to do justice to the importance of the contributions from so many centers, and I have had perforce to content myself with a survey of the work going on in our university laboratories.

Laue discovered X-ray diffraction only a generation ago. X-ray analysis has now come to be of such importance that the formation of an International Union of Crystallography has been approved by the Council of International Unions this year. It has indeed attained its majority, and I feel deeply moved when, on such an occasion as this, I review the tree which has grown from the seed of Laue's original discovery and the early attempts by my father and myself in 1912 to discover the arrangement of atoms in crystals.

A New Zealand Expedition of the American Museum of Natural History

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BETWEEN NOVEMBER 1947 AND MARCH 1948, field work for the American Museum was carried out in New Zealand by the writer and Mrs. Murphy. Aims of the expedition comprised the acquisition of material for two habitat exhibits in the Whitney Memorial Hall of Pacific Bird Life, systematic study of oceanic bird collections, negotiation of intermuseum exchanges, and the excavation of moas and other extinct birds. The writer also represented the Pacific Science Board in discussion of plans for the Seventh Pacific Science Congress, to be held in Auckland and Christchurch next February. Financial support of the undertaking was provided by the Whitney Memorial Fund, a gift to the American Museum of Natural History from Mr. Cornelius Vanderbilt Whitney.

The scientific program was arranged in advance with Dr. Robert A. Falla, director of the Dominion Museum at Wellington and president of the Royal Society of New Zealand. The State Department at Washington simultaneously requested necessary privileges from the New Zealand Government, with the result that the Department of Internal Affairs, acting through Secretary J. W. Heenan, extended generous and effective cooperation during travel and investigation from end to end of the Dominion. Related aid was given by the Marine Department, by the authorities of the museums and university colleges at Auckland, Wellington, Christchurch, and Dunedin, and by other institutions and individuals too numerous to list.

Field operations began at the Snares Islands, 62 geographic miles south of Stewart Island. This small and relatively inaccessible group had not previously been visited for more than a few hours by any scientific investigator. It has the great advantage over nearly all other islands in the subantarctic belt of being pristine. It has never had human inhabitants, introduced organisms are lacking or unobtrusive, and the extraordinarily interesting vegetation and animal life, including daisy-trees (*Olearia*) and the endemic crested penguin pictured on the cover of this issue of *Science,* have remained essentially undisturbed since the era of sealing in the early part of the 19th Century. The only mammals are three species of seals, for the Snares have escaped the curse of man's satellites, such as rats, pigs, etc. There are 25 kinds of native birds, of which three are endemic land birds. The vascular plants total about the same number as the birds. In a zone where a visitor might expect to find antarctic beeches (*Nothofagus*), the dense "goblin forest" is, on the contrary, made up of tree-composites of subtropical affinities.

A band of New Zealand scientists, led by Dr. Falla and including other naturalists, a geologist, and a geodesist, conveyed the American Museum representatives to the Snares in the 73-foot Diesel craft *Alert,* commanded by Capt. Alexander J. Black, of Dunedin, who is himself a well-informed naturalist and a famous leader and instructor of Sea Scouts. A telephonic radio station was established, after which the party of 9 men and 1 woman camped on the main island from November 24 until December 6, 1947, when the vessel returned. Collecting the abundant bird life was limited to specimens intended for installation in the exhibit in New York. Other organisms, such as plant specimens, were more liberally sampled, and, despite characteristically unfavorable weather of the west wind zone, a Kodachrome motion-picture record was obtained of birds, seals, landscape, and some of the activities of the investigators. The

most notable ornithological discovery was that the petrel called the Cape pigeon (*Daption capensis*) nests at the Snares, in the surprisingly low latitude of 48° S. All previously located breeding grounds of this sea bird lie south of the Antarctic Convergence, in the Polar belt.[1]

A significant result of the Snares reconnaissance is that the New Zealand Government has decided to maintain these islands as an inviolate wildlife sanctuary, secure even from the commonly approved annual harvesting of young shearwaters ("mutton-birds") as a food resource.

The second undertaking for the American Museum was carried out at Lake Brunner, Westland, South Island, in January and February 1948. Here studies were made at the edge of virgin mixed podocarp "bush" for the reconstruction of a New Zealand scene of 5 centuries or more ago, when at least one form of moa, and all the more recently extirpated native birds, still flourished. The Government granted permission to collect representatives of the part of the typical New Zealand avifauna that is still common. Newcomers to the Dominion, whether European species introduced by man or relatively recent natural invaders from Australia or Oceania, such as the harrier and the silver-eye, were excluded from consideration, since the exhibit is to represent strictly ancient New Zealand. Rarer birds, such as the kiwi and laughing owl, will be mounted from older study skins in the American Museum, whereas the extinct rail-like takahe (*Notornis*) and a small moa (*Euryapteryx*), the only member of its order known to have been hunted by the Maori aborigines, will be reproduced in facsimile.

Excavations for gigantic birds that disappeared before the arrival of white men were made possible by the liberality of the Canterbury Museum Trust and were undertaken between December and February at the Pyramid Valley Swamp, near Waikari, North Canterbury. This unequaled deposit has been once reported upon before the war,[2] at the beginning of which investigations were temporarily suspended. The site is the now-filled bed of a former forest lake in a pocket between limestone ridges. The matrix in which the bones of hundreds—perhaps thousands—of birds are remarkably well preserved is a curious yellowish, elastic, anaerobic, organic jelly which emits an odor of hydrogen sulfide. An 80-inch cross section of this substance, with its contained fossil or subfossil invertebrate remains, has been submitted for analysis to Prof. Edward S. Deevey, Jr., of the Osborn Zoological Laboratory, Yale University.

Several experienced leaders in New Zealand fossil-hunting, including Dr. Falla, Dr. W. R. G. Oliver, Profs. E. Percival, Robin S. Allan, Lance W. McCaskill, and Mr. Edgar F. Stead, took part in and guided the digging, with the result that the skeletons of 22 moas and bones of numerous smaller birds were recovered. The American Museum became the fortunate recipient of individual skeletons representing the following genera of moas, which run the whole gamut of size-range within the group: *Euryapteryx, Pachyornis, Emeus,* and *Dinornis.* The Museum was likewise granted an example of a rare contemporary of the moas, namely, the giant flightless rail (*Aptornis*), of which the first-known practically intact skeletons were recovered during the search here described.

No moa skin or feathers were found in the wet deposits of the swamp, but remains of this nature were studied in the Otago Museum at Dunedin. On the other hand, the Pyramid Valley pits yielded moa stomach contents, with gastroliths and readily identifiable leaves and twigs.

Secretary Heenan, of Internal Affairs, seemed hospitably determined that the visitors from New York should miss no opportunity to inspect the varied physiography and peculiar plant and animal life of New Zealand and to observe the tremendous man-made changes, for better or worse, that have come about in only slightly more than a century. Transportation by train, plane, motor car, launch, trawler, and the Government yacht *Matai* was provided for journeys to most parts of all three main islands. The Alps and other ranges, the lakes, the peerless sounds, fur-seal stations, glaciers, thermal districts, grasslands, the kauri, taxad, and beech forests, the Maori centers, and the bays and outlying islets were seen and enjoyed to an extent rarely possible even for New Zealanders. The islets visited included such classic localities as Little Barrier, Karewa, and Solander.

Most of the strange animals that symbolize New Zealand, such as the kiwi, weka, tuatara, *Amphibola,* and *Galaxias,* were observed and also in most cases captured alive, handled, and photographed. Dr. Falla, a foremost authority on the natural history of the southern circumpolar oceans and the best of guides and co-workers, devoted four months of his time almost exclusively to the interests of the Museum. It is anticipated that publication of reports on various aspects of the expedition will continue.

[1] Accounts of the visit have already been published by C. A. Fleming (*N. Z. Bird Notes,* 1948, **2**, 181–184) and Grace E. Barstow Murphy (*Nat. Hist.,* 1948, **57**, 412–416).

[2] This report was made by R. S. Allan, E. Percival, R. S. Duff, R. A. Falla (*Rec. Canterbury Mus.,* 1941, **4**, 325–353).