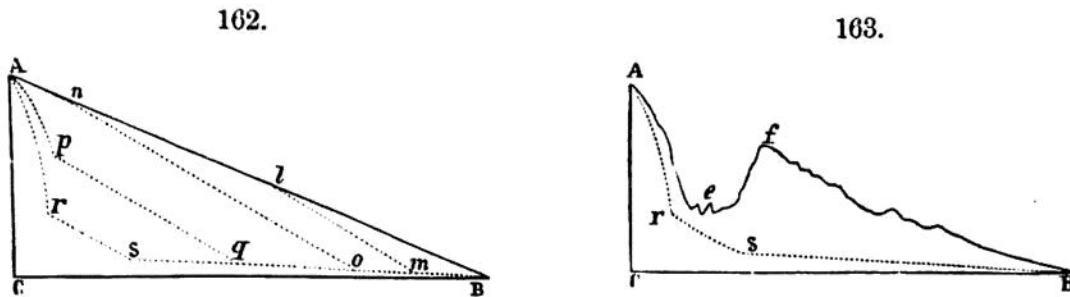


parts of the mountains, and especially those of the windward side, are the source of the water. The slopes collect it as it descends into streamlets; these increase toward the foot, where the valley, as Mount Kea shows, first takes shape.

The diagram Fig. 162, although greatly exaggerated in angle of slope, — that of the line AB, — will serve to illustrate the steps of progress. In the early stage a valley forms toward the base of the mountain, having its bed



along lm ; and later along no . On reaching o , the most of the descent of the declivity is made: the waters from o to B have, therefore, little eroding power at bottom, and commence to erode laterally during freshets, undermining the cliffs on either side, when the rocks admit of it, thus widening the valley and making a "flood-plain," or "bottom-lands," by deposition of the transported material in consequence of the slackened flow. The river, in this state, consists of its *torrent-portion*, Ano , and its *river-portion*, omB . Along the former, a transverse section of the valley is approximately V-shaped, and along the latter nearly U-shaped, or else like a V flattened at bottom. The river-portion, omB , usually exhibits, even in its incipient stages, its two prominent elements, — a *river-channel*, occupied at low water, and the *alluvial flat*, or *flood-ground*, which is mostly or wholly covered during freshets.

As the waters continue their work of erosion about the summits, where the mists and rains are generally most abundant and often almost perpetual through the year, the next step is the eroding about the summit and the continued deepening of the torrent-channel, making thus a precipice under the summit, or toward the top of the declivity; in this stage, the course of the waters is $ApqB$, and later, $ArsB$. The stream has now (1) a *cascade-portion*, and (2) a *torrent-portion*, besides (3) its *river-portion*. The precipices of the cascade-portion may be thousands of feet in height; and the waters may descend in many thready lines, to unite below in the torrent. The mountain cone, in such a case, may have its top chiseled into a narrow, crest-like ridge or peak, with many vertical alcoves in the face of the precipice that were made by the falling and leaping streamlets.

The next step in the progressing erosion, as Tahiti illustrates, is the thinning and wearing away of the ridges that intervene between adjoining valleys, in the higher regions where the descending waters are most abundant. It is in this way that two valleys (or perhaps more than two, by the wear of more