ITALIAN VOLCANIC ROCKS.[1]

ALTHOUGH the Tertiary and Recent volcanic tract along the western side of the Apennines is classic ground to the geologist no less than to the historian, we still possess only meagre information concerning the many remarkable, and often unique, rock-types for which these Italian volcanoes have long been famous. A comprehensive and connected study of a large part of the assemblage by a well-qualified authority is therefore peculiarly welcome. Dr. Washington has devoted much attention to the subject, both before and since the publication, ten years ago, of his "Italian Petrological Sketches."

"Comagmatic region" is synonymous with "petrographical province," and the author's reasons do not convince us of the necessity of abandoning a now familiar term. The Roman region is defined as extending from Lake Bolsena to the Phlegræan Fields; and probably few petrologists will dissent from the proposition that the community of characters among the volcanic rocks of this region points to a real genetic relationship of the several

Sketch Map of Italian Comagmatic Regions.

Roman Region.	V =Vulsinian District	Ve=Vesbian Volcano	5 =Monte Amiata		
	Ci=Ciminian District	P =PhlegræanFields	6 =Tolfa		
Tuscan Region.	S =Sabatinian District	I =Ischia	7 =Cerveteri		
	L =Latian District	1 =Montecatini	B =Berican Hills		
Venetian Region.	H =Hernican District	2 =Campiglia	E =Euganean Hills		
	A =Auruncan District	3 =Massa Marittima	Vu=Monte Vulture		
Apulian Region.	Ca=CampanianDistrict	4 =Roccastrada	Et =Etna		

magmas. The author separates, though somewhat doubtfully, the smaller "Tuscan region," lying farther to the north and west, which we hope will be the subject of a future memoir. It can scarcely be denied, however, that a certain community of characters unites all the Italian volcanic districts on this side of the Apennines (with Monte Vulture in the mountain-belt itself), the resemblance being emphasised by contrast with the rocks of the Euganean Hills on the opposite side of the main orographic line.

The body of the memoir before us consists of two parts. The first is purely descriptive, the several rock-types being treated in order, succinctly but thoroughly. The special features of this part are the quantitative element constantly introduced into the mineralogical descriptions, and the addition of a large number of new and carefully-made chemical analyses of the lavas. The peculiarity which has made the region famous in petrography is the abundance and variety of leucite-bearing rocks. The non-leucitic types are for the most part of trachytic affinities, though with a proportion of soda-lime-felspar which caused the author (in his former papers) to distinguish them under the names vulsinite and ciminite.

The second part of the memoir, discussing the mutual relations of the associated rocks, is headed "Petrology" (the first part being "Petrography"). It would seem more convenient to use the name petrology for the whole science of rocks, including the descriptive branch (petrography) and the rational. The author gives an interesting discussion of the facts which he has brought together, and touches on the genetic problems which underlie those facts. In particular, he attempts a calculation of the average composition of the magmas for the several districts and for the whole region. In the central part of the region all the lavas carry leucite, basic leucite-tephrites and leucitites being largely predominant; while at the two extremities of the region the trachytic types are in greater force. No definite order of succession in time can be made out.

While taking care to make his work intelligible to the ordinary petrologist, Dr. Washington employs throughout the methods and terminology of the Quantitative Classification, of which he is joint author. The memoir thus written does, as he claims, serve to make that system clearer by showing it in actual operation, and this is an incidental gain; but, although it is here seen at its best, as applied to a cognate collection of types, most of which possess strongly marked characteristics, we do not find our fundamental objections to the new classification weakened by a closer acquaintance with it. If a rigidly quantitative, and therefore artificial, classification be desirable, which we do not concede, it might be sought in the actual mineral composition of the rock (here estimated in most cases) rather than in the imaginary composition which is called the "norm." In reading the descriptions and discussions, it needs no very perverse fancy to construe many sentences as censuring Nature for departing from the "norm," or commending her for approximately conforming to it; and this air of artificiality must somewhat discount the usefulness of what is undoubtedly a very valuable monograph.

A. H.

[1] "The Roman Comagmatic Region." By Henry S. Washington. Pp. vi+199. (Washington: Carnegie Institution, 1906.)

INVERSION TEMPERATURES FOR AIR AND NITROGEN.

THE Bulletin of the Cracow Academy of Sciences for December, 1906, contains a preliminary note, by Prof. K. Olszewski, on the determination of the temperature of inversion of the Joule-Kelvin effect for air and for nitrogen when subjected to different pressures. The apparatus used was similar in principle to that adopted in 1901 in determining the inversion temperature for hydrogen, but details had to be modified owing to the necessity of working at much higher temperatures. The table which follows shows the inversion temperature of the gas when allowed to expand from the initial pressure p (expressed in kilograms per square centimetre) to the pressure of the atmosphere. Above the temperature t_i a thermo-element showed a heating effect on expansion, whilst below this temperature a cooling effect was observed.

Air		Nitrogen	
p	t_i	p	t_i
160	+259°	159	+243°
100	249	126	238
90	244	102	233
80	240	90	228
70	235	80	223
60	226	68	217
40	198	55	205
20	124	30	163

It is seen that the inversion temperature is a continuous function of the pressure, confirming the recent theoretical views of Witkowski and Porter. The value of the in-