

The figures given of these particles show that they closely resemble pumiceous dusts (see NATURE, vol. xxix. p. 587). An examination of the sandstones with which these dusts are sometimes found interstratified proved that they consist of well-rounded particles of triclinic feldspar, hornblende, and magnetite, and that they are therefore, like the associated dust deposits, of volcanic origin.

Among a series of so-called "Pliocene sandstones" collected in Montana and Idaho in 1871 by Dr. A. C. Peale, of the Hayden Survey, Prof. Merrill was able to detect similar pumiceous sands in a more or less pure state. In their microscopic characters several of these were found to be very similar to the pumice-dust which was thrown out so abundantly during the great eruption of Krakatão.

"All of the above-mentioned dusts yielded water when heated in a closed tube, and fused readily, with swelling, before the blow-pipe. Samples submitted to Mr. J. E. Whitfield, of the Geological Survey, for analysis, yielded results as follows:—

	Marsh Creek Valley, Idaho	Little Sage Creek Mountain	Devil's Pathway
Ignition	6'00	6'50	5'60
Water ¹	1'60	1'12	3'46
Fe ₂ O ₃ + Al ₂ O ₃	16'22	18'24	17'18
SiO ₂	68'92	65'56	65'76
CaO	1'62	2'58	2'30
MgO	trace	0'72	trace
Na ₂ O	1'56	2'08	2'22
K ₂ O	4'00	3'94	3'14
	99'92	100'74	99'66

Accepting the apparently well-founded conclusions of others to the effect that such dusts represent the extreme degrees of acidity of the lavas of which they formed a part, we are led to consider these as of andesitic or possibly trachytic derivation.²

Other similar materials have been examined from Bridger Creek, on summit of a hill near Bozeman, and in connection with fossil bones from the Niobara Loup Fork and Sweetwater regions. A sample obtained from the base of the Mazatzol Mountains at the edge of Verde River Valley is stated to be quite similar to that described from the east of the Black Hills of Dakota, described by Dr. Wadsworth,² and also to those previously described by Prof. Merrill from Nebraska. Other similar dusts have been obtained by the officers of the United States Geological Survey from Wray Station in Eastern Colorado, and from Norton and Phillips Counties, Kansas.

"In studying the probable origin or sources of these various beds, the distances which the dust can be carried by atmospheric currents is likely to prove of importance. It may therefore not be out of place to state here, that among a collection of pumices, ashes, &c., from the Krakatão eruption in 1883, and which were donated to the Museum by T. H. Houghton, was a small sample of the dust (36974) that 'showered on board ship *Beaconsfield* at the rate of one inch per hour for three days, in latitude 14° S., longitude 92° E., or at a distance of 855 miles from the scene' of volcanic activity. This dust is a very pure, nearly colourless, gray and highly pumiceous glass, the particles of which vary in size all the way up to 0.25 mm.

"As a matter of economic interest I may say in conclusion, that in Kansas and Nebraska these dusts are collected and sold in paper packages as 'diamond polishing-powder,' or put into soap which is sold for general scouring as well as for dental use under the name of 'Geyserte soap.'"

¹ Water given off at 105° C.

² *Science*, July 24, 1885.

THE POTATO TRICENTENARY

AN article on "The Origin of our Potato," which appeared in our columns on May 6, contained these words: "It would be a fitting observance of the third centenary . . . if we could celebrate it, not by speeches and after-dinner toasts to the memory of Drake or of Raleigh, but by clearly laying down our lines of inquiry, for they have been very ill-defined." These words, penned by our contributor with then no definite idea as to the way in which various thinkers could be brought together to help to lay down lines of inquiry, have had their effect. The proprietors of the St. Stephen's Hall took the subject up, and in a circular headed 1586-1886, printed in old English type, referred to the article in NATURE as drawing attention to the fact that 1886 was the accepted date for the tricentenary, and announcing their intention to celebrate it in the spirit suggested, with Conferences and an historic and scientific Exhibition, conjoined with a display of all known varieties of tubers that could be obtained. A "Scientific Committee of Consultation" readily offered their services to arrange the "historic and scientific" portions of the Exhibition and to conduct the Conferences. Leaving, as it was seen we were, the old lines of cultivation, and entering on a more thoughtful, a more scientific way of procedure, the turning-point appeared to demand a recognition of the past, an exposition of present knowledge, and something tangible of the on-look into the future.

The proprietors of the St. Stephen's Hall, while acting as the executive, and arranging the display of tubers, and offering gold, silver, and bronze medals, left all the scientific work to the Committee of Consultation. Those who first accepted their responsibilities had to seek the co-operation of others, and only those who were specialists in the portion of the subject they represented were invited to join it. In the list of sections as drawn up, the botanical aspects of the question naturally came first, and Mr. J. G. Baker, F.R.S., of Kew, undertook to illustrate "The Known Wild Species of Solanum," which he did partly by dried specimens and partly by drawings. No one was found to undertake the section "Batatas, yams, ighnamas, &c., that in Elizabethan times were called potatoes," but specimens of yams and so-called batatas were shown. Some uncertainty about the vernacular nomenclature of these seems to exist. The section "Cultivation by the Incas and other Andean Nations" was accepted by Mr. C. R. Markham, C.B., F.R.S., who in the Conference added more information than could be given in the form of an exhibit. For the next section on the programme, "Early Cultivation in the British Isles," no one could be found. This is a fact worth notice. There must surely be some one who has paid attention to this subject, yet even after the Committee was fully formed it was not known to whom to apply for information.

The next section, "Cultivation," with its sub-sections—(1) Selection, (2) Cross-breeding, (3) Hybridisation, (4) Grafting—was undertaken by Dr. Maxwell Masters, F.R.S.; and the following section, "Potato-disease," was well filled up with contributions from Mr. W. Caruthers, P.L.S., Mr. Worthington Smith, Dr. Plowright and Mr. Geo. Murray, F.L.S. For the section "Chemistry of the potato and batata as a food" Prof. Church sent new analyses, and Mr. W. Topley, F.G.S., of the Survey, contributed maps and notes on "Soils suitable for Potatoes geologically considered."

In "Meteorology as affecting Disease," Mr. J. G. Symons, F.R.S., exhibited rainfall maps showing coincidence with special disease years. The next section, "Historic literature of the potato," was in charge of Mr. W. S. Mitchell, M.A., and by the help of dealers in old books, and of private collectors, the list he had drawn up had but one gap—a Monardes. Such a collection has no before been brought together. The section "Maps showing the knowledge of the New World at the time of Elizabeth"

was formed by the help of Mr. Coote, of the Map Department of the British Museum, Mr. C. R. Markham, Mr. Henry Stevens, and others. For the section "Raleigh" Dr. Brushfield, of Salterton, Devon, sent up his collection of works, which, with some additions, were arranged by Mr. H. B. Wheatley, F.S.A.; while the "Drake" section was mainly composed of an interesting series of illustrations sent up from Plymouth by Mr. W. H. K. Wright, of the Public Library. Mr. B. D. Jackson, Sec. L.S., contributed the works illustrating the "Gerard" section; but no one could be found to supply any information about Herriott, as that section was blank.

It is worth noting that this Exhibition was not one in which the list of sections followed what was sent in. What ought to be shown was drawn up first, and where the required works or maps, &c., could not be obtained the blank was understood.

Many unexpected curiosities arrived. Potatoes from Youghal, co. Cork, where it is said Raleigh planted his first potatoes in Ireland, were sent, together with views of his residence there where he conversed with Spenser. Irish cooking-pots of the same type as those in use 300 years ago, and rough garden, or possibly field, tools, were also sent over. Potato-culture in every aspect was represented, except in illustrations of the new methods of artificially fertilising by removing pollen from one flower to another.

As regards the show of tubers, the judges, Messrs. Shirley Hibberd, William Earley, and R. Dean, considered them well worthy of the occasion. The especial aim was that every known variety should be represented, and there was a special section for new varieties, introduced within the last two years, not yet in the market. The prize-winners of the medals offered by the executive have been made known in journals devoted to these subjects.

The Exhibition itself dealt with the past, including in that, history from the time of Raleigh and Drake down to the recent past,—Mr. Baker's work on distinct wild species of tuber-bearing Solanums, which he has reduced from six to four since his paper at the Linnean Society was read.

The chief scientific importance of the celebration of the tercentenary, however, lay in the Conferences.

At the opening, Mr. W. Carruthers, P.L.S., took the chair, and the first paper was read by Mr. W. Stephen Mitchell, M.A., on "Historic Consideration of the Question, whence came the Potato to England." Alluding to articles he had written, he said it was easy to see how the mistake had arisen that the introduction of the potato had been attributed to Raleigh, and that Virginia had been regarded as its original home; and he expressed his belief that Drake brought it from Carthage in his 1586 expedition, on which expedition he had asked his friend, Mr. W. H. Pollock, to contribute a paper. This paper (read in the writer's absence by Sir Richard Pollock) detailed the expedition, and showed that there was opportunity for Drake to have taken on board the potato as ship's-provender at Carthage. The supply at Carthage depended on native cultivation. Then in due sequence followed Mr. Clements R. Markham's paper on "The Cultivation by the Incas and other Andean Nations." This paper proved to be the surprise for the Conference. The cultivation by the Incas was already fairly well known, as our article of May 6 showed, from the writings of Garcillasso de la Vega, Acosta, and Cieza de Leon. But the cultivation by the Chibchas was the revelation. Not only have the people died out, but their language has been lost. A *vocabulario*, however, has preserved many of the words they used, and nine varieties of potato are in it named. It is thus seen that before the Old-World people (the Spaniards) reached the New World, the potato had been so long cultivated, and that distinct varieties were recognised. Mr. Markham most eloquently described the high civilisation of the Incas,

and with a large-scale lecture-map, belonging to the Royal Geographical Society, showed the regions of potato-cultivation as they can be inferred from early writers. Following most appropriately on this was Mr. J. G. Baker's paper on wild species of potatoes as known to botanists at the present day. In the discussion which followed, there was naturally raised the question, What are wild species, and what were cultivated by the Incas and other neighbouring peoples? but, of course, no definite answer could be given. This is one of our troubles. Mr. Markham's paper was also of very considerable interest. M. Henri de Vilmorin then gave a brief account of what he had been able to ascertain about the introduction of the potato into France, which he hopes to be able to work out more fully. This concluded the historic portion of the work of the Conference. Then Mr. George Murray, F.L.S., of the British Museum, gave an account of the history, of the study, and of the present state of our knowledge of the potato-disease. The facts he mentioned have already appeared in these columns. The day's work ended with a vote of thanks to the Chair, proposed by Earl Cathcart.

On the second day of the Conference, Mr. W. S. Mitchell in the chair, the first paper read was by Dr. Maxwell Masters, F.R.S., "On the Production of Varieties by Cultivation." It embodied the thoughtful appreciation of past work, and what has to be done in the future. It is on hybridisation our hope must mainly rest, on a cross by artificial fertilisation between two distinct species, all other "cultivation" being but a continued ringing of changes. It was, from a practical point of view, the most important communication made to the Conference. The following papers by Mr. W. Earley, Mr. A. Dean, and Mr. R. Dean took up the question of cultivation from the grower's point of view, and coming as they did from such recognised practical men they were of value. Mr. Hibberd criticised, from his own experiments, the value of the Jensen system of earthing-up, and stated his belief that it did not add to the crop, even if it might, as asserted, prevent disease from spreading. He suggested, and backed up his suggestions with reference to his own experience, that the early raising of a crop showing signs of disease was of use. The period for doing this, however, he did not mention, and to raise a crop before the starch is formed in the tubers would be of little real value. The suggestion, however, is one of importance for future consideration. He detailed an unintended experiment made during the last twelve months which is worth the attention of practical men. It will reach them through horticultural journals. Mr. R. Dean, in his paper, admitted that, although he had thought potato-culture was thoroughly "threshed out," he had come to see much remained to be done. The aim of the cultivator had been to produce handsome table tubers. Sufficient attention had not been paid to degeneracy and the causes of it. Again, though it is very well to produce new varieties, the trouble is to get them into general use. People will follow their old lines. In the course of his paper he advocated deep tilling. Mr. A. Dean, in reading on "Raising new varieties of potatoes," referred to the fact that some cultivated varieties do not produce any flowers, and some with flowers do not mature pollen. He detailed several experiments in crossing, and especially drew attention to varieties that do or do not produce much haulm. As it is through the leaves on the haulm that the disease reaches a plant, this is a matter of importance. In the course of the discussion Mr. Ap Thomas gave some valuable information about potatoes in South America, and Earl Cathcart expressed the hope that the information should be in some form preserved.

After the usual votes of thanks had been passed, the generally expressed opinion in conversation was that the Exhibition should have been open for four weeks instead of four days. That the Conferences, by bringing together

people who view the whole subject from different stand-points, have done good appears to be admitted. The future will show.

NEW ZEALAND COLEOPTERA¹

IN an important memoir quite recently published, Dr. Sharp describes a large number of new species of Coleoptera from New Zealand. Although the entomology of these islands is of considerable interest, it is still very imperfectly known, and a quite erroneous idea as to its poverty is very often found to exist. Linnæus knew of no Coleoptera from the group, but a small number had been obtained by the naturalists of Capt. Cook's voyage. Some of these were described by Fabricius about a century ago, and a few of these are still to be found in the Banksian Collection at South Kensington, but from Cook's day until the date when the island was visited by Her Majesty's ships *Erebus* and *Terror* little was done in the way of investigation. When Adam White published the account of the Coleoptera of this last Expedition (1846), he enumerated all the species of the group known to date to inhabit New Zealand, and the total was about 150; however, between 1866 and the present time, the greatly increased activity of collectors swelled the number of species known to nearly 1500, and in the memoir we are now noticing Dr. Sharp describes 141 additional forms. Dr. Sharp still, however, regards the Coleopterous fauna as very incomplete, and on the consideration of such data as he possesses ventures on an estimate that between 3000 and 3500 species will probably be found in New Zealand; so that there is an immense field still open for collectors. The fauna so far as known is very analogous to that of Europe in extent and complexity. The species when examined show similar structures, exhibiting analogous gradations and cross affinities, but the New Zealand insects possess a larger proportion of forms in which the structures are less perfect—comparatively, as it were, little evolved. In brilliancy of colour and in large and conspicuous forms, the New Zealand Coleoptera are very deficient, but to the specialist they make up for this in the interest attaching to many of them as isolated forms having, so far as is at present known, little or no connection with the ordinary Coleopterous fauna of the island.

While the data are so imperfect it is obvious that no reliable answer can be given to the question of the affinities of the New Zealand fauna; but Dr. Sharp, from what is known, entertains the impression that it will be in the Chilian and Patagonian fauna that the greatest amount of affinity will be found, and that, while numerous points of propinquity with the Australian fauna undoubtedly exist, yet they are rather exceptions dealing with isolated forms, and but little affect the mass of the fauna.

Lasiorhynchus barbicornis is the only member of the Brenthidæ found in New Zealand, and is perhaps the most remarkable beetle of the islands; it must be considered a highly evolved form, the sexual differentiation being great, with remarkable male characters, large size, and considerable perfection of general structure, and while it appears to be quite foreign to the New Zealand fauna, it would seem to have no really close ally in any other country.

Another isolated form, of large size, for many years known, but still a great rarity, is *Dendroblax*. Its position has never been satisfactorily fixed; it has no ally in New Zealand, and no near ally out of it. Such cases are extremely difficult to explain. Dr. Sharp thinks it possible that there has been going on in New Zealand, for an enormous period of time, the evolution of a fauna parallel with that of the continents of the world, and that during this period it has occasionally received intrusions

from other countries, some of which have continued to evolve since their introduction, while others have remained with little change. On such a view *Dendroblax* might be an ancient intrusion into New Zealand, which has become extinct elsewhere, and has evolved but little in New Zealand; while *Lasiorhynchus* might have evolved much since its introduction.

This memoir forms a part of the *Scientific Transactions* of the Royal Dublin Society, and both as regards the paper and press-work it is extremely creditable to the Society. The two quarto plates contain fifty figures of the new species described. These are from the pencil of Baron Schlereth, of Vienna, and are among the best illustrations of Coleoptera we have seen. The plates have been printed after a new and brilliant process by Bannwarth, of Vienna.

THE RELIEF OF EMIN PASHA

EVERYBODY seems agreed that Dr. Schnitzler, better known as Emin Bey, but recently created Emin Pasha, ought to be relieved; for he does not want to be rescued. For ten years he has been in the Egyptian service, for most of that time as Governor of the Equatorial Province, which, in spite of the Mahdi and his hordes, the death of Gordon, and the collapse of the Egyptian Soudan, he continues to administer with success, and to the comfort and satisfaction of all but slavers. What Emin Pasha has done for science in the little leisure left him by his arduous duties, the readers of *Petermann's Mitteilungen* and the *Proceedings* of the Zoological Society know. He is a good type of the kind of explorer that is wanted now that mere pioneering work has been pretty well exhausted: a man well qualified by his scientific training to remain in a particular region for years if necessary, and study it in all its aspects. We have had such men in the past: some of the greatest names in science could be mentioned as examples. We do not insist in these pages on the great services which Emin Pasha has rendered to civilisation during his residence in the Soudan, first as the noble-minded Gordon's lieutenant, and latterly as one who, in the spirit of Gordon, resolved to stick to what he conceived to be the post of duty at all hazards. Our own Government has virtually admitted its responsibility for the present position of Emin Pasha, but has weakly attempted to shirk its duty by devolving the business of relief on private individuals. Should disaster happen, however, to Emin Pasha or to any expedition sent to his relief, we may be sure that public opinion will not blame any private individuals. Government, however, has gone so far as to promise every assistance short of contributing money.

It is unfortunate that already there has been a delay of several months since first we knew of Emin Pasha's critical position, and since first the Intelligence Department began to make inquiries as to the best route for a relief expedition. Even now, when an expedition has been decided upon, there seems little prospect of a speedy start. Surely, if those to whose hands the 10,000*l.* contributed by the Egyptian Government have been intrusted had the interests of Emin Pasha solely at heart, a competent leader would have by this time been within hail of Zanzibar. A better leader, under the conditions, than Mr. Stanley could probably not be found; but surely there has been unnecessary delay in deciding to send him. The idea of more than one expedition is entertained by many; and, as our map will show, the most direct and safest route is by Masai Land, about which we now know so much through the journeys of Mr. Thomson and the late Dr. Fischer. Dr. Junker telegraphs from Zanzibar that a relief expedition is urgently necessary, and that as fighting is inevitable, Mr. Stanley ought to be sent. By the Masai Land route, as shown on the map, avoiding Unyoro

¹ "On New Zealand Coleoptera, with Descriptions of New Genera and Species." By David Sharp, M.B. With two plates. (Dublin, 1886.)