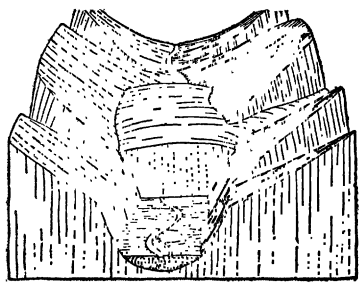
the main and the tributary channels becomes very striking, while we lose sight of the accordance that must have prevailed in the confluent



surfaces of the main glacier and its tributaries. The river channel as well as the glacial channel is U-shaped, but the abandoned glacial channel is so large that it often gives name to the valley in whose bottom it is eroded. The accompanying diagram roughly presents the form of an Alpine valley in preglacial (background), glacial (middleground), and postglacial (foreground) time.

THE heavy glaciation of valleys eroded in the massive gabbros of Skye has produced the following features, as noted by Harker (Geol. Mag., London, 1899, 196–'99). The cross-section of the valleys is U-shaped, especially in their upper part. The head of the valley expands in a corrie (cirque or amphitheatre) whose floor is often a rock-basin holding a tarn. In longitudinal profile, the floor of a valley often consists of two or three stretches of relatively gentle slope (or even of basin-form) separated by relatively sudden descents. Tributary valleys mouth at a considerably higher level than the floor of the main valley. McGee's paper on 'Glacial Cañons' (*Journ. Geol.*, II., 1894, 350–364), referred to by Harker, may be read to advantage in this connection.

It is noteworthy that the discordance of side and main valleys, emphasized by Penck as a characteristic of glacial action, and clearly recognized by McGee and Harker, has been mentioned in but few essays on glacial erosion; yet it can hardly be doubted that such discordance is one of the most striking features of strongly glaciated mountain regions.

ANCIENT VALLEYS OF NORTHEASTERN GERMANY.

THE origin of many broad valleys in northeastern Germany, as determined by ancient rivers flowing westward, marginal to the retreating ice-sheet of the last glacial period, has lately been restated by Keilhac (*Verh. Gesellsch. Erdlc.*, Berlin, XXVI., 1899, 129–139, map), with fuller detail than was given in the earlier explanations by Berendt and Girard. Five important valley courses are traced, exterior to five morainic belts; the southernmost connects the Oder at Breslau with the Elbe above Magdeburg; the northernmost led the Oder from Stettin northwest to Ribnitz and south again from Lübeck to the Elbe at Lauenburg. Lakes are indicated by horizontal shore-terraces at certain depressed areas along the valley courses, where the present northward discharge was ice-barred. The ancient ice-margin valleys owe their considerable breadth to the large volume of the rivers that were then supplied by melting ice on the north as well as by rainfall on the south. The rivers of to-day follow the ancient marginal valleys for moderate distances only, and then turn northward through depressions that were opened to them as the ice melted back; sometimes again turning westward for a stretch along the next marginal valley that is encountered. Thus sub-rectangular bends to the right and the left are systematically repeated seven times by the Oder, between Breslau and Stettin.

W. M. DAVIS.

ZOOLOGICAL NOTES.

MR. C. W. ANDREWS, in a recently issued part (Vol. XV., part 3), of the Transactions of the Zoological Society of London, describes at length and figures the skull and portions of the skeleton of *Phororhacos inflatus*, one of the gigantic extinct Patagonian birds. In discussing the relationship of the genus, which is put among the *Gruiformes*, Mr. Andrews shows a decided leaning toward *Cariama*, saying that the relations of the one toward the other are much the same as those of the extinct *Glyptodon* and *Panocthus* towards existing armadillos. Mr. Andrews will be glad to know that among the material obtained for Princeton University by

Mr. J. B. Hatcher, is a small species of *Phororhacos*, or some closely allied genus, in which the sternum is preserved, that this sternum is slightly keeled, and, although no critical comparisons have been made, that the general aspect of the sternum is like that of *Cariama* or *Gypogeranus*. F. A. L.

THE MALARIA EXPEDITION TO WEST AFRICA.

Major Ronald Ross, the lecturer to the Liverpool School of Tropical Diseases, who recently headed the malaria mission to Sierra Leone, delivered an address on December 27th at Liverpool, on the invitation of the African trade section of the Liverpool Chamber of Commerce. His subject was 'The Recent Medical Expedition to West Africa.' According to the London *Times* Major Ross said that politics and science were culminating in two movements of high importance. In politics the Great Powers, tired of self-development, were endeavoring to extend their possessions and civilization all over the world; while in science they had created what was perhaps the most fundamentally important of all knowledge—the experimental science of disease. He believed that in the coming century the success of Imperialism would depend largely upon success with the microscope. Our possessions in Africa were battle grounds between Englishmen and king malaria: they were conquests maintained only at the sacrifice of hecatombs of our countrymen. Malarial fever was perhaps the most important of the diseases of the tropics. For a long time they could obtain no accurate knowledge as to how the disease was produced, but in the last two years they had ascertained definitely at least one mode of infection. They knew for certain that malarial fever was often, perhaps always, caused by the bite of the species of gnat or mosquito called anopheles. The object of the expedition from the Liverpool School of Tropical diseases was to ascertain whether there was any chance of exterminating the anopheles from a given malarious area. It was not the immediate purpose, as some supposed, to banish malaria then and there from the whole continent of Africa. They wished to inquire what could be done in two or three square miles. They selected Free Town, Sierra Leone, for the investigation, and reached there last August. After describing Free town, Major Ross said that the mission set themselves to work at once on the lines of the recent investigations in India and Italy. In a few days they found numbers of the anopheles, and in a few days more they discovered the germs of malaria actually within those insects. They knew then to an absolute certainty that the anopheles of Sierra Leone were responsible at least for a large part of the fever there. The next thing was to ascertain how they bred. Those very dangerous insects bred in small pools or puddles of a certain kind easy to detect when one had once seen them. They made a map of those pools and carefully studied the habits of the insects' larvæ. The conclusion they unanimously came to was that it would probably be an easy and inexpensive matter to rid the town almost entirely of the anopheles either by destroying the larvæ in the puddles or, bettter still, by draining away the puddles altogether.

Comparing the general mode of life of Europeans in Sierra Leone and India, Major Ross said that, though Sierra Leone was scarcely more fatal to Europeans than some parts of India, it was certainly much more unhealthy than the large majority of Indian towns and cantonments were. He confessed that after a service of many years in India and Burma he was much struck with a certain negligence in respect to some matters in Africa. In India Englishmen had learned how best to live in tropical countries. They had certain fixed institutions which they seldom did without. He referred to the commodious bungalow, with its large compound, the punkah, and the mosquito netting on the beds. There was no doubt all those were of great assistance, but in Sierra Leone he was astonished to find none of those things, at least in general use. Instead of there being a separate European quarter on the highest ground available and consisting of well-built houses each in the midst of an open garden, most Europeans in Freetown occupied poor wooden structures quite unfit for English people in that pestiferous climate, crowded together and mingled with the houses of the towns-