, since this stream is within the old rock trough. But it is a mere pin scratch in a wide alluvial plain, any other line of which is just as likely as that to have been the flow-line of the Platte at some period. Of course this great river has shifted about within its rocky gorge. The most significant fact in respect to the influence of rotation is that it now, in many places, crowds upon the south bluffs, as shown in Fig. 2.

It is agreeable to have the concurrence of Professor Todd in my opinion that "the Loups did formerly flow through to the Platte.' I trust he will not recede from this harmonious attitude in consequence of finding it impossible to put the Platte over into the Loup in order to get them together. Strictly speaking, however, that is not impossible. A big canal would accomplish it literally. The real difficulty is to get the Platte back to its present higher channel. It is not now a constructive stream, building up its bed above the surrounding country, else we might suppose that it had shifted to its present position and then built it up above the Loup. It has not probably been a constructive river at any time since the Rocky Mountain uplift emptied Lake Cheyenne, and gave the Platte such a steep gradient that it is able to accomplish a little vertical erosion in spite of its great burden of sediment. It trembles on the verge between vertical erosion and deposition, the balance inclining to the former, but so slightly that it maintains its levels with great steadiness. Herein lies another reason for doubting that great changes of level have recently occurred in its valley.

L. E. HICKS.

Lincoln, Neb.

## Sistrurus and Crotalophorus.

ON page XXVI. of the introduction to a work on North American Reptiles, in the "Memoirs of the Museum of Comparative Zoology," VIII., 1883, the name Sistrurus was applied to one of the two genera of rattlesnakes because Crotalophorus, the previous title, was a synonym for Crotalus, the other genus. Professor Cope, in his latest paper on the serpents, Proc. U. S. Mus., 1892, p. 624, objects to the change in these terms: "Mr. Garman has named this genus Sistrurus, on the ground that the name Crotalophorus was preoccupied at the time it was employed by Gray. This does not, however, seem to be the case. It is true that Linnæus uses it instead of Crotalus in the sixth edition of the Systema Naturæ (1748, p. 35), but the system of nomenclature thus adopted is not binomial, so that the names are not authoritative as against later ones." This makes a considerable display of lack of caution, to say the least of it. If use by Linné in the sixth edition of the Systema (as also in the seventh and the ninth editions, and the Amoenitates) was all that bore on the question there might be nothing to say. But in proposing the new name I had in mind more than appears from the citation. Linné and Gronow only were mentioned. The dates for the latter were 1756 and 1763, which brings us within the range of the tenth edition, 1758. Gronow might be put aside as unsound binomially. If so, I still had Houttuyn, 1764, who certainly regarded the names as synonymous, for he says, "De geslagtnaam deezer slangen, *Crotalophorus*, en by verkorting *Crotalus*, is afkomstig van den ratel, dien zy aan't end der staart hebben." But, again, if not allowed to go farther back than the twelfth edition, 1766, there was another authority for Crotalophorus instead of Crotalus, Vosmaer, 1768, according to whom, "De Heer Linnéus geeft de benaaming van *Crotalophorus* aan dit geslacht, in het welk hy drie onderscheidene soorten heeft opgeteekend, die hy *Horridus*, *Dryinas* en *Durissus* noemt."

Under the name Crotalophorus, 1748–68, neither Linné, Gronow, Houttuyn nor Vosmaer included any of the species of the genus defined by Gray, 1825, with the same name. That they were not binomial authorities may be urged against Linné and Gronow, but not against Houttuyn and Vosmaer, who, though they retained the earlier name, adopted the genus and the species from the tenth edition of the Systema. Linné dropped Crotalophorus for Crotalus in 1758. In 1766 he described the first species of the other genus, placing it in Crotalus, where it was kept by most authors until removed by Gray. The necessity of the change I have made in the name of Gray's genus is best shown by a concise view of the synonymy for the two genera.

### Crotalus.

*Caudisona* Linn., 1735–47; Laur., 1768; Flem., 1822; Cope, 1861–71; Coues, 1875.

*Crotalophorus* Linn., 1748–56; Gronow, 1756–63; Houtt., 1764; Vosm., 1768.

*Crotalius* Linn., 1754.

*Crotalus* Linn., 1758–66; Daud., 1803; Merr., 1820; Gray, 1825–49; Fitz., 1826–43; Wagl., 1830; Holbr., 1842; Bd. and Gir., 1853–59; Dum. Bibr., 1854; Cope, 1859, 1875–92; Garm., 1883. (Many omitted. In most cases, from 1766 till 1825, a species of Sistrurus was included.)

*Crotalinus* Raf., 1815.

*Uropsophus* Wagl., 1830; Gray, 1831–49; Fitz, 1843.

*Urocrotalon* Fitz., 1843.

*Aploaspis* Cope, 1866–75.

*Aechmophrys* Coues, 1875. (The last four apply to particular species.)

### Sistrurus.

*Crotalophorus* Gray, 1825–31, 1849; Holbr., 1842; B. and G., 1853–59; Cope. 1859, 1886–92.

*Caudisona* Fitz., 1826–43; Wagl., 1830; Bon., 1831; Gray, 1842; Yarr., 1875; Cope, 1875–80.

*Crotalus* Flem., 1822; Cope, 1860; Coues, 1875.

*Sistrurus* Garm., 1883.

S. GARMAN.

Mus. Comp. Zool., Cambridge, Mass.

## "Scientific" Genealogy—Rejoinder, No. 2.

QUITE recently I contributed to these columns (*Science*, Vol. XIX., No. 476. "'Scientific' Genealogy—A Rejoinder."—Veritas.) a brief paper intended to curb some tendencies prevalent in genealogical circles, notably untenable assumptions regarding family traits and likenesses inherited.

Since the appearance of the above article several criticisms have been sent to this magazine — rather surprising to "Veritas" for the reason that they indicated a lack of acquaintance with what he opposed in the article.

General discussions of biology, breeding of animals — human and brute — are, I doubt not, of interest and profit, only, — they hardly touch my point in the argument, and it is important in open discussion to keep to the question, — so many readers mistake a rambling generalization for argument and fact. Then, too, I object to portions of the article by "Enquirer," namely, p. 155, paragraphs 1 and 4, as mistakenly quoting my views (for light on which my article is in evidence) and also to his last para-

graph, p. 155, in which, as I read it, he eludes and dodges the question.

More and more thought in the matter only convinces me in greater degree that these words of mine "The writer does not for a moment combat the well-exhibited inheritance of peculiar appearance and traits of a man from his father or mother, his grandparents or great-grandparents, or in rare cases from great-great-grandparents, but beyond these limits the historian has little to encourage him in his attempt beyond uncertain and traditionary tales" (Rejoinder, p. 157) are safely within the truth.

Considering that "Enquirer" knows relatively nothing of $99\frac{61}{100}$ per cent of his emigrant ancestors, I still frankly disbelieve that he can locate traits or characteristics of John Doe the first, in any living descendant, with truth. However dear a hobby or theory may grow to a man, unless facts fully substantiate the theory, and it be capable of proof, it is questionable honesty and mistaken wisdom to give that theory currency as if it were fact.

As far as I can group and draw inferences from the facts, on an average the maternal blood has almost, if not full as much, influence in determining the traits and appearance of offspring as the paternal,— this with reference to human beings.

With some one hundred living descendants of a man (the man and descendants included in four generations) I have had intimate acquaintance, and neither in those bearing his surname, nor the males by themselves, nor in all together, does there appear one common trait or characteristic, which state of things I consider due to the great influence of new strains of blood brought in by marriage.

Being as yet too young, personally, to claim the experience necessary to theorize concerning likenesses, I feel that my only safety is in stating fact. I have made a specialty of gathering the likenesses of my ancestors and close relations, and from oil paintings, through silhouettes, daguerreotypes, and ambrotypes to photographs, I honestly see as much in appearance derived from the maternal blood as from the paternal. Photographs are of too recent origin, however, to affect the argument I put forward.

Could those who are interested in the matter alter their point of view long enough to realize the blending, the existing cousinship, to realize that the living child of old New England parentage has relatives (sixth cousins and nearer) to easily populate Boston, Mass., and to spare, such a light will come to them as will widen, enlarge, and much more than offset the narrow views now cherished.

"VERITAS."

## BOOK-REVIEWS.

*Helen Keller:* Souvenir of the First Summer Meeting of the American Association to Promote the Teaching of Speech to the Deaf. Second Edition. Washington, Volta Bureau. 1892. Large. 4°.

THE great interest aroused in the education of the blind and the deaf by the remarkable story of the life of Laura Bridgman is destined to be eclipsed by the most astounding educational strides of the twelve-year-old Helen Keller. Blind and deaf since her eighteenth month, she receives her first instruction in language at seven years, she learns in days what it required months for Laura Bridgman to acquire, and within a year has a fund of knowledge and a capacity for using it quite remarkable for an eight-year-old child in full possession of the five senses. Her interest in her surroundings, her retentive memory, and appreciative imagination, her capacity to learn and reproduce are wonderful enough, but they are outdone by her remarkably quick and, from all accounts, remarkably exact acquisition of vocal speech. By placing her hands upon the mouth, lips, and throat of the speaker, she learns the position of the speech-making organs when uttering the different sounds; setting her own vocal organs in the same position she reproduces the sound, correcting it according to the instructions (by the finger alphabet) of her teacher,—an acquisition difficult enough when guided by the eye, but certainly marvelous for one both blind and deaf.

It is only natural that her story should excite interest everywhere, and the present memoir of her education tells the salient points of her life. It is admirably prepared, and contains an excellent portrait and *facsimiles* of her very remarkable letters. It is to be hoped that all the details of her career will be carefully noted and that the present is only an introduction to a fuller and more complete account of Helen Keller. It is certainly proper that the sympathy in her case should be used to excite an interest in the education of the deaf and the blind, and the souvenir will aid in this meritorious work.

*Bacteriological Diagnosis: Tabular Aids for Use in Practical Work.* By JAMES EISENBERG, Ph.D., M.D., Vienna. Translated and augmented with the permission of the author from the second German edition, by NORVAL H. PIERCE, M.D., Surgeon to the Outdoor Department of Michael Reese Hospital; Assistant to Surgical Clinic, College of Physicians and Surgeons, Chicago, Ill. F. A. Davis & Co., Philadelphia and London. 1892.

THIS is, without exception, the worst translation that has ever fallen into our hands. Not only this, but it exhibits throughout an utter ignorance of bacteriology on the part of the translator. We cannot but express the greatest astonishment at the temerity shown by the translator in attempting the task, deficient as he evidently is not only in the knowledge of the German language but also in the subject treated. To set forth all the errors would be to write another book, so we will make but a few quotations to show that our condemnation is not too severe.

Beginning with the first page, we find in the preface "a bacteria" occurring twice instead of "a bacterium," and "bacteriæ" instead of "bacteria." In the index, Bacillus "sublilis" instead of "subtilis" is seen, which might be an oversight if it were not again misspelt at the head of the tabulated description (No. 14) which deals with this organism. We will pass over a vast number of comparatively small mistakes such as the translations "pretty" for "schön," "nourishing-ground" for "Nährboden," "faint" for "matt" (dull), "spirules" and "spirillæ" for "spirilla," "flagellæ" for "flagella," "color-glass" for "Blende" (diaphragm), "object-glass" for slide, "éprouvette" for test-tube, "whitish fimbria" for "weislichen Saum" ("whitish border" would be more the author's meaning), and "slim staves" or "staffs" for "schlanke Stäbchen" (we usually speak of "rods" when speaking of bacilli). Wherever microscopic measurements are given we find "m." (meters) instead of "$\mu$." On pages 14, 15 and 57, minus signs are omitted from in front of temperatures ranging from —10° to —20° C., thus taking all meaning out of the translation.

Serious errors would be represented by such translations as these, taken at random: P. 17, where the growing out of the Bacillus subtilis from spores is described "Stäbchen sprossen senkrecht auf die Längsachse der Sporen aus," translated "Staves sprout in the direction of long axis of spores." P. 24, "Häufchen, die zu einer kernigen, brauner Masse mit abgerundeten Ecken zusammenfliessen," translated "heaps, which amalgamate into a seedy, brown mass." Same page, "Umfangreiche, schnelle Verflüssigung, vom ganzen Impfstich gleichmässig ausgehend; gelbliche Verfärbung," translated "Growth elaborate, yellow, and quickly liquefying. The growth spreads from the entire inoculation point." P. 53, "im Condensationswasser," translated "in the water expressed in desiccation." P. 57, "Im Darminhalt von frischen Choleraleichen und Stuhlentlerungen Cholerakranker," translated "In the intestinal canals of recently moribund cholera patients and from the fæces of the same." Same page, "Am Anfang des Stichkanals bildet sich ein kleiner Trichter, es tritt Verflüssigung längs des Impfstichs ein, an der Oberfläche entsteht luftblasenartige tiefe Eisenkung," translated "Liquefaction begins slowly, commencing at the entrance of the puncture around an inclosed air bubble." Same page again, "nach Unterbindung der Gallengänge," translated "after ligature of the intestine below the bile duct." On p. 63 one's astonishment is somewhat increased by finding "verschiedenartige Zeichnung" translated "indifferent pictures." "Wasserstoff" (hydrogen) translated "water" — "ohne Sauerstoffzuführ" as "without addition of acid." On p. 72, "Schnittpräparaten" (sections) translated "excised preparations." On p. 79, instead of "Rausch-

brandbacillus" we find "anthrax bacillus." It is pleasing to read (p. 86) that the spore formation of Bacillus anthracis "occurs most plenteous at breeding temperature." We cannot agree that the equivalent of the German "welche in der Richtung der Längsachse der Mutterzelle auskeimen," is given in "which spring from the long axes of the maternal cells." On p. 96, where the effects of the injection of Staphylococcus pyogenes aureus into the blood-vessels are considered, "nach Lädierung der Herzklappen" is translated "later they attack the valves of the heart," and so we might go on indefinitely.

In the third German edition of this book, which appeared in 1891, 376 micro-organisms are described, whilst this translation of the second edition appears in 1892 and describes some 133 micro-organisms. The appendix belonging to the third German edition, which was not present in the second edition, has been added to the translation of the latter. We have not noticed much that is "augmented" in the translation, but much that is distorted and misstated. The climax was reached when we found the Plasmodium malariæ (not mentioned in Eisenberg at all) classified under the heading "Pathogenic Bacteria." In justice to the publishers, we are only too happy to remark that the printing, and especially the binding of this book are well done.

On one point the translator justly gives himself credit, and that is in the preface where he says, "The arrangement of the text has been somewhat changed from the original." G. H. F. N.

## AMONG THE PUBLISHERS.

A GUIDE-BOOK is a *sine qua non* to the average American bound for a summer's trip in Europe. But, aside from the stock information which the regulation books of that class contain, there is a large number of questions in regard to foreign things and ways which remain open, and it is to help the tourist to just such additional and most necessary information that Brentano's, New York, has just brought out "Abroad and at Home," by Morris Phillips, the well-known editor of *The Home Journal*. In this book can be found accounts of the author's experiences while in Great Britain and France, and the close of the volume contains much similar information about our Southern States and the Pacific Coast, this last justifying the "At Home" in the title.

— Thomas Curtis Clarke, the eminent engineer, in the June number of *Scribner's* will suggest a solution for the problem of rapid transit as it now confronts the cities of New York, Chicago, and Boston. The New York plan, which he favors, involves a new street with an open-air viaduct on one side of it, abutting on great warehouses, the lower stories of which enter directly into the tunnel for freight trains beneath the viaduct.

— Messrs. Macmillan & Co. are about to issue, under the title of "Calmire" (a name of French origin, pronounced Calmēre), an exposition, through the medium of a story, of that scientific explanation of the basis of morals, for which many are seeking out-

## CALENDAR OF SOCIETIES.

### Society of Natural History, Boston.

May 18.—J. S. Kingsley, Notes on the Anatomy of Amphiuma; W. O. Crosby, On Some Evidences of Tertiary Deposits in the Boston Basin.

### Biological Society, Washington.

May 14.—W. H. Seaman, The Photogenic Organs of Fireflies; C. Hart Merriam, A New Prairie Dog from Mexico; Charles Hallock, Where Salt-Water Fishes Hide: Results of Deep-Water Seining; Theo. Holm, Additions to the Flora of Washington (with exhibition of specimens); Frederick V. Coville, The Use of Certain Terms in Geographic Distribution.

## Publications Received at Editor's Office.

BERNARD, HENRY MEYNERS. The Apodidae. New York, Macmillan & Co. 12°. 336 p. $2.

BUTLER, AMOS W. The Birds of Indiana. Brookville, Ind., Wm. B. Burford, printer. 8°, paper. 135 p.

NAEGELI, CARL AND SCHWENDENER, S. The Microscope in Theory and Practice. Trans. from the German. 2d ed. New York, Macmillan & Co. 8°. 394 p., ill. $2.60.

SMITHSONIAN INSTITUTION. Report of the National Museum for the year ending June 30, 1891. Washington, Government. 8°. 954 p.

U. S. BOARD ON GEOGRAPHIC NAMES. First Report. 1890-1891. Washington, Government. 8°. 56 p.

WEED, ALONZO R. Business Law. Revised ed. Boston, D. C. Heath & Co. 8°. 172 p. $1.10.

side of the historic creeds. It is entirely distinct in theory and mode of treatment from the widely-read novels touching on the religious question, and will take a place among the books most thoughtfully discussed by that increasing class of readers, which finds in the insistent problems of religion and the proletariat the most absorbing interests of the day.

— P. Blakiston, Son, & Co., Philadelphia, announce "Materia Medica, Pharmacy, Pharmacology, and Therapeutics," by Wm. Hale White, M.D., Physician to, and Lecturer on Materia Medica at Guy's Hospital; Examiner in Materia Medica Royal College of Physicians and Royal College of Surgeons, etc. This is an American copyright edition, edited by Reynold W. Wilcox, M.A., M.D., Professor of Clinical Medicine at the New York Post-Graduate Medical School and Hospital, Assistant Visiting Physician Bellevue Hospital, etc.

— The ninth volume of the new edition of "Chambers's Encyclopædia" is in a forward state, and will be published by the J. B. Lippincott Company in June. Another volume will complete this excellent work of reference The following are some of the principal articles and authors in the new volume: "Rousseau," Rev. H. G. Graham; "Runes," Canon Isaac Taylor; "Russia," "St. Petersburg," "Siberia," Prince Krapotkine; "Salmon," Archibald Young; "Salvation Army," Bramwell Booth; "Samoa," C. P. Lucas; "George Sand," Mr. G. Saintsbury; "Scandinavian Mythology." Professor Rasmus Andersen; "Schopenhauer," Professor W. Caldwell; "Schleiermacher," Dr. Otto Pfleiderer; "Spectrum," Professor Knott; "Scotland," history, Professor Grub; "Scottish Language," Dr. J. A. H. Murray; "Scottish Literature," Hume Brown; "Sir Walter Scott," Andrew Lang; "Seal," "Sole," J. T. Cunningham; "Secularism," Mr. G. J. Holyoake; "Shakespeare" and "Shelley," Professor Dowden; "Sheep," James MacDonald; Generals "Sheridan" and "Sherman," General Grant Wilson; "Shipbuilding," David Pollock; "Shorthand," Isaac Pitman; "Siam," J. S. Black; "Slang," C. G Leland; "Socialism," T. Kirkup; "Herbert Spencer," Professor Sorby; "Sphinx," Stanley Lane-Poole; "H. M. Stanley," J. S. Keltie; "Dean Stanley," Professor Story; "State Religion," Canon Curteis; "Steam" and "Steam-Engine," Professor A. B. W. Kennedy; "Sterne," Traill; "Strawberry," Blackmore.

# QUERY.

Can any reader of *Science* cite a case of lightning stroke in which the dissipation of a small conductor (one-sixteenth of an inch in diameter, say,) has failed to protect between two horizontal planes passing through its upper and lower ends respectively? Plenty of cases have been found which show that when the conductor is dissipated the building is not injured to the extent explained (for many of these see volumes of Philosophical Transactions at the time when lightning was attracting the attention of the Royal Society), but not an exception is yet known, although this query has been published far and wide among electricians.

First inserted June 19. No response to date.



# TO THE READERS OF SCIENCE.

## PUBLISHER'S ANNOUNCEMENT.

OUR PLANS.

WITHIN the past six months the use of *Science* by scientific men and women as a medium for prompt publication and weekly discussion, has increased very materially, so that the pages are now well filled each week with original matter. As the number of those promising contributions is increasing at the rate of three or four each day, it cannot be long before *Science* at its present size will be too small for the amount of matter offered. We have under consideration therefore an enlargement of the paper by one-half, but must first learn the temper of our constituency as to an advance in price to $5.00, which was the subscription price from the start for four years, up to June 30, 1887. Further, to carry out the proposed enlargement, we shall need five hundred additional subscribers. If you are not already a subscriber, are you willing to aid in making *Science* more worthy of American scientific work by becoming one?

It goes without saying, that the demand for scientific literature is limited, when compared with that for literature which is more to the public taste, so that the receipts of most of the Scientific Journals, in this country, do not pay quite for their printing and paper, to say nothing of the other items of expense. We say this merely to emphasize the fact, that generous and prompt support must be accorded this move if it is to succeed.

Titles of Some Articles Published in *Science* since Jan. 1, 1892.

Aboriginal North American Tea.
Actinism.
Amenhotep, King, the tomb of.
Anthropology, Current Notes on.
Arsenical Poisoning from Domestic Fabrics.
Anatomy, The Teaching of, to Advanced Medical Students.
Astronomical Notes.
Botanical Laboratory, A.
Brain, A Few Characteristics of the Avian.
Celts, The Question of the.
Collection of Objects Used in Worship.
Deaf, Higher Education of the.
Diphtheria, Tox-Albumin.
Etymology of two Iroquoian Compound Stems.
Eye-Habits.
Family Traits, Persistency of.
Fishes, The Distribution of.
Fossils, Notice of New Gigantic.
Grasses, Homoptera Injurious to.
"Healing, Divine."
Hemipterous Mouth, Structure of the.
Hypnotism among the Lower Animals.
Hypnotism, Traumatic.
Indian occupation of New York.
Influenza, Latest Details Concerning the Germs of.
Infant's Movements.
Inventors and Manufacturers, the American Association of.
Iowa Academy of Sciences.
Jargon, The Chinook.
Klamath Nation, Linguistics.
Lightning, The New Method of Protecting Buildings from.
Lissajou's Curves, Simple Apparatus for the Production of.
Maize Plant, Observations on the Growth and Chemical Composition of.
Mineral Discoveries, Some Recent, in the State of Washington.
Museums, The Support of.
Patent Office Building, The.
Pocket Gopher, Attempted Extermination of.
Psychological Laboratory in the University of Toronto.
Psychological Training, The Need of.
Rain-Making.
Rivers, Evolution of the Loup, in Nebraska.
Scientific Alliance, The.
Star, The New, in Auriga.
Storage of Storm-Waters on the Great Plains.
Teaching of Science.
Tiger, A New Sabre-Toothed, from Kansas.
Timber Trees of West Virginia.
Tracheæ of Insects, Structure of.
Vein-Formation, Valuable Experiments in.
Will, a Recent Analysis of.
Wind-Storms and Trees.
Wines, The Sophisticated French.
Zoology in the Public Schools of Washington, D. C.

Some of the Contributors to *Science* Since Jan. 1, 1892.

Aaron, Eugene M., Philadelphia, Pa.
Allen, Harrison, Philadelphia, Pa.
Baldwin, J. Mark, University of Toronto, Canada.
Barnes, Charles Reid, Madison, Wis.
Baur, G., Clark University, Worcester, Mass.
Beal, W. J., Agricultural College, Mich.
Beals, A. H., Milledgeville, Ga.
Beauchamp, W. M., Baldwinsville, N.Y.
Boas, Franz, Clark University, Worcester, Mass.
Bostwich, Arthur E., Montclair, N.J.
Bradley, Milton, Springfield, Mass.
Brinton, D. G., Philadelphia, Pa.
Chandler, H., Buffalo, N.Y.
Comstock, Theo. B., Tucson, Arizona.
Cragin, F. W., Colorado Springs, Col.
Davis, W. M., Harvard College, Cambridge, Mass.
Dimmock, George, Canobie Lake, N.H.
Farrington, E. H., Agricultural Station, Champaign, Ill.
Ferree, Barr, New York City.
Flexner, Simon, Johns Hopkins University, Baltimore, Md.
Foshay, P. Max, Rochester, N.Y.
Gallaudet, E. M., Kendall Green, Washington, D.C.
Garman, S., Museum of Comp. Zool., Cambridge, Mass.
Golden, Katherine E., Agricultural College, Lafayette, Ind.
Hale, Edwin M., Chicago, Ill.
Hale, George S., Boston, Mass.
Hale, Horatio, Clinton, Ontario, Canada.
Hall, T. Proctor, Clark University, Worcester, Mass.
Halsted, Byron D., Rutgers College, New Brunswick, N.J.
Haworth, Erasmus, Oskaloosa, Iowa.
Hay, O. P., Irvington, Ind.
Haynes, Henry W., Boston Mass.
Hazen, H. A., Weather Bureau, Washington, D.C.
Hewitt, J. N. B., Bureau of Ethnology, Washington, D.C.
Hicks, L. E., Lincoln, Neb.
Hill, E. J., Chicago, Ill.
Hill, Geo. A., Naval Observatory, Washington, D.C.
Hitchcock, Romyn, Washington, D.C.
Hotchkiss, Jed., Staunton, Va.
Howe, Jas. Lewis, Louisville, Ky.
Hubbard, Gardiner G., Washington, D.C.
James, Joseph F., Agricultural Dept., Washington, D.C.
Johnson, Roger B., Miami University, Oxford, O.
Kellerman, Mrs. W. A., Columbus, O.
Kellicott, D. S., State University, Columbus, O.
Macloskie, G., Princeton, N.J.
McCarthy, Gerald, Agricultural Station, Raleigh, N.C.
MacDonald, Arthur, Washington, D.C.
Marshall, D. T., Metuchen, N.J.
Mason, O. T., Smithsonian Institution, Washington, D.C.
Nichols, C. F., Boston, Mass.
Nuttall, George H. F., Johns Hopkins University, Baltimore, Md.
Oliver, J. E., Cornell University, Ithaca, N.Y.
Osborn, Henry F., Columbia College, New York City.
Osborn, Herbert, Agricultural College, Ames, Iowa.
Pammel, L. H., Agricultural Station, Ames, Iowa.
Pillsbury, J. H., Smith College, Northampton, Mass.
Ruffner, W. H., Lexington, Va.
Schufeldt, R. W., Washington, D.C.
Scripture, E. W., Clark University, Worcester, Mass.
Slade, D. D., Museum Comp. Zool., Cambridge, Mass.
Smith, John B., Rutgers College, New Brunswick, N.J.
Stevenson, S. Y., Philadelphia, Pa.
Stone, G. H., Colorado Springs, Col.
Thurston, R. H., Cornell University, Ithaca, N.Y.
Todd, J. E., Tabor, Iowa.
True, Frederick W., National Museum, Washington, D.C.
Turner, C. H., University of Cincinnati, Cincinnati, O.
Ward, R. DeC., Harvard University, Cambridge, Mass.
Ward, Stanley M., Scranton, Pa.
Warder, Robert B., Howard University, Washington, D.C.
Welch, Wm. H., Johns Hopkins University, Baltimore, M.D.
West, Gerald M., Clark University, Worcester, Mass.
Williams, Edward H., Lehigh University, Bethlehem, Pa.