the Royal Astronomical Society, and was a member of the most important scientific societies.

ALFRED E. BEACH died in New York on January 1st. He was one of the proprietors of the *Scientific American* and had made several important inventions, the best known of which is that of pneumatic tubes adjusted for carrying parcels and cars. The deaths are also announced of Robert F. Welsch, a writer of ichthyology; of Prof. A. P. Kostycher, of the Russian Agricultural Department, known for his investigations of soils and agricultural products; of Dr. A. V. Brunn, professor of anatomy in Rostock, and of Dr. Ludwig Teichmann, formerly professor of anatomy in Cracow.

UNIVERSITY AND EDUCATIONAL NEWS.

A BILL to establish a National University at Washington has been introduced in the Senate and House of Representatives. It provides for its government a board of sixteen regents, with the President of the United States at its head, and a University Council, embracing the board and twelve educators, representing institutions belonging to different States.

A TELEGRAM to the *Evening Post* states that Elon College, in North Carolina, has received an endowment fund of $100,000 from a citizen of New York City, whose name is not at present made public.

PRESIDENT Mark W. Harrington, of the University of Washington, writes that he proposes to establish a department of terrestrial physics and geography in the University, and will be indebted to authors and publishers who will send to the University publications relating to these subjects.

THE N. Y. *Medical Record* states that the Chicago College of Physicians and Surgeons is making arrangements to amalgamate itself with the University of Illinois

IT is stated that Mrs. E. G. Kelly, of Chicago, will erect a chapel at a cost of $100,000 for the University of Chicago, as a memorial to her brother.

DR. DOCK, of the University of Michigan, has been appointed professor of pathology and bacteriology at Jefferson Medical College in Philadelphia.

WE learn from the *American Geologist* that Prof. W. I. Blake, of New Haven, Conn., has accepted a professorship of geology and mining in the University of Arizona.

DR. HÜFNER, of Tübingen, has been called to the chair of physiological chemistry at Strassburg, vacant by the death of Hoppe-Seyler. Dr. Julius Bauschinger, of Munich, has been made associate professor of astronomy and head of the bureau of calculations in Berlin.

ACCORDING to the *Academische Revue* the number of students matriculated at the University of Berlin is 5368: 486 in theology, 1812 in law, 1258 in medicine and 1812 in the philosophical faculty. There are 776 foreigners, 219 from America, 198 from Russia, 32 from Great Britain, 22 from France, etc. 40 women are admitted as auditors.

CORRESPONDENCE.

THE THEORY OF PROBABILITIES.

TO THE EDITOR OF SCIENCE: It is easier to make true and misleading statements in the subject of probabilities than anywhere else. In this class I should be inclined to place the remark made by Professor Mendenhall, near the close of his article in your issue for December 20, regarding a deal in whist in which each of four players had all the cards of one suit. He says:

"The chances against any other particular distribution of the cards were just as great as against this and * * * the result of every deal of the cards is just as remarkable as this."

To the first part of this statement it is of course impossible to take exception; the second part seems to me misleading, if not untrue. To take another case. The chances of my tossing heads one hundred times running are precisely those of my tossing the particular succession of heads and tails that I do toss in any hundred throws of a coin. But is the former case no more *remarkable* than the latter? It is so much more remarkable that it at once arouses the

suspicion that I have committed fraud, while in the other case no one thinks of such a thing, unless—and here lies the gist of the whole matter—unless I or somebody else predicted exactly the succession of heads and tails that occurred. The remarkableness lies in the coincidence, not in the mere numerical probability of the configuration. Now the distribution of cards mentioned by Prof. Mendenhall and the succession of throws of a coin in which all are heads are both natural arrangements that readily occur to the mind, and hence are as striking subjects for coincidence as actually predicted arrangements. The fact is that an unpredicted arrangement is not judged 'remarkable,' because its probability is compared with that of *each and every* (individual) other possible arrangement, while with a predicted or other coinciding arrangement the comparison is between its probability and that of *any* other possible arrangement (no matter what). We may call the ratio of such comparison the 'ratio of surprise,' if you will. When heads turn up twice in succession the numerical probability ($\frac{1}{4}$) is precisely that of every other possible succession of heads and tails, but its ratio of surprise is $\frac{1}{4} \div \frac{1}{4} = \frac{1}{1}$, whereas that of an arrangement not subject to comparison with some predicted or conspicuous arrangement is $\frac{1}{4} \div \frac{1}{4} = 1$. The distribution of cards already mentioned belongs to the former class of configurations, and its 'ratio of surprise' is almost infinitesimal. It is therefore very remarkable, while an ordinary deal would not be so.

Professor Mendenhall of course does not need to be told of any of these things, but it seems worth while to call attention to what will seem, to the non-mathematical reader, a lack of correspondence between scientific and ordinary language—a thing to be avoided when possible.

ARTHUR E. BOSTWICK.

MONTCLAIR, N. J.

THE DEVELOPMENT OF THE EMBRYO OF PTERIS.

TO THE EDITOR OF SCIENCE—*Sir:* For two years I have been in correspondence with various biologists concerning a very evident error in Sedgwick and Wilson's Biology, and had I supposed it possible that the new edition would repeat such an error, I would have at least tried to prevent it. I refer to the oösphere quadrant developments as mentioned in the texts, old edition, bottom page 98 and top of page 99; New edition, top of page 140. He says in both places: 'The lower anterior quadrant as it undergoes further division grows out into the first root; the upper anterior quadrant in like manner gives rise to the rhizome and the first leaf.'

In a note below Fig. 80, in both editions he gives the truth in the matter but says: 'In *Pteris serrulata* the development is slightly (!) different.'

Where and how does the author obtain his authority for the statement as it stands in the text, making the root spring from the anterior quadrant?

Please call attention of botanists to this statement, and if any of them have obtained such a result with *Pteris aquilina*, let us hear from them and see their drawings.

F. D. KELSEY.

OBERLIN, OHIO, December 12, 1895.

TO THE EDITOR OF SCIENCE—*Sir:* Prof. Kelsey has our thanks for pointing out an obvious error in our description of the development of the embryo of *Pteris* from the oöspore. We can only regret that while corresponding 'for two years,' concerning the matter, 'with various biologists,' he did not include us among the number, as he might then, possibly, have saved himself some trouble and would have enabled us more promptly to correct the error.

THE AUTHORS OF THE *General Biology.*

LINE DRAWINGS OF BLUE PRINT.

THE method of making line drawings upon a blue print, mentioned by Mr. Slosson on page 893 of the last volume, is capable of being made very useful. I have used it for a number of years, and some of the results have appeared in the horticultural bulletins of the Cornell Experiment Station. I have no artistic ability, and yet one of these blue-print drawings was highly commended by an artist, who, fortunately, knew neither who the draughtsman was nor what was the method of its making!

L. H. BAILEY.

CORNELL UNIVERSITY.