of very distant eras has been mainly owing to this circumstance, that the mineral character has no tendency to be affected by climate. A large river may convey yellow or red mud into some part of the ocean, where it may be dispersed by a current over an area several hundred leagues in length, so as to pass from the tropics into the temperate zone. If the bottom of the sea be afterwards upraised, the organic remains imbedded in such yellow or red strata may indicate the different animals or plants which once inhabited at the same time the temperate and equatorial regions.

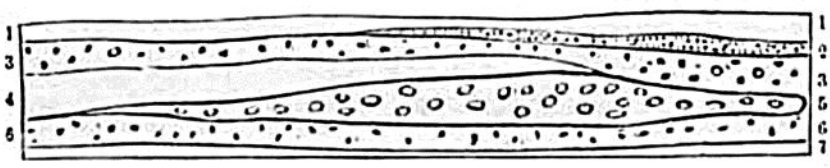
It may be true, as a general rule, that groups of the same species of animals and plants may extend over wider areas than deposits of homogeneous composition; and if so, palæontological characters will be of more importance in geological classification than the test of mineral composition; but it is idle to discuss the relative value of these tests, as the aid of both is indispensable, and it fortunately happens, that where the one criterion fails, we can often avail ourselves of the other.

Test by included fragments of older rocks.—It was stated, that independent proof may sometimes be obtained of the relative date of two formations, by fragments of an older rock being included in a newer one. This evidence may sometimes be of great use, where a geologist is at a loss to determine the relative age of two formations from want of clear sections exhibiting their true order of position, or because the strata of each group are vertical. In such cases we sometimes discover that the more modern rock has been in part derived from the degradation of the older. Thus, for example, we may find chalk with flints in one part of a country; and, in another, a distinct formation, consisting of alternations of clay, sand, and pebbles. If some of these pebbles consist of similar flint, including fossil shells, sponges, and foraminiferæ, of the same species as those in the chalk, we may confidently infer that the chalk is the oldest of the two formations.

Chronological groups.—The number of groups into which the fossiliferous strata may be separated are more or less numerous, according to the views of classification which different geologists entertain; but when we have adopted a certain system of arrangement, we immediately find that a few only of the entire series of groups occur one upon the other in any single section or district.

The thinning out of individual strata was before described (p. 16).

Fig. 104.



But let the annexed diagram represent seven fossiliferous groups, instead of as many strata. It will then be seen that in the middle all the superimposed formations are present; but in consequence of some of them