So far as accessible to observation, the outer portion of our planet consists mainly of metalloids. Its metallic constituents have already in great part entered into combination with oxygen, so that the atmosphere contains the residue of that gas which has not yet united itself to terrestrial compounds. In a broad view of the arrangement of the chemical elements in the external crust, the suggestive speculation of Durocher deserves attention.[2] He regarded all rocks as referable to two layers or magmas coexisting in the earth's crust, the one beneath the other, according to their specific gravities. The upper or outer shell, which he termed the acid or siliceous magma, contains an excess of silica, and has a mean density of 2·65. The lower or inner shell, which he called the basic magma, has from six to eight times more of the earthy bases and iron-oxides, with a mean density of 2·96. To the former he assigned the early plutonic rocks, granite, felsite, etc., with the more recent trachytes; to the latter he relegated all the heavy lavas, basalts, diorites, etc. The ratio of silica is 7 in the acid magma to 5 in the basic. Though the proportion of silicic acid or of the earthy and metallic bases cannot be regarded as any certain evidence of the geological date of rocks, nor of their probable depth of origin, it is nevertheless a fact that (with many important exceptions) the eruptive rocks of the older geological periods are very generally super-silicated and of lower specific gravity, while those of later time are very frequently poor in silica, but rich in the earthy bases and in iron and manganese, with a consequent higher specific gravity. The latter, according to Durocher, have been forced up from a lower zone through the lighter sili-

[2] Ann. des Mines, 1857. Translated by Haughton, "Manual of Geology," 1866, p. 16.