of ordinary algebra, of determinants, of substitution and group theory, of the theory of numbers, and of the theory of probability. Netto's book is of value as a reference book, especially as no text of importance on combinatoric has been published for sixty-five years. In arrangement and selection of material it resembles somewhat Netto's brief article 'Kombinatorik' in the 'Encyklopädie der Mathematischen Wissenschaften.' The book takes notice of researches of recent date, including several papers by American authors. Starting out with the fundamental definitions the author treats of combinations, permutations, and variations under different limiting conditions, leading up to various problems, as, for instance, Tait's problem of knots. Combinations and variations are considered under the restriction of a definite sum or a definite product of the elements. The partition of numbers and Durfee's graphs are taken up. In the course of further combinatorial operations the author studies systems of triads arising in connection with Kirkmann's and Steiner's problems. Steiner's queries have not yet been fully answered. Kirkmann's is the 'Fifteen School Girl Problem': 'To walk out fifteen girls by threes, daily for a week, without ever having the same two together.' In the discussion of this it is to be regretted that Netto overlooked E. W. Davis's pretty 'geometric picture,' given in the *Annals of Mathematics*, Vol. XI., 1897, where a one-to-one correspondence is established between the fifteen girls and fifteen points on a cube; eight points at the corners, six at the mid-points of the faces, one at the cube-center; the thirty-five triads are then easily found.

Netto's book is substantial food for the average reader. Yet some topics in combinatoric were originally suggested by questions propounded for amusement. The 'problem of the eight queens' is of this nature. Eight queens are to be placed upon a chessboard so that none of them can capture any other. It was first propounded in Berlin in 1848 and has 92 solutions. J. Bernoulli, in his 'Ars Conjectandi' (1713), gives certain hexameter lines in which the words were to be changed about in every possible way, yet so that every new arrangement still conformed to the laws of verse. Thus the hexameter,

Tot tibi sunt dotes, Virgo, quot sidera cœlo,

studied by several pious mathematicians, admits, according to Bernoulli, of 3,312 such arrangements. An interesting recent book, taking up combinatorial and other mathematical topics for the purpose of recreation, is W. Ahrens' 'Mathematische Unterhaltungen und Spiele' (Teubner, 1901).

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Discussion and Correspondence.

The Opportunity for Further Study of Volcanic Phenomena.

To the Editor of Science: It has been just four months to-day since the terrible calamity at St. Pierre occurred. Much has been written and said concerning it. Many able scientific men—French, British and American—have examined the locality and published thereon, but so far as I am aware their observations and conclusions only point to one deduction—that the terrible secret of Pelée's destructive clouds is still unsolved, and that the volcano still exhibits a deadly unexplained force, as attested by two thousand additional victims last week.

I think I may speak correctly, when I say that all the visiting geologists agree upon the major geological facts and only diverge seriously when they reach the field of speculation concerning the nature and behavior of the mysterious gases and clouds of lapilli, which descend instead of arising, which developed marvelous electric effects, after passing away from the crater, and which create powerful destructive forces.

So far as I am aware there was not a single member of the American scientific corps who did not leave the scene with a knowledge of the incompleteness of his studies and the lack of facilities for study during the brief time he was there. One of these, Professor Heilprin, has returned to the scene at his own expense, but, alas, even if he has survived

last week's eruption, he was not equipped with means to complete the work.

While more geological study is needed, the chief problem of Pelée is the nature of its gaseous ejecta, and it is no longer within the power of a geologist single-handed to solve it, but a carefully planned and equipped co-operative expedition accompanied by physical, chemical and photographic apparatus is needed.

In order to advance knowledge a party should be sent to Martinique for an indefinite stay of several months, with spectroscope, seismographs, chronographs, special photographic apparatus and all necessary equipment to study the eruptions with special reference to their electrical, magnetic, gaseous and other physical behavior. Furthermore, some society or individual should have seismographic stations established throughout the West Indies and our southern coastal plain—and this could be probably aided by our Coast and Geological Surveys, or by the Weather Bureau.

A temporary and healthful observatory and laboratory could be established on the slopes of Carbet overlooking Pelée, from which studies could be made with perfect safety. The talk about the danger of the annihilation of the island is all wrong. The recent deaths were all within the previous zone of danger coincident with the slopes of Montagne Pelée proper, but the rest of Martinique, except villages at sea level in reach of tidal waves, is perfectly secure.

Never was there a time so propitious or important for concerted effort to secure new and important light upon the behavior of volcanoes, and some society or individual should immediately raise the funds to conduct and direct this important work.

Americans are letting a great opportunity pass to add to knowledge, and I humbly beg that those who are in a position to equip such an expedition or to influence our learned societies or individuals, give this subject their serious consideration.

ROBT. T. HILL.

U. S. GEOLOGICAL SURVEY.

MR. BORCHGREVINK ON THE ERUPTION OF MT. PELÉE.

TO THE EDITOR OF SCIENCE: There are certain features of the article 'History's Greatest Disaster,' by C. E. Borchgrevink, descriptive of the eruption of Mt. Pelée, Martinique, in May of the present year, and published in the July number of *Frank Leslie's Monthly*, which are so inaccurate or misleading that they should be corrected.

On page iii of the 'Martinique Supplement' referred to there is an illustration with the caption: "This remarkable photograph was taken during the grand eruption [of Mt. Pelée] of May 20th. The camera was knocked from the photographer's hand and was not recovered till the following day. The fate of the photographer is unknown." The facts are that this photograph was not taken on May 20; it does not represent an eruption of Mt. Pelée; the photographer did not lose his camera; he is still doing business in Kingstown, St. Vincent. The photograph was taken by J. C. Wilson, photographer, of Kingstown, St. Vincent, and it represents an eruption of La Soufrière.

On page iv there is an illustration with the caption, 'The smoking lava beds of Pelée.' This illustration was not made from a photograph of any part of Mt. Pelée, but from a photograph of the mouth of the gorge of the Wallibou river, St. Vincent, with Richmond Peak (a part of Morne Garou) in the background.

On page xiii of this article on Martinique there is a picture labelled, 'The two craters of La Soufrière.' These so-called craters are not on Martinique. The illustration was made from a photograph of the Pitons of St. Lucia, which is a stock picture in all photographers' shops.

The last instance to be noted is one on page xvi, which is called 'General view of the island'—presumably of Martinique, since the article deals solely with that island. This illustration is not of Martinique. It is a composite, made up from two photographs of La Soufrière, St. Vincent, taken from nearly the same point of view. In the middle distance we have, be-