In another respect, also, the relation between ancient and modern river-beds is sometimes peculiar. The late channels have been rendered by erosion deeper than the older ones. But on the eastern slope of the Ural this is almost totally reversed. The diluvial gold-deposits characterized by the remains of the mammoth often lie below the water-level of the present streams, so that the latter must be diverted in order to mine the ancient beds. This condition apparently extends throughout the whole Siberian Plain, and may be taken as evidence that the erosive energy of its rivers has decreased since the Diluvial period, their fall having been reduced, either by the accumulation of the erosion-detritus or by changes in the relative altitude of the Ural Range.

The eastern slope of the Ural is characterized by numerous lakes and swamps along the tributary streams, and a number of these contain auriferous detritus, which has been mined for gold.

Marine Detritus.—In some regions, the auriferous detritus, after being repeatedly deposited and again swept away, to be redeposited further down the valleys, has at last reached the sea. The coast of Oregon, in western North America, and Vladivostock, in south-eastern Siberia, are examples. Here the ebb and flow of the tide operate very nearly on the principles of artificial ore-dressing; and one would think that a concentration of the heavier particles might be thus effected. But it does not appear that such effects have been recognised hitherto.

Kackar District, in the Ural.—At the beginning of this section, in the discussion of features of auriferous erosion detritus, some characteristics of the Ural placers were described. A few additional particulars concerning them may be of interest. The gold-bearing stratum occurs at no definite depth. As a rule, the whole of the barren or poor cover is stripped off and thrown aside before the auriferous layer thus laid bare is systematically attacked. Open cuts in the surface, of greater or less depth, are thus created, and are usually left to be filled up by the rivers. In the district of Kackar, already mentioned, in the Southern Ural, original gold-deposits ("root-deposits") of gold have been repeatedly found in the bottom of these cuts. They were well-defined quartz-veins, carrying in the upper zone free gold, but at greater depth sulphides and arsenides rich in gold. The original open cut extended for a considerable distance along the strike of the vein; but the bed-rock (which was at the same time the country-rock of the vein) was much decomposed, so that the difference between detritus and bed-rock was not strikingly evident; and the placer-working passed only by gradual stages into vein-mining.

Hysteromorphous gold-deposits may thus be said, in a general way, to occur in the following positions: 1. In the simple detritus of weathering, immediately upon the original deposit (root-deposit). 2. Mixed with the sand and gravel of present streams. 3. At certain points, in the river-bottom, into the crevices and fissures of which the gold has sunk. 4. Mixed with the impermeable material of older water-courses, through which the gold could not sink. 5. On the false bottoms or bed-rocks. 6. On the true bed-rock. 7. In the decomposed bed-rock itself.

In considering the chemical changes of the outcrops of deposits (including, of course, those which give rise to hysteromorphous derivatives) we have seen that sulphides suffer total decomposition, and that of their constituents only the unoxidizable metals, such as gold and platinum, remain unaffected. Silver-ores and native silver, being attacked by the chlorides of the vadose circulation, are consequently not found in hysteromorphous deposits. But gold occurring in nature is for the most part alloyed with silver. The gold from the veins of Budweis, in Bohemia, contains by weight about two parts of silver, and that of Transylvania contains by weight more than three of silver, to ten of gold. Whenever the gold of an original or root-deposit has been compared with that of its derived placer, the latter has been found to be of greater fineness—that is, to contain less silver. This phenomenon may be ascribed to the prolonged contact with water containing chlorides. The dull surface of placer-gold and its frequently spongy interior structure, as compared with the lustre and solidity of "quartz-gold," favour this explanation.

Platinum Placers.—Detrital deposits of platinum have been, until recently, particularly observed in the Ural only, from which the main supply of platinum was derived. Additional localities are now reported in the Altai district of Siberia, and in Canada and British Columbia. In the Tulameen district, it is said, the hydraulic method of mining has been introduced for platinum.

In the Ural, and particularly in its most productive district, that of Niznyj Tagil, the conditions closely resemble those of gold-deposits. The richest platiniferous layers are on the true bed-rock. Platinum and its associates, palladium, nevjanskite, and siserskite, being found to occur occasionally adhering to olivine and chromite, it was inferred that they were derived from the serpentine, which is itself a secondary product from olivine-rocks. More recently, platinum is said to have been found in an olivine-gabbro not yet metamorphosed; but whether the metal is a primary or an exotic constituent can as yet scarcely be declared with certainty.

Formerly no other occurrence of platinum than the native metal was known; but now a platinum-ore has been found in the Sudbury district, Canada, namely, sperrylite, a compound of platinum and arsenic. Since this is certainly xenogenous, the question as to the original sources of platinum deposits is advanced to a new phase by its discovery.

Tin Placers.—In connection with the occurrence of tin as cassiterite in detrital deposits, the specific gravity (6·97) of this mineral, nearly equalling that of iron, and the great resistance which it offers to natural agents of decomposition, doubtless play the principal part. Of the numerous and various associates of cassiterite in its original deposits, none, except quartz, are equally able to resist decomposition; and the consequence is that the detritus, both of weathering and of erosion, from the outcrops of such deposits, contains, besides the products of the decomposition of these other minerals, chiefly quartz and pieces of cassiterite. The latter, by reason of its high specific gravity, will tend to sink through the lighter detritus and be concentrated near the bed-rock.

The stanniferous detrital deposits of Bohemia and Saxony, as well as Cornwall, were long since exhausted; those of Australasia, the South Sea Islands, and South America are still worked. According to the special monograph of Dr. E. Reyer, the richest layers are, in fact, found at the bottom of the detritus, immediately on the bed-rock.