*tiszta-seg,* for the modern *halál·nak, tiszta-sag.* It clearly did not exist in the organic Ural-Altaic speech, but was independently developed by the different branches on different lines after the dispersion, its origin being due to the natural tendency to merge root and suffix in one harmonious whole. The principle being thus of a purely psychological character, and necessarily an after­growth, it is not surprising to find no traces of it in the oldest and even in the later Accad texts, as seen by comparing the old *idi bar-mun-sib* with the more recent *igi mun-sib-bar.*

This progressive vocalic harmony has been compared to a sort of progressive *umlaut,* in which the suffixed vowels are brought by assimilation into harmony with those of the root All vowels are broadly divided into two categories, the guttural or hard and the [)alatal or weak, the principle requiring that, if the root vowel be hard, the suffixed must also be hard, and *vice versa.* But in some of the groups there is an intermediate class of “neutral” vowels, which do not require to be harmonized, being indifferent to either category. In accordance with these general principles the vowels in some of the leading members of the Altaic family are thus classified by L. Adam—@@1

|  |  |  |  |
| --- | --- | --- | --- |
|  | Gutturals. | Palatals. | Neutrals. |
| Finnish | u, o, a | ü, ö, ä | e, i |
| Magyar | u, o, a | ü, ö | e, i |
| Mordvinian | u, o, a | ä, i |  |
| Siryenian | ô, a | ä, i, e |  |
| Osmanli | u, o, a, e | ü, ö, e, i |  |
| Mongolian | u, o, a | u, o, a | i\*\* |
| Buriat | u, o, a | ü, ö, ä | e, i |
| Manchu | ô, o, a | e | u, i |

A close analogy to this law is presented by the Irish rule of “ broad to broad ” and “slender to slender,” according to which under certain conditions a broad (*a*, *o, u)* must be followed in the next syllable by a broad, and a slender (*e*, *i*) by a slender. Obvious parallelisms are also such forms in Latin as *annus, perennis, ars, iners, lego, diligo,* where, however, the root vowel is modified by the affix, not the affix by the root. But such instances suffice to show that the harmonic principle is not peculiar to the Ural-Altaic, but only more systematically developed in that than in most other linguistic families.

This is not the place to discuss the vexed question of the relation of the Babylonian Accad and Sumirian, or of the Etruscan, with the Ural-Altaic linguistic stock. It must therefore suffice to state in a general way that, according to the latest views, both of those long extinct languages were really branches either of the Finno- Ugric or of the Turko-Mongolic division of that family. In reply to the objection that Sumirian was a prefix language, it is pointed out that Neo-Sumirian, extinct some 1600 years before the Christian era, had already become postfixing, so that the *nin-gar* of the oldest answers to the *garra-bi* of the later texts, from root *gar*=to make. Nevertheless the point is far from settled, as may be judged from the fact that such specialists as Dr Zimmern and Dr Hommel are still at issue on the fundamental question of the Ural-Altaic affinities of Accad and Sumirian. The position of Etruscan is much the same, the main outcome of recent controversy being that this primitive Italian language can scarcely have been a member of the Aryan, whatever its relationship to the Finno-Ta- taric family.

Regarding the Japanese and Corean languages, it may be re­marked that Winkler agrees with Boiler in unhesitatingly includ­ing the former, while doubtfully excluding the latter from this connexion. On the other hand, W. G. Aston (*Journ. Roy. Asiat. Soc.,* August 1879) considers that both are as nearly related to one another as English and Sanskrit. The probability therefore is that Japanese and Corean are aberrant branches of the Ural-Altaic family, and that they separated at long intervals from the parent stock and at such remote periods that their affinities can no longer be clearly traced.

*Bibliography.—*Besides the references given above, the chief general treatises on Ural-Altaic philology are—Kellgren, *Die Grundzüge der finnischen Sprachen mit Rücksicht auf die Ural-Altaischen Sprachstämme,* Berlin, 1847 ; Castrén, *Ueber die Ursitze des finnischen Volkes,* Helsingfors, 1849 ; Id., *Syrjaen. Gram., Samojed. Gram.,* and numerous other comparative grammars, dictionaries, and general treatises, chiefly on the Finno-Ugric and Samoyedic groups ; W. Thomsen, *Ueber den Einfluss der germanischen Sprachen auf die Finnisch-Lappischen* (Germ. trans. by Sievers, Halle, 1870—a classical work) ; Abel Rémusat, *Recherches sur les Langues Tartares,* Paris, 1820 ; L. Adam, *Gram. de la Langue Mandchoue,* Paris, 1872, and *Gram. de la L. Tongouse,* Paris, 1874; Böhtlingk, *Die Sprache der Jakuten,* St Petersburg, 1851 ; Radloff, *Volksliteratur der türkischen Stämme Sud-Sibiriens,* St Petersburg, 1872, and “ Remarks on the Codex Comanicus,” *Bull. St Petersb. Acad. Sc.,* xxxi., No. 1 ; Zenker, *Gram. der türkischen-tatarischen Sprachen ;* Schmidt, *Mongol. Gram.* ; Gabelentz, *Gram. Mandchoue,* Altenburg, 1833; Csink, *Hung. Gram.,* London, 1853; and Vambéry, *Das Türkenvolk,* Leipsic, 1885, and *Uigurische Sprach-Monumente u. das Kudatku Bilik,* Inns­bruck, 1870. For further particulars relating to the affinities and characteristics of the various branches, and of their associated members, see the articles Finland (vol. ix. p. 219), Hungary (vol. xii. p. 374), Russia (vol. xxi. p. 79), Turks (vol. xxiii. p. 661), Mongols (vol. xvi. p. 750), and Siberia (vol. xxii. p. 8). (A. H. K.)

URAL MOUNTAINS. The girdle of mountains which extends from the Arctic Ocean southwards nearly to the Caspian Sea, and is now regarded as separating Europe from Asia, was anciently the subject of various myths. Even the Slavonians, who in the 11th century frequently visited the region of the Urals for trade with the Ugrians (which people at that time lived there), described them as mountains reaching to the sky, intersected by terrible pre­cipices, and as being inhabited by a population of cave- dwellers. Although crossed by a continuous stream of Russian colonizers from the 16th century onwards, the Ural Mountains still retained something of their mythical character in Western literature, and in the 18th century they received from geographers the high-sounding designa­tion of *montes dicti angulus terræ.* The Russians describe them either as Kamen (stone) merely or by the appropriate name of Poyas (girdle), while the name of Urals *(Urały)* —derived either from the Ostiak *urr* (chain of mountains) or from the Turkish *aral-tau* or *ural-tau—*has with them become a generic name for extensive mountain chains. (See plate II. vol. xxi. and plate I. vol. xxii.).

Notwithstanding numerous scientific expeditions by which the exploration of various parts of the range began to be undertaken from the earlier portion of the 19th century, and notwithstanding partial accurate surveys and levellings and numerous geological researches made within the last thirty years, the real structure of the Urals, both oro­graphical and geological, remains still imperfectly known. Even on maps otherwise good they are still very often represented as an unbroken chain, at least 1200 miles in length, running north and south from the Arctic Ocean to the sources of the river Ural. But every fresh addition to our knowledge has made it increasingly apparent that their real structure is much more complicated; and in view of recent explorations it becomes plain that the Urals con­sist of a series of several separate upheavals, some having a north-western direction and some a north-eastern, which reach their maximum heights along a zone which lies nearly north and south. They have thus some resemblance to the mountain-chains of Central Asia and Siberia,—which also have north-eastern and north-western directions, but are grouped in zones which, roughly speaking, lie west and east,—although in both cases chains running either along meridians or along parallels are, wherever they exist at all, only rare exceptions.

The composite nature of the Urals is best seen at the northern and southern extremities of the system, where the upheavals assume the character of distinct chains of mountains. The Pai-hoi Mountains are a ridge which, beginning at the head of Kara Bay, runs north-west, and is continued in the Island of Vaigatch and the southern island of Nova Zembla ; and the Northern Urals, which join the Pai-hoi chain at the head of Kara Bay, run north­east and south-west as far south as 64° N. lat. In their middle portion the architecture of the Urals is complicated by the plateaus of middle Russia. The southern parts do not consist, as Humboldt supposed, of ramifications from main meridional chain, but of a series of parallel ranges running distinctly from north-east to south-west, as is plainly seen in the excellent maps recently published by the Russian Geological Committee.@@2 The structure of the separate parts of the Ural complexus is explained in some detail below.

I. The Pai-hoi or coast ridge (Samoyedic “ stony ridge ”) is quite independent of the Urals proper, from which it is separated by a marshy *tundra,* some 30 miles wide. It has a distinct north-north- westerly and north-westerly trend along the shores of the Kara Sea ; and, although it is cut by the Ugrian Strait, there is no doubt

*@@@1 De l’Harmonie des Voyelles dans les Langues Ouralo ∙Altaïques,* Paris, 1874.

*@@@2 Carte Géologique Générale de la Russie d’Europe,* sheet 139 ; and “Description Orographique,” by A. Karpinsky and Th. Tchernycheff, in *Mémoires du Comité Géologique,* vol. iii. No. 2, 1886.