

At 10 A.M., sighted Java Head lighthouse; but the wind hauling ahead, we kept away, and went round Prince Island. Latter part, fresh breezes, and thick, smoky weather. Friday and Saturday, passed large quantities of ashes in the water. Saturday, crew employed in cleaning ashes off masts and rigging. Water had a green color.

The point of special importance in the above account is the record of the sudden barometric fluctuations, due to the great air-wave with which readers of *Science* are already familiar.

Accompanying the above extracts from the log, is a sample of the 'sand and ashes' which fell so thickly upon the rigging. It is of a light gray color, and harsh to the touch. It is essentially a pulverized pumice, by far the greater part of it consisting of fragments of volcanic glass. These fragments are sometimes twisted, but generally in flat, angular transparent scales, which are filled with minute bubbles, and, of course, are isotropic. Angular fragments and crystals of transparent plagioclase, occasionally showing the hemitropic striations, and giving bright colors in the polariscope, together with more irregular and rounded fragments of dark green and brown pyroxenic minerals, probably augite and hypersthene, are scattered very occasionally among the glass particles. Grains of magnetite, often well rounded, also occur, and may be picked out and examined separately by a magnet covered with tissue-paper.

The dust collected by Mr. Joseph Wharton, from snow which fell in the suburbs of Philadelphia on Jan. 22, and supposed by him to be of volcanic origin,<sup>1</sup> has been kindly submitted by him to the writer for examination. It is composed of particles of quartz, coal, cinders, vegetable matter, etc., among which are certain glassy hairs and rounded globules. These bear no resemblance to the angular glass fragments composing the Krakatoa dust, which is remarkably free from either filaments or globules; and the supposed volcanic glass particles in the Philadelphia dust appear to be of local origin, — from blast-furnaces, foundries, or the like.

For the vial of dust, and the extracts from the log, I am indebted to my friend, Rev. Wayland Hoyt, D.D., of this city.

H. CARVILL LEWIS.

Philadelphia, May 27.

#### Professor Gill on assumptions of museum-keepers.

In a recent issue of *Science*, p. 615, my friend Professor Gill has made a rather savage attack upon another very good friend of mine, for which I feel in some degree responsible, since a remark in my review of the 'Voyage of the Challenger' has been taken by the former as a text for his philippic. I have no desire to cross swords in argument with so skilful a dialectician as Professor Gill, and shall therefore be contented to make certain general statements.

1. The policy of Dr. Günther, as keeper of the zoölogical collections of the British museum, has, from the start, been an extremely liberal one, much more so than that of his predecessor. I know of no museum where facilities are more readily granted, the methods in the natural-history department and in the great library of the British museum being precisely similar. Any person known to the authorities may secure the use of a table in one of the laboratories, and may have specimens brought to him day after day, from morning till night, as fast as he can fill up and sign the requisitions. That this is so, I can testify from personal knowledge. Within the past eighteen months, I have known of seven ichthyologists, —

three from the United States, one from Italy, one from France, one from Sweden, and one from Australia, — each of whom spent weeks in the museum, and had no specimens refused him. I have also known of several other American zoölogists who have been treated with equal courtesy. I may mention, in passing, that no person, not an officer of the museum, is ever allowed to work in a room by himself, no matter how well he may be known, — a precaution which I believe to be quite necessary, since privileges of this sort have in the past been shamefully abused. I might mention one instance, many years ago, in which the entire collection of alcoholic specimens in one group of vertebrates was badly mutilated by a series of coarse dissections, carried on, without the knowledge of the authorities, by a young student, now one of our most distinguished American zoölogists. I have heard the story from his own lips, as well as from Dr. Günther.

2. The Challenger fishes are not, as yet, turned over to the British museum, but are still under the control of the lords of the admiralty, by whom, through Sir Wyville Thompson, Dr. Günther was requested to prepare the report upon the ichthyology of the expedition. Dr. Günther, therefore, in my opinion, is perfectly right in retaining this collection under his own control until his report is completed, after which they will, no doubt, become the property of the British museum, and be open to inspection under museum rules. The distinction between Dr. Günther in the capacity of keeper of the zoölogical collections of the British museum, and Dr. Günther in the capacity of naturalist, engaged upon the Challenger report, should be carefully observed.

Professor Gill refers to a case in which a certain European ichthyologist has recently been refused the privilege of examining the Challenger collections. Not being in possession of all the facts in the case, I shall not attempt to explain it. This I do know, however, that, at the time referred to, the Challenger fishes were being moved, together with the natural-history collections of the British museum, from Bloomsbury to South Kensington, and were in large part packed in boxes, so that they were really inaccessible; but a portion of the collection was still upon a table in Dr. Günther's private office: and these specimens, as well as others in his own house, were freely shown by him to Dr. Bean and myself. I cannot doubt that the same privilege would have been extended to any other ichthyologist who had made any reasonable request for the use of the material. It should be remembered, however, that these collections were not worked up in any way, were neither catalogued nor labelled, and were held by Dr. Günther as a personal trust from the Challenger survey, and had not yet passed into his official custody.

The question as to the extent to which any specialist, charged with the duty of working up collections made by a government expedition, may reserve to himself, while engaged in the preparation of his report, the handling of the material, is one into which I do not wish to enter at present. Professor Gill is apparently of the opinion that some question of moral principle is involved, and that working naturalists should be communists in respect to the use of material. The only point which I desire at present to make is this, that Professor Gill has evidently been misinformed as to the manner in which Dr. Günther has administered his trust as custodian of the zoölogical collections in the British museum.

In conclusion, I desire to enter a serious protest against the bitter and unreasonable criticisms upon Dr. Günther's work which have of late years so fre-

<sup>1</sup> *Science*, Feb. 1, 1884, p. 139.

quently appeared in American journals. Criticism which ignores all that is good, and exaggerates all that is imperfect, in the work of any specialist, especially in that of so eminent a master as Dr. Günther, is greatly to be deprecated. G. BROWN GOODE.

Washington, June 1.

#### 'A singular optical phenomenon.'

With reference to the 'optical illusion' to which your correspondent 'F. J. S.' drew attention (*Science*, No. 57, p. 275), and which has been abundantly illustrated and explained in later numbers, may I suggest to your readers who have not yet witnessed the phenomenon, to beg, borrow, or buy a few square inches of that finely perforated card which ladies were accustomed to use a good deal for working book-markers, initials, and the like.

There are several ways of using it with good effect. 1°. Before cutting the sheet, use it with a hand-mirror, standing (a) with the back to the light, and looking *through* both the real and the reflected cards; (b) facing the light, and looking *through* the one, *at* the other. 2°. Cut off a strip if the quantity available is restricted: otherwise divide in two more equal portions, and holding the smaller in one hand, between the eye and the larger, vary the distances absolutely and relatively, and also the relative inclinations (in their proper parallel planes); in this case, also, varying the position with respect to the light. 3°. Use the same close to a strong light, in such a way that the first surface (and the fourth) shall be in shade, while the second, and more especially the third, shall be in strong light.

The variations possible are, of course, far too numerous to admit of categorical statements. Still less can I attempt to describe what is seen. Nor, indeed, would it be a sensible proceeding to describe what is at once so easy, and so very much more interesting to see. My object is merely to point out the means and the manner.

I will, however, mention two of the more curious aspects presented. 1°. When a luminous background is seen through the reflected screen, and the latter is moved freely about in its own plane (which, of course, is supposed parallel to the glass), the phantom screen remains *stationary*. 2°. When one screen is held at arm's length, and the other two or three inches nearer to the eye, so as to produce a phantom some three or four times the size of the real pattern, the circumstances are favorable for concentrating attention on the contrast of colors presented. What I see is a sharply-defined rectangular network, as of blue steel wires with secondary and tertiary nets of doubtful color and indistinct form. As the intermediate screen is brought nearer to the eye, up to halfway, the intensity of color of the blue netting is much increased. I cannot pretend to give an exact indication, as I have only made a sort of hasty reconnaissance of this field. I notice, however, that the phenomenon presented by *inclining* the axes of the patterns to each other produces a wonderfully kaleidoscopic appearance.

To pursue the experiments, I should wish to use different patterns of perforation, and differently colored lights.

J. HERSCHEL.

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London.

#### Guyot's 'Creation.'

In the notice of Guyot's 'Creation' there is an error which makes me say precisely the opposite of my meaning. On p. 601, first column, fifth line, for 'only' read '*more than*.'

WRITER OF THE NOTICE.

#### PRESIDENT ELIOT ON A LIBERAL EDUCATION.

PRESIDENT ELIOT's address before the Johns Hopkins university in February last, which appears in the *June Century*, though radical from one point of view, is not so from another. In maintaining that Greek should no longer be an indispensable requisite to the bachelor's degree, he takes what the conservative educators must regard as very radical ground. But when we examine what he would substitute for Greek, and what studies he regards as affording the most profitable culture, we see that he does not take the same view as the advocates of scientific education. The studies which he would elevate as at least co-equal with Greek, are the English language and literature, the French and German languages, history, political economy, and natural science. A careful examination will show that this proposed change would not be the substitution of a scientific for a literary culture, but rather the contrary. The leading studies in literature are now Greek and Latin; the modern languages, literature and history, being confessedly taught in a comparatively imperfect way. By adding history and the three modern languages to the curriculum from which the student makes his choice, a very large addition is made to the literary side of the banquet. This addition is hardly compensated by the increased consideration which he would give to political economy and natural science.

While it seems, therefore, that we can hardly regard President Eliot as a pronounced partisan of a scientific education, it must be admitted that the ground taken by those who are such partisans is not very definite. Their stereotyped complaint is that too much attention is given to languages and mathematics. Scientific studies are thus placed in contradiction to those two subjects. Now, comparing our own education with that of other countries, it can hardly be claimed that we pay disproportionate attention to either mathematics or languages in this country. Not only is our mathematical education far behind that of France and Germany, but a much better mathematical training than our average student gets is absolutely necessary to an adequate comprehension of modern physical science. To take an example: it is safe to say that the number of our college graduates who know mathematics enough to understand clearly what physicists mean by the terms 'conservation' and 'transformation of energy,' is very small. One fact well worthy of consideration on both sides is, that, notwithstanding that the Germans