

PHYSICAL BACKGROUND OF THE BALKAN PENINSULA

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THESIS

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PREFACE

Scarcity of materials was the main difficulty the writer of this thesis encountered. Time and distance were other elements of hardship in securing some available materials abroad. To all friends in Bulgaria who helped me in procuring materials I express my gratitude and appreciation. But above all I want to thank Professor W. O. Blanchard of the Department of Geology and Geography of the University of Illinois. He was of great help in offering valuable suggestions as to the treatment of the subject-matter and painstakingly going over the manuscript. However the author is solely responsible for all the possible mistakes that might have crept into the final form of his thesis.

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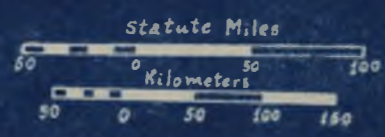
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CONTENTS

I. Location, area, and population.....page	1
II. Name	" 2
III. Boundary lines.....	" 4
IV. Relief features.....	" 12
a. Mountains.....	" 12
b. Lowlands.....	" 26
V. Hydrography.....	" 33
VI. Climate.....	" 33
VII. Vegetation.....	" 40
VIII. Summary.....	" 41
Bibliography.....	" 45



PHYSICAL MAP of the
BALKAN PENINSULA



Longitude 20° East of Greenwich

THE PHYSICAL BACKGROUND OF THE BALKAN PENINSULA

The southern part of Europe consists of three great land projections, the Iberian, the Italian, and the Balkan peninsulas. Two of these--the Iberian Peninsula in the west and the Balkan Peninsula in the east--serve as connecting links of Europe with Africa and Asia Minor respectively.

Especially great is the significance of the Balkan Peninsula whose lands have been and still are at the cross roads of humanity. Here have tramped the legions of Rome; here have passed a multitude of races, consisting of Avars, Goths, Huns, Slavs, etc.; here have crossed the Crusaders on their way to the Holy Sepulcher; here have marched the hordes of the Osmanli Turks in an attempt to conquer the whole of Europe; here the native peoples caused the retreat of the Turks back to Asia Minor; here the armies of Russia, of Germany, of Austria, of Italy, of France, of Great Britain, mixed with African and Asiatic races, manouvered back and forth and made the natives resist as long as they could. Therefore, I am not exaggerating when I say that it is geographic location which made the Balkan Peninsula a shock-absorber of conflicting European interests.

The end of the World War in 1918 temporarily put an end to two ambitious plans of two great European powers: one was Russia which aimed at conquering Constantinople and securing an easy outlet to the Mediterranean Sea which would have enabled her to be within a thousand miles from the entrance to the Suez Canal; and the other was the German plan of constructing^g the railroad of "The Three B's"--Berlin-Bizantium-Bagdad--which was to carry the German spirit of "Irang nach Süd Osten".

I. LOCATION, AREA, AND POPULATION

The Balkan Peninsula is located between 36° and 45° north latitude and between 14° and 29° east longitude. Its south to north extent is equal to that of the British Isles but the width of the northern part makes it

decidedly larger in territory. The total area of the Balkan Peninsula is estimated at 191,000 square miles, which is as large as Germany, ^{without Austria.} It has some 25,000,000 people, which is a little over one-third of the population of that country.

II. NAME

As a geographic unit it is only recently that the Balkan Peninsula got its present name. In the past those men of letters and of science who became adepts of the ancient Greek civilization referred to its home as the Hellenic Peninsula or the Greek Peninsula, always meaning the portion south of the Gulf of Salonika. Knowledge about the other peoples who lived north of the Greeks was very scanty or completely lacking. Historians interested in Bizantine history called it the Bizantine Peninsula; and those who specialized in Roman history called it the Roman Peninsula, or the Illyrian Peninsula from Illyricum, the name of the Roman province along the Adriatic Sea. Cartographers, who, at this time, knew something about the political status of Europe called its southeastern part by a more elaborate term, "The Great Ottoman Empire of Europe" or simply "European Turkey".

Analyzing these names we see that all are historic and political in character. But the beginning of the last century marked some territorial changes on this peninsula of many names. In addition to independent tiny Montenegro, Serbia and Greece won their independence too. Geographers found the political name of the peninsula confusing. Travelers of the first half of the nineteenth century were still more puzzled. They found that in the northern part of the peninsula lived people of Slavonic origin, and were different from both the Greeks in the south and the Albanians in the west.

A solution of the problem was sought by calling the peninsula after the name of some outstanding natural or geographic feature possessed by the peninsula itself. Consulting atlases geographers discovered to their

great satisfaction that in this part of Europe, as shown on the maps, based upon information from antiquity, there was an unbroken mountain chain which extended from the Black Sea on the east to the Alps on the northwest. This chain was fatefully reproduced on geographic maps as late as 1870, which, of course, was an exact copy of the ideas of Strabo (a Greek geographer of I century B. C.) and Ptolemy (Greek-Egyptian astronomer and cartographer of II century A. D.) about the relief features of the present Balkan Peninsula. To the ancients this chain was the ^{northern} boundary line of the warm southern lands of Thrace, Macedonia, and Greece. North of it were the cold lands of the Barbarians. The eastern part of this same chain was called Haemus. After the Turks conquered the peninsula they substituted Balkan for Haemus. The word "Balkan" is in no way a translation of Haemus. In plain Turkish it means a "mountain". Today Haemus is known to the Bulgarians as Stara Planina, meaning the "Old Mountain", which is perhaps symbolic of the protection it offered the people during many centuries of oppression. There is no other mountain in Bulgaria which is so intimately interwoven in the feelings and the songs of the nation as this one. Balkan is still used in the sense of denoting particular sections of the mountain, as Shipka Balkan for instance, or in poetry referring to the Stara Planina as a whole. Traces of the ancient name of Haemus are preserved in the eastern most section of Stara Planina, known as Eminska Planina and its cape, called Haime, upon which towers a light house.

Influenced perhaps by the ancient idea of the unbroken chain, rising in the center of the peninsula, it was the German geographer A. Zeune, who, in 1808, originated the name of Balkan Peninsula.

In short, the name of the Balkan Peninsula originated as a result of the erroneous conception of the geographers of antiquity about the relief of the country, and, later, the use of the Turkish word "Balkan" which was

STRUCTURAL FEATURES OF THE MEDITERRANEAN REGION



After M.I. Newlin

1. Young Folded Mountains
 2. Depressed Areas Within The Sea, Marking The Site Of Foundered Earth-blocks
 3. Ancient Land-masses Around Which Folding Has Taken Place
- Transitional Areas Shown By Dots

applied only to one mountain of the whole peninsula.

I think that if the general meaning of the word "Balkan" is interpreted as an adjective to mean "mountainous" it will describe better the nature of "The Mountainous Peninsula".

III. BOUNDARY LINES

When it comes to boundary lines we are at some difficulty to say just where is the northern limit of the Balkan Peninsula. Contrary to what we find in either the Iberian Peninsula or the Italian Peninsula where great mountain chains separate each geographic unit from the rest of Europe, in the case of the northern part of the Balkan Peninsula we find a broad fertile plain traversed by a mighty river which is more of a connecting link than a mark of separation. This is the reason why one author¹ suggests that the northern boundary line of the Balkan Peninsula be placed on the Carpathian Mountains. Nevertheless it is generally accepted that the old frontier line between the two former empires--of Austria-Hungary on the northwest and of Turkey on the south--be taken as the northern limit of the Balkan Peninsula. That former frontier, starting in the vicinity of Fiume (east of the city), followed the course of the little stream of the Kulpa, a tributary of the Sava, then the Sava itself to its confluence with the Danube River at Belgrade (Belgrade), and from Belgrade on to the Black Sea, following the course of the Danube. Everybody can easily see that this is not a geographic boundary as north of it live people of the same race, language, and occupation. Also they belong to a country called Yugoslavia which has its political boundary extending north of the Sava and the Danube. While most geographers accept this boundary as workable, there are some, however, who suggest a slight change, namely, that the Isarco River be substituted for the Kulpa River because, they argue, it will not only include the little peninsula of Istria, which is part of the Dinaric system anyway, but the valley of the Isarco River marks distinctly

¹ A. Cancher, "The Balkan Peninsula", p. 18

the end of the Alps and the beginning of the Dinaric Mountains.

On the east side the Balkan Peninsula faces the tempestuous Black Sea which annually averages from 30 to 40 terrible sea storms. Such storms were largely responsible for the name it was given by the natives sailing on its waters. The Black Sea does not penetrate deep into the land of the Balkan Peninsula. There is only one large indentation, namely the Gulf of Burgas, which measures 8 miles in length and 8 miles in width. Here we find Burgas, the busiest port of Bulgaria, which is rapidly growing as a result of the country's loss of the outlet to the Aegean Sea at the close of the World War. To the north is the little Gulf of Varna which is only half as large. Varna has a good port but its commercial importance declined tremendously after the southern part of the Dobrudja, a great cereal producing region, was lost to Rumania. Today Varna is an attractive summer resort both for natives and foreigners. Its unusually good beach, climate and abundant, wholesome food, and comparatively cheap prices draw middle class people from Constantinople, Bucharest, Czechoslovakia, Poland, Austria, and other central European countries.

Constanța (Constanza) is the most important Rumanian port equipped with big grain elevators and oil reservoirs. It is particularly busy in winter time when navigation on the Danube is suspended. Communication with the hinterland is facilitated by the railroad bridge on the Danube at Cherna Voda, which is not only the biggest upon that river but also the only single bridge between Belgrade and the delta of the Danube.

From the standpoint of commerce and economic development in general, the Black Sea has little significance for the peninsula as a whole. In addition to its storminess it is an inland sea, away from the chief European markets, and connected with the Mediterranean Sea only through the Bosphorus and the Dardanelles, two straits which are not always open to sea trade.

The Strait of the Bosphorus is a place where Europe and Asia Minor come

closest to each other. In the twenty-miles length of the Bosphorus there are points opposite each other which are less than 2000 feet apart. And at its greatest indentation of less than one half of a mile the Bosphorus forms the famous Gulf of the Golden Horn, the southern side of which is occupied by the city of Constantinople, today known as Istanbul. Also the Golden Horn shelters the world famous port of Constantinople. The Bosphorus connects the Black Sea with the Sea of Marmara. This is a small sea, oval in shape, and measures 120 miles in length between Constantinople and Gallipoli. But its importance is great as a link between the Bosphorus and the Dardanelles. The Strait of the Dardanelles is the second meeting place of Europe and Asia Minor. However its length and width is twice that of the Bosphorus. The depth of the water in both straits is considerably over 150 feet and is perfectly satisfactory for the largest ships to pass through them. In this connection should be mentioned the fact that in the Strait of the Bosphorus there is a very swift current, running as fast as close to 4 miles per hour, a fact which constitutes an obstacle to navigation. The existence of this current is due to the higher level of the Black Sea, resulting from the large quantities of fresh water brought in by its numerous big rivers and the impossibility of disposing of the excess water by evaporation.

In contradistinction to the Black Sea which is old in origin, the Aegean Sea is of a recent formation, as geologists count time. The Aegean Sea is a branch of the Mediterranean Sea and fills the sunken parts of the Balkan Peninsula submerged during the Pliocene period--the time when Europe was separated from Asia Minor. The fact that there are frequent earthquakes in the adjacent lands and the existence of some active volcanoes, as that on the island of Santorin (Thera), for example, which is a part of a chain of volcanic islands, bordering the Cretan Sea on the north, indicate that significant changes are still going on around and in the basin of the Aegean

See. The numerous islands which project above the surface of the Aegean Sea are the highest points of a former terrain. These islands contribute very much to the unique charm and beauty of the Aegean Sea and at the same time are of considerable difficulty to sailors because the shallow portions of water which fill the troughs in between constitute a real danger to navigation. The deepest portion of the Aegean Sea, reaching a depth of over 600 fathoms, extends between the plain of Thessaly in Greece and the Gulf of Saros in Thrace. The group of islands called the Northern Sporades, and the individual islands of Limnos and Imbros, together with the Peninsula of Gallipoli mark the southeastern limit of this deep portion of the Aegean Sea.

Besides the last mentioned islands there are others which stand very close to the mainland, as Euboea for instance, which is connected with the Peninsula of Attica by a swinging bridge only 180 feet in length. Euboea is the largest island in the Aegean Sea. In the narrow strait which separates it from the mainland one can see a puzzling phenomenon. The sea water, filling the narrow strait, runs swift current with a speed of four to five miles an hour, shifting its direction back and forth a dozen times a day. Close to Thrace are the islands of Thasos and Samothraki. Off the coast of Asia Minor are the following important islands: Imbros and Tenedos which stand at the entrance of the Dardanelles and for the present are the only Turkish possessions of the Aegean Archipelago; south of them are found Mytilene, Sio (Chios), and Samos. The rest of the islands are scattered all over the sea so that the short distance of sea route of 200 miles between Greece and Asia Minor is studded with marine stations. There are two big clusters of islands: one close to the coast of Asia Minor, known as the Sporades, consisting of more than 20 big and small islands; and the Cyclades, southeast of Athens, containing over 30 islands, are the other cluster. Syra, one of the Cyclades Islands, is known as the birth place of Achilles.

Another characteristic feature of the Aegean Sea is the lack of the storminess of the Black Sea. Being comparatively a quiet sea, which keeps its surface smooth during a great part of the year, it has impressed the Slavonic people of the Balkan Peninsula, who dreaded the tempestuous Black Sea, and so it was given the name of the "White Sea". This is the name by which it is known to the Bulgarian people. The name "Aegean Sea", as it is known to the rest of the world, is of uncertain origin. Two legends associate the name of the sea with two distinguished mythological characters who perished in its waters. Perhaps as a tribute to their memory posterity has attached the names of the illustrious victims to the sea which caused their deaths. One of the legends uses the name of the Amazon queen Aegae who is said to have lost her life in this particular sea. The other legend refers to Aegaeus, the father of Theseus, who committed suicide by drowning himself in the same sea, after postulating that his beloved son was already dead. A third explanation is more or less geographic in character. It says that the Aegean Sea got its name from the town of Aegae.

The Aegean Sea is also known for the most articulated coast line of its size in the world. Big and small arms of sea penetrate the land and narrow and pointed spurs of land project far into the sea until the whole southern part of the Balkan peninsula is a series of large and small peninsulas of most varied forms. It is only appropriate that we examine the Aegean coast line of the Balkan Peninsula. For this reason we may divide the coast line into parts according to the regions it serves.

From the Peninsula of Gallipoli west to the mouth of the Mesta River is the Thracian coast. Here the largest indentation is the Gulf of Saros which has shallow waters and is not protected against the northeasterly winds which sweep across the eastern part of Thrace. With the Maritza River entering the Aegean Sea just west of the Gulf of Saros we are likely to expect a big port. However this is not the case. Enez, which is built

at the delta of the river, is an obscure little town, and can not be turned into a big port because the Maritza brings thousands of tons of silt. To remedy the situation, during the latter part of the last century, when this region was part of the Ottoman Empire, the Turks have built another town, west of Enos, at the heights of a Rhodope spur. This new town, which was called Pedagogatch, is not a good natural port. Porto Lagos is a shallow lagoon which could be turned into a good harbor after considerable improvements are made.

The Macedonian coast line stretches between the Nesto River and the Bistritza River. East of the Chalkidika Peninsula are the Gulfs of Orphens and Kavala. Although the Gulf of Orphens is the larger of the two there is no important harbor on it because the Struma River has converted into marshes a large area of the land along the Gulf itself. The Gulf of Kavala shelters the important port of Kavala which is primarily engaged in the export of tobacco.

And now we come to the most important gulf not only of Macedonia but of the Balkan Peninsula and parts of middle and eastern Europe as a whole. This is the Gulf of Salonika, named after its most important port of Thessalonikē (Salonika), which traces its origin of name to the time of Alexander the Great when his brother-in-law, after conquering the city, known as The Thema, called it Thessalonika, after the name of his wife.

The Gulf of Salonika is 85 miles in length and 50 miles in breadth. It has only one short coming. The Vardar River, which flows into the Gulf, increases its delta 150 feet annually and so constant dredging is necessary. Political events have been largely responsible for the fact that the excellent port of Salonika, where land, air and sea routes meet so conveniently, is still not used to the best economic and cultural advantage of the people living in this part of Europe.

South of the Gulf of Salonika is found the well inclosed Gulf of Volo, where the port of Volo serves Thessaly, the largest lowland of Greece proper. Then comes the Gulf of Aegina where Piraeus, the most important modern port of Greece is located. It is a stirring port and rates fourth in importance as a Mediterranean port. For Greece it is of unusual interest and importance because it handles one half of her foreign trade.

On the west side the Balkan Peninsula faces the Adriatic Sea. The geologic origin of this body of water is not exactly known but it is believed that it already existed in Late Pliocene, immediately before the glacial epoch. Through faulting of the terrain a graben, or a rift, was produced and the Mediterranean Sea filled the basin. Later this long, narrow arm of sea, stretching from northwest to southeast for about 500 miles came to be known as the Adriatic Sea, deriving its name from the ancient city of Adria or Hadria, located not very far from Venice. The Balkan coast line of the Adriatic Sea consists of long, unbroken mountain chains. This is a great handicap to Yugoslavia. The two good Adriatic ports of Trieste and Fiume, which geographically belong to the Balkan Peninsula, are included in Italian territory. Of the few good harbors on the Ionian coast, Yugoslavia has turned Split ^{to} a first class modern port. Zadar is her main naval base.

Parallel to the Balkan coast of the Adriatic Sea are some 800 islands but only sixty-two of them are inhabited. Brač (Voglio) is the largest and is found south of Fiume.

The Albanian coast is low and marshy land with one notable indentation, the Gulf of San Giovanni di Medua, where the Adriatic Sea penetrates farthest to the east into the Balkan Peninsula. With the help of Italy, Albania has improved and well equipped the port of Durazzo, which is nearest to

Tirana, the capital of the country.

The Adriatic Sea ends at the Strait of Otranto where the Balkan and the Italian peninsulas come closest to each other, the distance being only 45 miles. Italy guards well the Strait of Otranto by having in her possession the little island of Saseno at the entrance of the Albanian port of Valona.

South of the Strait of Otranto is the mountainous coast of Greece which is well penetrated by the waters of the Ionian Sea. Two outstanding gulfs deserve mention and consideration. Arta, the smaller, is in the northern part, and Corinth, the long and narrow but well enclosed gulf, to the south. After the building of the Corinth Canal the gulf actually became a strait, and the distance between the Ionian Sea and the Aegean Sea was shortened by more than 200 miles. In spite of the fact that the Corinth Canal is the shortest world sea-canal--less than four miles--it is not convenient for the passage of big ships, not only because it is narrow--about 70 feet-- but also because a strong current of water runs in it. Furthermore, the steep sides of the canal are easily eroded and occasionally slides of great quantities of earthy matter fill the canal and so navigation is hindered for a certain length of time. High tax, for using the canal is another reason why big ships avoid the passage and enter the Aegean Sea by sailing around Cape Matapan, the southern-most point of the Balkan Peninsula.

Of the seven Ionian islands the largest is Cephalonia but its infertile soil and frequent earthquakes makes it a quite unattractive place to live on. Corfu, the second largest, is an important winter resort and a good stopping place for ships going to and coming out of Adriatic ports in the north. Ithaca, a small island at the entrance to the Gulf of Corinth, is famous as the birth place of Odysseus.

Finally, there is Crete--the largest of all Balkan islands. Being

placed somewhat between Greece, Asia Minor, and Egypt it played the very important part of originating its own civilization which is considered as the first well developed civilization of Europe.

To sum up, we may say that the Balkan Peninsula consists of two parts: In the north the Slavonic region, called so because of the compact masses of South Slavs, is the larger but conspicuously lacking in good natural harbors. Moreover, it is surrounded by two almost inland seas--on the east the Black Sea which is connected with the Mediterranean Sea by the narrow straits of the Bosphorus and the Dardanelles; and on the west the Adriatic Sea which merges in that portion of the Mediterranean known as the Ionian Sea where the Strait of Otranto is found. Although this strait is much wider when compared with the Dardanelles, for instance, it is guarded by Italy, whose territory forms the western coast of the Adriatic Sea, and on the east she is in possession of the little strait island of Sasno.

The Greek region, stretching south of the Gulf of Salonika, is unusually well endowed in protected and easily reached harbors. In addition to this, all of the harbors are located on the shores of a free sea where one of the largest arteries of world commercial traffic flows.

RELIEF FEATURES

A. Mountains

If you would take a trip from Belgrade to Salonika by the secondary route leading through Mitrovitza-Jakub, and then by boat to Burgas via Constantinople, and return to Belgrade by way of the Rose Valley-Sofia-Hish you would have touched upon the geological boundaries of the three mountain systems comprising the Balkan Peninsula. The central area around which the proposed itinerary leads you is called the Rhodope Massif, and is composed mainly of old crystalline rocks, dating from the Archeozoic Era. Sedimentary rocks were deposited by the surrounding seas in parts which were submerged. Volcanic eruptions added strips of recently erupted

materials as the mountains around the town of Kratovo, in Macedonia, are the largest well known region of most recent volcanic rocks on the Balkan Peninsula. Previous to volcanic eruptions, movements of the earth's crust, producing depressions and fault lines, dotted with many hot springs, considerably changed the original structure of the Rhodope Massif. River erosion, especially after the sinking of the Aegean basin, which lowered the base level, particularly in Macedonia, caused the dissecting of the Massif to such an extent that today it consists of numerous mountain units, the most notable being The Rhodope Mountains, The Rila, The Pirin, The Belasitza, and the Bozdagh. While the Rhodope, the Rila, and the Pirin are bound together with the Rila in the center, west of the Pirin, the section between the Struma River and the Vardar River is a highland of great structural complexity, of mountains, scattered in all directions, with large and small plains in between.

The Rila is not only in the very center of the Balkan Peninsula but is also distinguished in having the highest of all Balkan peaks, called Mussala, which measures exactly 2925.40 meters (9595 feet).

The height of the Mussala must have made a lasting impression upon the imagination of some ancient rulers in the Balkans. For in the past days of Roman conquest of the peninsula, Philip V, ally of Hannibal, in a desperate effort to find out the number of the Roman legions that were coming to crush the last remnants of the Macedonian Empire, climbed the Mussala. Being told that from the top of the Mussala he could see not only the Danube, and the Black Sea, but also he could get a clear view of the Adriatic Sea and beyond, also he looked in vain for the land of Rome and her mighty legions.

This is the story of historians. Geographers interested in the same geo-historical event, basing their conclusions mostly upon the

vegetation of the peak as it was given in the historic narrative, and comparing it with present conditions, are convinced that it was the Vitocha (7500 feet), the mountain rising above Sofia, which Philip V climbed. Today both mountains are an object of tourism. The Vitocha, being only five miles from Sofia, has been declared a national park in its upper parts. Every week-end it is visited by thousands of hikers in the summer season and by hundreds of skiers in the winter. Both the Vitocha and the Rila have meteorological stations on the top of their summits and meteorologists are hoping that their records will prove of great value to the studies of climate in this part of the Balkan Peninsula.

The Rila is a mountain which possesses many characteristics that are typical of the Alps. The glacial lakes, one hundred and forty five in total, with their beautiful marine color, reflect the wild scenery of the surrounding jagged cliffs. Vast green pastures offer rich food to sheep, goats, cattle, and horses. Valuable coniferous and deciduous trees cover great areas which have given rise to many primitive saw-mills and some modern, electrically driven, lumber enterprises. In the thickly wooded northern slopes of the mountain, five miles south of Samokov, and forty miles from Sofia, is found one of the most beautiful mountain resorts in Bulgaria, known as Chern Kozlevo, meaning "The Pine Forest". Here, besides several royal resting places, set up among admirable and charming scenery, are found the cottages of many well-to-do Bulgarians. About a day's walk from Chern Kozlevo is found the Rila monastery, the largest and most sacred place in Bulgaria, frequented by people from all parts of the country. It is the only place in the Rila mountain connected with a railroad and the latter is of a narrow-gauge type, following the deep valley of a river called after the name of the mountain itself. The Rila River supplies power for a great hydro-electric concern in southwestern Bulgaria. The Rila mountain is a great source of water.

Etymologically the name suggests that this is the mountain "abundant-in-water", which is in contrast to Verile a low, dry, lacking-in-abundance-of-water mountain. The Maritza and the Iskar, two of the largest rivers on the peninsula draw their supplies of water from the Rila. Part of the source-water of the Iskar is captured in an aqueduct which supplies an abundance of good water to the capital of the country, and so makes Sofia not only unique among the Balkan capitals in this respect but places her well ahead of many great western European cities in the solution of the water-supply problem.

Few are the good roads found in the Rila and most of them touch only on its periphery. Recently labor recruits of the compulsory labor service in Bulgaria finished a Macedonian road, crossing the mountain at an elevation of over 8000 feet, which makes it the first highway in Bulgaria reaching such a height, and so connects Smokov with the little town of Banako, situated in a depression, south of the mountain, where The Rila meets with the Rhodopes in the east and the Pirin in the south.

The Pirin, stretching between the long and narrow valleys of the Struma River and the Mesta River, is very similar to the Rila mountain. Blinpeak, the highest point of the Pirin, is a close rival of the Musala.

East of the Mesta River and south and west of the Maritza River are the Rhodope mountains, which occupy an area of 7000 square miles. This is a huge massif cut up in ^{in rounded} rounded peaks, divided by winding stream valleys, long ridges and smoothed uplands surrounding beautiful glens and vales. Some say that from the top of the highest peaks of the mountain the Rhodopes roughly resemble the petal of a rose; and it was this similarity between the leaves of a rose and the arrangement of the mountain ridges which led the ancient inhabitants of this part of the peninsula to give it the name of Rhodope, if philologists are correct in their interpretation of the name the mountain bears.

Forests are a distinguishing feature of the Rhodope mountains. This is especially true of the western part of the mountain known as the Dopsat where some excellent woods are to be found. For the present the Rhodope mountains contain three-fourths of the coniferous trees in Bulgaria. Lumbering in the west, and tobacco raising in the southeast, and stock-raising in both, are the chief occupations of the people. Mining is slowly developing. Roads and railroads are inadequate. There are two railroads which branch off the upper Thracian lowland, one in the west, of a narrow gauge type, and another in the east of a standard gauge, that penetrate into the interior of the mountain. Neither of these railroads extends to the coast of the Aegean Sea. The western railroad branch is busy mostly during the summer season when it serves the tourist traffic to the Chapino resort, an interior depression known for its excellent pine-forest climate and numerous hot springs frequented mainly by people of the Maritza basin. There has been a tendency for more people to come into the region from all parts of Bulgaria after the hot water pools were built. Export of lumber from the region and import of foodstuffs are the items figuring prominently on the freight list of the railroad. The eastern railroad branch is serving a tobacco region and the mining district that is developing along the Greece-Bulgarian frontier.

Swelling and fast flowing streams have their beginning in the Rhodopes. All of the streams flowing to the north of the watershed are tributaries of the Maritza River, which is in a close proximity to the mountain itself. These tributaries of the Maritza are used chiefly for irrigating the extensive rice fields ofazardjik and Philipopolis, and up in the mountain they are harnessed to drive the numerous saw-mills or to transport wood cut in convenient size, to the communities settled at the foot of the mountain. The Vacha River supplies water power to the greatest hydro-electric

plant in Bulgaria. The longest of the Rhodope rivers, called the Arda, rises in the heart of the mountain and flows parallel to the Maritza, until the latter makes a sharp turn at Adrianople where nearby not only the Arda joins the Maritza, but the Tundza, its longest tributary, as well.

Spurs of the Rhodopes advance to the the shore line of the Aegean Sea and through the ridges of the northern islands of the Aegean Archipelago, extend into the mountains of Asia Minor, which indicate the uninterrupted continuity of the Massif before the sinking of the Aegean basin took place.

The Strandje Mountain, east of the Rhodopes, and the Sredna Gore (The Middle Mountain) to the north, across the Maritza basin, are composed of old rocks, but being subject to folding during the folding process of the Balkan Mountains, are classed as a transitional group of mountains. Of a similar origin are the mountains found along the right bank of the Varder River, which is considered as part of the western boundary of the Rhodope Massif.

Now we have to consider the two systems of young folded mountains, namely the Balkan Mountains to the northeast and the Dinaric-Albanic-Greek chain west of the Rhodope Massif.

Traveling in the Rose Valley one is impressed by the precipitous slopes of a mountain in the north. This is the central section of the Balkan Mountains, which extend from the present Bulgaria-Yugoslav frontier to the Black Sea. Geologically speaking they represent a continuity of the great Carpathian arch which is broken by the Danube River at the Iron Gate. The link between the two chains is a group of low mountains known as the East Serbian Mountains.

The Balkan Mountains are a series of parallel ridges, at first running where one of the richest copper mines of Europe is found from northwest to southeast to the gorge of the Isker River, and then straight east to the

Black Sea, where they are separated from the mountains in Crimea and the Caucasus. According to the late Professor Z. Radev of the University of Sofia, the Balkan Mountains were ^{formerly} extending southeast and joining the mountains in Asia Minor along the Black Sea.

The forces instrumental in originating of the Balkan Mountains were active during the tertiary period. Operating in a general south to north direction they lifted up rather abruptly the southern slopes and gradually dropped the northern slopes. So in the north for the most part was produced a tier of low ridges running at some distance parallel to the mountain. This is known as the Little Balkans. Sections of the Little Balkans are famous for extraordinary beauty and scenery. The most impressive example is that of the Belogradchik Cliffs which called forth the admiration not only of natives but of foreign travelers and visitors as well.

Coming back to the terrestrial forces of action we have to emphasize the fact that most certainly they have operated most intensively in the central portion of the mountain as today is seen by the high crest which culminates in the Yumruk Chel or Ferdinand's peak, rising over 7780 feet above sea level. In the eastern section the intensity must have been checked but the folding which lasted longer and the result was three main folds which separate in the vicinity of the city of Sliven.

As a mountain barrier the Balkan Mountains are not as effective as the Pyrenees, for instance. Extending for about 400 miles they average only about 20 miles in width, reaching to 30 miles at the widest point in the west and to 40 miles in the east. Some thirty passes, of which only half are frequently used, connect the lowlands on either side. Two rivers, the Isker in the west, and the Little Kamchia in the east, cut through the chain. Two railroads, one following the Isker gorge--the main artery of traffic in Bulgaria, and the other winding up between Stara Zagora and Turnovo to help

the exploitation of coal, cut across the mountain. Two macadam roads get most of the wagon and automobile traffic, one between Sofia and Botevgrad (Orhanis)^e using the Arake Kanak pass at an elevation of over 3120 feet, and the other crossing at the Shipka pass (4300 feet) is the road between Kazanluk, the center of the Rose Valley on the south and Gabrovo, the "Bulgarian Manchester," on the north.

Water power derived from the swift flowing streams, wool supplied by the numerous sheep, the relative freedom during the Turkish administration enjoyed in the more isolated districts of the Balkan Mountains started the textile industry in Bulgaria, with Gabrovo as its center. In the course of time the region around Gabrovo became the most densely populated mountain section of the whole Balkan Peninsula.

The western part of the Balkan Peninsula is occupied by a long range of folded mountains which run so close to the sea that for the most part they proved to be a strong barrier to the inland penetration of foreigners. From the standpoint of a single mountain unit the Balkan Mountains are better defined than this composite western range known as the Dinaro-Albano-Creek Mountains, which for short I will call the Dinalgris; however, the latter have twice the length and five times the width of the Balkan range. Furthermore their crest rises higher than that of the Balkans.

Beginning where the eastern parts of the Alps, known as the Julian Alps, end, the Dinalgris stretch to Cape Matapan and by way of the mountains of the islands of Cerigo, Crete, Karpathos, and Rhodes, continue as the Taurus Mountains of Asia Minor. A more detailed study of the Dinalgris range will reveal certain characteristics which are peculiar to each section.

The Karst is a limestone plateau occupying the extreme northwestern part of the Balkan Peninsula, namely the region which has as a center the little Peninsula of Iatria, extending to the Isonzo River in the west and

to the Gulf of Squarnero in the east, and in the north stretching as far as the lowlands of Croatia. The name of the plateau is the German form of the Croatian term Kars or Kras meaning a country of sharp and hard stones, which is very likely of Celtic origin signifying a "desert of stones". Perhaps few are the places in the world where names contain the shortest possible description of the nature of the place and the way it has influenced the natives. In the Karst, erosion has produced some of the most fantastic forms that can be shown by a Karst topography the world over. Some travelers have compared the region to a "petrified sponge". Economically, however, this is one of the poorest sections of Europe and together with adjacent lands of similar character have been a great source of South-Slavonic emigration to America.

South of the Karst proper extend the Dinaric Alps. Many authors include the Karst plateau in the Dinaric Alps and speak of the Karst country as stretching as far south as Albania. The reason for this is the fact that the Dinaric Alps are a long white wall of limestone with all the Karst phenomena characteristic of the Karst plateau. Honeycombed surface is one of the most characteristic features of the Karst country. This is produced by the abundant rainfall beating upon the bare surface of the limestone. Of the various forms of depressions produced on the surface of the Karst country the most typical are the dolini and the polje (polye). The second, being the larger, is the only fertile patches of land cultivated by poor peasants. Soil in these depressions is of the terra rossa type, a residue of the limestone rocks. Many of the depressions are well enclosed basins and have deep bottoms.

Another feature of the Karst country is the subterranean river system. There are many semi-surface, semi-ground rivers. One of the best examples is that of the Lyublyana River. Beginning in the Karst plateau it disappears twice, and of the total length of the stream one-quarter is subterranean flow.

This is perhaps the reason why it has three different names before it reaches the city of Lyublyana. Of the surface rivers, the Nereta is the longest and the best known. Its deep gorge provided an important outlet to the Adriatic coast, as the interior is a well isolated country thanks to the parallel and unbroken ridges of the Dinaric Alps. Flowing through a "desert of stones" the Nereta offers striking similarities to the Nile River in its lack of tributaries and the making of a narrow ribbon of fertile soil in its lower course.

Vegetation is lacking on the steep slopes of the Dinaric Alps. Venetian shipbuilders have cut down a good deal of the famous Dalmatian forests. Fires caused by pirates destroyed what was left over. Today the shallowness of the soil, aided by the destructiveness of the numerous goats frustrate every attempt at reforestation. These desolate slopes of dazzling white limestone are in sharp contrast to the little oases of vegetation on the coastal plain. Another striking contrast is the difference in culture on both sides of the mountain. Roman civilization on the Adriatic side and Oriental civilization on the inland side indicate the way the Dinaric Alps have influenced the mobility of races and cultures.

The Dinaric Alps possess the Dinar Peak (6007 feet) which by no means is the highest. Durator of the Montenegr Mountains rise over 2000 feet above the Dinar. Montenegro is the most mountainous country of the Balkan Peninsula. The character of the land is largely responsible for the liberty-loving people inhabiting this part of today's Yugoslavia. During the long centuries of Turkish rule in the Balkan Peninsula, the Montenegrins were actually never subjected to Ottoman administration. In the days of Montenegro's independence it is said that in this ultra democratic country her king knew personally all of his male citizens above the age of thirty.

Going north-east of the Dinaric Alps the Karst features of the mountains change and well fed streams run on a surface thickly covered with vegetation.

Bosnian forests possess a large supply of timber, and they constitute a part of this important item of Yugoslav exports. Great mineral resources, especially of iron ore, coal, and salt are known to exist and are exploited. In spite of the fact that the mountains belong to the Dinaric system they are known to the people as the Bosnia-Herzegovina^{VIA} Mountains. A local proverb distinguishes between the two provinces by saying that "Bosnia begins with the forests; Herzegovina with the rock". This sharp distinction is not altogether true because a great part of the Karst region is claimed by Bosnia.

The second part of the Dinalgric is the Albanian Alps. They consist of two groups of mountains--one in the north known as the North-Albanian Alps and the East-Albanian Alps, sometimes known as the Malisories. The northern mountains are much higher than the eastern. Prokletia has peaks which rise over 8000 feet. Another difference between the two mountain ranges is the fact that while the northern mountains swing to the east and so open space for the so called Albanian Gap which offers a route from the Adriatic Sea to the interior of the peninsula, the eastern range has its mountains running in north-south direction. Still another distinction is that while they have gentle slopes on the west, where gradually they merge into the Musakia, the largest lowland of Albania, they rise in the east and some parts of the range have their cliffs almost perpendicularly above the channel of the Black Drin River. Fortunately there are rivers which are running transversely and so communications are not lacking altogether. Through the East-Albanian Alps, the Romans, using the valley of the Shkumbi River, built the famous road of Via Egnatia and so effected communications between Rome and Bizantium by the shortest possible route. Today this road is not in use.

The Dinaric Alps and the Albanian Alps show some marked differences. Although the two systems are composed of limestone the Karst topography is not dominant in the Albanian Alps. While the Dinaric Alps are rising with

steep escarpments from the coast, which very likely has experienced some sinking, the Albanian Alps, especially the eastern mountains, are rising gradually, separated from the sea with a considerable lowland which was added as the coast was rising.

East of the Albanian Alps, between the Black Drin River and the two lakes of Ohrida and Prespa on one side and the Vardar River on the other side, but closer to the former, are the Western Macedonian Mountains. In part a more satisfactory boundary line in the east, separating them from the transitional group of mountains, is found in the Monastir Lerin plains. Shar Planina is the most outstanding of the Western Macedonian Mountains. It rises like a big massive wall discouraging communications between regions to the north and south of it. Only in the east where the Lepenetz River has carved an imposing defile into the steep-rising slopes of the Lyubetrun (about 8000 feet) the outstanding peak of Shar Planina, an important route of communication exists. A century ago when the great French geologist, Ami DuRoi, was exploring this part of the Balkan Peninsula he called the Lepenetz gorge "The Gateway of Macedonia".

The Vardar River, whose valley offers part of the two great routes of communication through the Balkan Peninsula, namely the Morava-Maritza and the Morava-Vardar, has its source in the Shar Planina. Mining explorations of German engineers during the World War discovered the existence of chrome in the Shar Planina.

The last part, or the southern section of the Dinalgric is the Greek Mountains. They may be treated as a continuation of two major groups of mountains; in the west they are linked with the Albanian Alps and in the east they are parts of the Western Macedonian Mountains.

Greece proper has very complex relief features. Numerous depressions have cut up this part of the Dinalgric range so that the local people think

of the mountains in Greece as distinct units. The greatest of all is the Pindus. Its dominance led many geographers to use its name as inclusive of all the Greek mountains of the folded type.

Characterizing in general the Greek mountains we may say that they consist of limestone, some of which is of the Karst type. Poor forests and a dry Mediterranean climate cannot supply an abundance of water for the short rivers. The Akheios River (Aspropotamos), less than 120 miles in length, is the largest. Another ^{thing about} the Greek mountains is that from the top of the high summits one always finds the sea as a background. And while the mountains have been a great handicap in the life of the average Greek, the sea has always been to him a source of inspiration and a hope for a better living.

The best way to dispose of the Greek mountains is to begin with the two mountain knots, one in the north, known as the Zygos, and the other in the south on the Peloponnese, referred to as the Arcadian plateau. The Zygos is both an orographic and an hydrographic center of Greece. Mountains and rivers radiate from this point in all directions.

A mountain well known for its pastures, called the Ossa (8446 feet), extend just north of the Zygos. In height it is considered as one of the loftiest on the Dinalgia. South of the Zygos rises the Pindus proper. It is a mountain of high crest, similar to that of the Ossa; it possesses vast areas of good pastures and has slopes that are well forested. Its northwest-southeast direction marks two distinct provinces. On the west is the Epirus, a poor mountainous country, composed of limestone with a good deal of Karst phenomena. East of the Pindus is the only Greek lowland of considerable size, known as Thessaly. The southeastern end of the Pindus merges in the Eta mountain, whose eastern cliffs formed the famous Thermopylae Pass, where the Spartan King Leonidas with 300 brave soldiers resisted the multitudes of Xerxes. At the time the battle took place the pass was a very narrow one. Today, however, after about 2400 years have elapsed, the agents of waste

have considerably changed the appearance of the pass as we know it from the descriptions of historians. The cliffs of the mountain were smoothed and a nearby stream continuously depositing silt along the sea coast succeeded in widening the pass from 40 feet to a few miles, varying from $1\frac{1}{2}$ miles at its narrowest point to 3 miles at its widest point.

Parnassus, the residence of the Muses, is the dominant mountain in central Greece. Peaks of the mountain rise above 8000 feet. Under different names the Parnassus extends eastward and ends in the Laurium, the southernmost tip of the Peninsula of Attica, where lead and silver deposits.

Across the Gulf of Corinth is the Peloponnese which is just as mountainous as the rest of Greece. As it was already mentioned the plateau of Arcadia in the center out of which mountains extend in all directions and vanish as they approach the sea. Taygetus is the outstanding mountain. It has a north-south direction and terminates in Cape Matapan.

So far nothing was said about the Olympus (9577 feet), the highest of all Greek mountains. This was done rather deliberately because the Olympus belongs neither to the young folded mountains of the west nor is a part of the Rhodope Massif. Strictly speaking it is an outlier of the Macedonian transitional group of mountains, along the right bank of the Vardar River. It is distinguished from the Rhodope Massif in having above its foundation of crystalline rocks, some thick layers of Cretaceous rocks and it has undergone some folding. For a long time the Olympus was considered as the highest point of the Balkan Peninsula. Careful measurements have discovered that it is ^{of} slightly below the Musala of the Rila mountain. An explanation [^] why the Olympus was considered the highest of all mountains of the Balkan Peninsula could be found in its immediate rise from the edge of the sea. Nothing could be more imposing than to see one of the highest mountains of the peninsula towering above the

sea coast. In the case of the Hila one can take a good look at the mountain only after he gets close enough to it in a place like the plain of Semokov, which alone is 3000 feet above the sea level. It is no wonder that the top of Olympus was climbed first by two Swiss-Alpinists ^{late} as 1913. Today the ancient home of Zeus is no longer held in divine esteem as the Olympus was declared a Greek national park.

B. Lowlands

Finally we have to consider the lowlands of the Balkan Peninsula. Consulting a physical map, one is impressed by the fact that the major lowlands are found on the margins of the peninsula. Moreover they are considerably more numerous and extensive in the east than in the west.

Perhaps the largest lowland of the Balkan Peninsula is the southern part of the Danubian Basin, a compact area south of the Danube River and north-east of the Balkan Mountains. Politically it is divided into two parts--the Danubian Table Land in the south, which belongs to Bulgaria, and the Dobrudja in the north-east, which is part of Rumania. As a rough approximation, this Balkan lowland is equal to over 16,000 square miles. This is the largest cereal growing country of the Balkan Peninsula.

The Danubian Table Land extends southward of the Danube River as far as the foothills of the Balkan Mountains. Its billowy surface has been produced not only by the erosion of the streams and endogenous terrestrial forces, but also by the transporting power of the wind as it piled layers of loess taken from the morainic deposits of Russia. The latter has influenced not only the surface features of the region, but it has been greatly responsible for the fertility of the soil as well. While in the past it was thought that the loess cover of the Danubian Table Land extended only ten to fifteen miles south of the Danube River, the latest study of Professor G. Gunchev of the University of Sofia has proved beyond doubt that the loess cover extends at least twice

as far south. Furthermore, in the case of the eastern part of the region, where the Balkan Mountains ^{are} below 3000 feet, the transporting power of the wind was able to carry over the crest of the mountain and to spread some loess in southern Bulgaria, in the region north-west of the harbor of Burgas.

West of the Yantra River, the Danubian Table Land is more level and more monotonous. In a few meridional cracks we find the river beds of the Vit,^{or} the Osem, and ^{or} the Yantra, three of the largest tributaries of the Lower Danube, coming from the Balkan Mountains. Between the Osem and the Yantra, as a result of volcanic outbursts along a tectonic crack, there are found fifteen basalt hills.

Farther west between the Vit and the Osem, are the Plevna Hills, well eroded elevations, composed of ^{calcareous} calcareous materials. The Plevna Hills dominate this part of the region. They were advantageously used by Osman Pasha during the Russo-Turkish war of 1877-78, and only after a long siege were the Russians able to force the Turkish garrison to surrender.

Generally speaking the western part of the Danubian Table Land is much lower and considerably more level than its eastern part. It is densely populated by a rural people producing mainly wheat, corn and barley of the cereals, and an increasing quantity of both table and vinous grapes. Of the industrial plants, sugar beets are raised only to satisfy immediate demands of the three sugar factories in northern Bulgaria. Colza and sunflowers are produced, from year to year, in variable quantities. Hemp is the most important textile plant, while attempts to raise cotton have not been altogether successful. Forests are lacking, and in places where natural vegetation predominates, the region assumes the character of a steppe. Considerable areas are still devoted to pastures where cattle are grazed.

To increase the arable land and to protect cultivated lands from

inundations, embankments were built along the mouths of three Danubian tributaries--the Isker, the Vit, and the Yantra, and a stretch of exceedingly low terrain in the neighborhood of Vidin, the most northwestern city of Bulgaria. A combined area of 66,000 acres has already been saved from the annual inundations of the Danube. Structurally these embankments consist of dikes built about 200 feet away from the Danube and reaching a height of from twelve to fifteen feet. The Karaboazi Digue (embankment) is the longest, extending between the Isker and the Vit for a distance of twenty-four miles.

Going east of the Yantra River, the topography of the Danubian Table Land begins to change. Level areas diminish in size, and a hilly country, partly covered with deciduous forests, begin to assume larger dimensions. Scarcity of streams is a characteristic feature of the region as well. Actually the eastern part of the Danubian Table Land consists of two regions: 1) The Plateau Region in the south, and 2) The Deli Orman in the north.

In the Plateau Region there are three outstanding plateaus, arranged one after another as the traveler goes from west to east, between the valleys of Kamchia and the Provadia rivers. The soft and easily eroded limestone that lies below the loess cover of the region, and a semi-dry climate have been largely responsible for the distinct forms that all of the three plateaus have acquired. The largest of the three, known as the Plateau of Shumen has the shape of a horse shoe and has served as a natural fortress to the city of the same name. In the center is the Plateau of Provadia. Recently there were discovered large deposits of salt just north of it.

The Deli Orman is a hilly country. Considerable parts of its area are covered with oak forests. In former times these woods made the region look wild. The wild scenery gave rise to the Turkish name of Deli Orman which means "Wild Forest". Lately much of the forested area was cleared in order to furnish arable land for the Bulgarian refugees from the

Dobrudja.

One of the distinctive features of the Deli Orman region is its lack of surface water. This is due to the meager rainfall, high temperature during the summer, and the soft limestone, underlying the loess, which lets the water seep into the ground. In order to get to the water table people had to dig hundreds of feet into the ground. Recently Bulgarian state engineers captured the waters of the main springs and so the people of the Deli Orman have a better supply of water. On the other hand, the ground waters of the Deli Orman, and for that matter of the Dobrudja as well, flow in subterraneous channels to the Black Sea or come out as powerful springs, only a few miles from the sea, as the case is ^{with} of the Levnye Spring, which discharges 3670 liters of water per second.

At the southeastern end of the Deli Orman, not very far from the city of Varna, are found the so called "Set Up Stones", which are unique not only in Bulgaria, but in Europe as well. These are huge cylindrical blocks of sandstone. From a distance they create the illusion of a strange kind of a forest, ^{but are} produced by the agents of waste.

The eastern part of the Danubian Table Land is not as intensely cultivated ^{is} as its counterpart in the west. Nevertheless its large level areas abound in wheat, legumes, sun flowers, and colza. Cleared parts of the Deli Orman produce tobacco and many of the hillsides are covered with vineyards.

Leaving the forest of the Deli Orman, and going north and north-east of it, the landscape changes. Trees disappear, hills diminish, and the traveler sees a vast country devoted to cereals and pastures. This is the southern part of the Dobrudja which is a rolling plain lacking in surface water and often suffering from droughts. Frequent crop failures and ~~the absence~~ of permanent streams are indices of it. However, it is covered with loess and chernozem and during years of sufficient rainfall, crops are abundant.

A few decades ago southern Dobrudja was an important sheep raising country, but today, with the increase of its population, pastures decrease as they are turned into barley, corn, and wheat fields. Of all the lowlands of the Balkan Peninsula proper, ^s southern Dobrudja is the region where farming machinery is ^{most} extensively used. The reason lies mainly in the fact that here are found some rich landowners who could afford to buy the kind of mechanical equipment they used in their agricultural economy.

The northern part of the Dobrudja is a hilly country. Close to the Danube, in the northwestern corner, are the Machin and the Hahadag Hills, which, geologically, are part of the Balkan Mountains and the Caucasus Range. These hills are covered with deciduous forests, mainly oak, and their sunny slopes are devoted to vineyards and orchards. Moreover, they are the source of a few short, but permanent, streams. The hills and the surface streams form a strong contrast with the thirsty, featureless area of southern Dobrudja.

South of the Balkan Mountains is the Thracian Lowland or the Basin of the Maritza River. Undoubtedly this is the outstanding fertile lowland of the whole peninsula. Its fertility was well known in antiquity. Homer in his *Iliad* mentions that "boats well laden with wine were carried to Troy". Today it is a region of more diversified crops. In addition to all sorts of cereals, the best known of which is the "Zagaria", a type of wheat grown around the city of Staro Zagore, wine and table grapes, fruits, truck gardening, rice, tobacco, cotton, flax, hemp, and different oil bearing plants are only a few items of a long list of agricultural products raised on the fertile soils of the Thracian Lowland.

Geologically it is a part of the Rhodope Massif. It came as a result of subsidence of the northeastern parts of this massif. Inter sedimentary layers were accumulated and the original bed rock was covered. At the present

time only the syenite hills of Plovdiv (Philippopolis), upon some of which the old city was built, testify to the origin of the best Balkan lowland.

While the larger part of the Thracian Lowland is within the basin of the Maritza River, the surface features of the land made geographers divide the lowland into three parts. The middle course of the Maritza comprises the so called Upper Thracian Lowland. It is entirely within the boundaries of Bulgaria. The lower, or Eastern, Thracian Lowland, east of the Maritza covers the basin of its tributary--the Erkene. This constitutes the larger portion of European Turkey. West of the lower course of the Maritza is the Aegean Thracian Lowland, known also as Western Thrace. The latter is wholly within Greek territory.

The Upper Thracian Lowland is the best developed portion of the Maritza basin. It produces not only sufficient cereals to feed its dense population but yields the largest amount of rice produced in the Balkans, chiefly raised in the vicinity of Plovdiv. A superior quality of strawberries are raised not only to supply local needs, but to find a place in the markets of central Europe, and, in the form of strawberry pulp to supply British demands. Fine tomatoes and grapes are exported in ever increasing quantities. Larger areas are devoted to cotton, especially in the southern parts of the Stara Zagora district, to supply a large part of the home consumption.

Eastern Thrace has been least developed. Now it is included in the economic scheme of modern Turkey. It is colonized by Mohammedans who are leaving other parts of the peninsula, ruled by Christians. To facilitate its colonization the Turkish Government advanced large sums of money. Besides buying supplies of food for the new comers, the task of the Government representative is to help the settlers cultivate the land and be self-sustaining as soon as possible.

Greece has been very active in colonizing Western Thrace. Many of her

nationals, expelled by the Turks from Asia Minor, were settled in southern Macedonia and Western Thrace. The latter region produces some of the best cigarette tobacco in the world. In addition to that, vineyards and silk cocoon raising are important industries. As a matter of fact, the silk industry is of great significance in all three parts of Thrace, and especially around Adrianople, the place where the three come together. Wilenograd, a Bulgarian town near the Turkish frontier, derives its name from this particular industry. In Bulgarian the name means "Silktown".

Before we leave the discussion of the main Balkan lowlands a word should be said about the Rose Valley. This little region is a part of a series of small depressions between the Balkan Mountains on the north and Sredna Gora (the Middle Mountains) on the south. Here we see a combination of soil and climatic conditions coupled with the tedious perseverance of a hard working population which has made the Rose Valley produce over two-thirds of the rose oil in the world. Unstable world markets for the product and the introduction of other industries in Kazanluk, the nucleus of the Rose Valley, made the center of rose production move west to the poorer town of Karlevo and its vicinity.

The rest of the Balkan lowlands, larger or smaller plains, most of them the bottoms of former lakes, have only a local significance as a source of food supply. On the other hand, the strategic position of some of them, as the Kosovo Plain or the Sofia Plain, for instance, have played an important part in the history of the Balkan countries.

It seems as though the location of the lowlands along the northern, north-eastern and south-eastern sides of the peninsula, where routes of great traffic were focusing, made the Balkan Peninsula a meeting place of peoples. In this case the lowlands have acted as wide open gates where everybody, who happened to be passing by or made it a point of coming, could have

easily entered.

One is likely to wonder, what would have happened to the Balkan Peninsula if it has not been so centrally located and its "doors"--the lowlands--have been effectively closed by nature.

V HYDROGRAPHY

Rivers in the Balkan Peninsula are comparatively short, and, for the most part, swift. Moreover, they lack in stability of volume--overflow their channels during the spring season and greatly dwindle in late summer and autumn. The larger rivers build deltas at their mouths. The reasons for all these phenomena are easily discernible. In the first place the position of the main watershed of the land, which, for the most part, runs through the middle of the peninsula, has naturally not been suitable to the development of long rivers. In the second place the lack of glaciers and snowfields on the top of the highest mountains and the comparatively light rainfall in the lowlands, on the whole do not favor large rivers. Beginning in mountains which are not a long way from the sea and flowing into ^{largely} seas lacking in tides, Balkan rivers rapidly build their deltas with materials they pluck from the steep slopes of their upper channels. The rapid flow of most of the Balkan rivers has helped the development of primitive sawmills, fulleries, flour mills, etc., and in modern times have been instrumental in the construction of hydro-electric power plants. Largely due to climate, as well as to relief, the Slavonic region of the peninsula is better suited to the development of water power. Modern irrigation is very little practiced.

Navigation on the rivers of the peninsula proper practically does not exist. Maritza, the longest river, over 300 miles in length, has been navigable in the Thracian Lowland from early Christian times to the advent of railroads during the late seventies of the last century. The more efficient railroads took what little traffic was carried by keel boats down the river to the Aegean port of Enos. There are also historical evidences that some

Danubian tributaries, as the Isker for instance, were used by the Romans. Today only the Morava River of the Balkan Danubian tributaries, and the Drina, a tributary of the Sava, in Yugoslavia, have some significance to local navigation, such as the floating of timber or loading some bulky material. The Boyana River, which carries the surplus water of the Skutari Lake, is the most important waterway on the Adriatic coast.

On the whole, it is only too obvious, for the reasons stated above, that the Balkan rivers are of little significance as waterways. The only truly navigable river is the Danube. However it is a European river which connects part of the peninsula with central Europe and vice versa. It has no importance as a transportation route among Balkan countries. Moreover it is still an effective boundary between the Balkan Peninsula to the south of the river and the lands north of it. Along the whole length of over 500 miles (Belgrade-Bulina) of the Danube which forms the eastern portion of the northern boundary of the peninsula, there is only the bridge of Cherna Voda. Being in Rumanian territory this bridge is of no practical importance to the Balkan Peninsula.

As part of the hydrography of the peninsula there should be mentioned a few lakes. According to origin we can group them into five types: 1) Glacial lakes of the Alpine type. Such lakes exist at the bottom of cirques in the higher mountains, as the Rila, the Pirin, the Olympus, etc. Three of the glacial lakes of the Rila provide the source of the Maritza River. 2) Tectonic lakes are found chiefly in the center of the Balkan Peninsula. The Macedonian lakes of Ochrida, Prespa, Dojran, and in Epirus the lake of Yanina are most representative. The Ochrida Lake is the deepest Balkan Lake (938 feet). 3) Karst lakes are found in regions of Karst topography. 4) Littoral lagoons are found along the coast of the Black Sea, the Aegean Sea, and the Adriatic Sea. The largest of this type, and of all Balkan lakes, is the Skutari Lake

on the Adriatic Sea (120 square miles). 5) Fluvial ponds are mostly parts of former river beds and the best examples are found in the swampy areas along the Danube.

VI. CLIMATE

Although considerably smaller in area than the American state of Texas, the Balkan Peninsula has a great variety of climates. Three major types are distinguished: the Marine, the Continental, and the Alpine (Climate of high altitude). The reasons for the existence of these major types of climate over such a small area are to be found in 1) the unique position of the Balkan Peninsula with reference to the surrounding seas, 2) the lowlands that connect it with the rest of Europe, and 3) the comparatively high mountains which occupy a large portion of it. Regarding the mountainous character of the peninsula, it is a significant fact that when we compare its average height of 1902 feet above sea level with that of the Italian and the Iberian peninsulas, each of which has an average height of only 1148 feet, immediately we see that the lands of the Balkan Peninsula are, on the average, higher than the lands of the other two southern peninsulas of Europe. Naturally all of these factors play an important part in causing differences of climate over small areas. In fact, it is surprising how, in many parts, natives of the peninsula, who go a few scores of miles north or south, east or west of their home towns or villages, experience a marked difference of climate.

As a general rule south of the main water divide of the Balkan Peninsula the climate is Mediterranean in the immediate regions bordering the Adriatic, the Mediterranean, and the Aegean seas, and modified Mediterranean far inland. North of the same line, across a larger portion of the peninsula, the climate is continental, and in the high mountains of both zones the climate is Alpine.

CLIMATIC REGIONS OF THE BALKAN PENINSULA



After K. E. Kirov

1. Boundary Line of Mediterranean Climate
2. Boundary Line of Black Sea Influence
3. Typical Mediterranean Climate
4. Mediterranean Influence
5. Black Sea Influence
6. Transitional Mediterranean Influence
7. Transitional Steppe Influence.
8. Continental Climate of Central Europe
9. Transitional Continental Climate
10. Alpine Climate

In spite of the fact that lands extending from Trieste to Istanbul are for the most part included in the Mediterranean climatic zone, the typical Mediterranean climate is most pronounced along the littoral and its adjacent lowlands. All of them have hot summers, which is one of the characteristics of this climatic zone. However the more typical characteristic, namely a rainless summer is manifested only in the southernmost part of the peninsula, south of a line connecting the Gulf of Arts in the west with the Gulf of Volo in the east. Athens is a typical example of a Balkan Mediterranean climatic station. It has a hot, dry summer, practically rainless. Temperatures rise as high as 80° F. (July average), while during many summer days the thermometer registers a temperature of over 100° F. From the standpoint of rainfall distribution we find that July is the driest month and during the period of April-September the precipitation averages only 23% of the rainfall, whose total amounts to 16 inches. This is remarkably similar to the rainfall distribution of the west facing island of Corfu, where the local meteorological station indicates 20% of rainfall for the period April-September. Otherwise, in the course of the year, Corfu gets four times as much rain as Athens does. On the other hand both stations have mild winters with most of the annual rainfall coming during the cold season and average winter temperatures of about 50° F. As a result of comparatively high winter temperatures the annual range of temperature in Balkan lands of typical Mediterranean climate is one of the lowest on the peninsula, varying between 61.5° F. (Corfu) and 68.8° F. (Athens).

The lands of the Adriatic coast differ from Athens in having cooler summers and copious annual rainfall. Tsakvitze' in the Gulf of Etor is known as having the heaviest rainfall in all of the Balkans (175 inches of annual precipitation). Then, the seasonal distribution is somewhat more equable--about 30% of the total rainfall coming from April to September,

with July ^{being} again the driest month of the year. However there is a marked increase both in summer and winter temperatures as one goes south. The Bora, which is a cold, northerly wind, visits the Adriatic coast in winter time as a result of a sharp low pressure area over the sea and the cold heavy air descending from adjacent lands. Due to the steep rising of the Dinaric range the influence of this marine climate is limited to a very narrow region of the littoral.

Eastward, in the basin of the Aegean Sea, Macedonian and Thracian littoral lands resemble Athens in having hot summers and July minimum in rainfall. However the maximum of precipitation comes in the latter part of autumn and, on the whole, is more evenly distributed throughout the year. The winter season is considerably different in having sometimes very low temperatures, snow, and the blast of the Vardar wind (coming by way of the Vardar River Valley) occasionally freezes the coastal waters of the Selenika Gulf.

A long but narrow stretch of land, about thirty-five miles in width, along the Black Sea coast, has a marine type of climate. Nevertheless it differs from the Mediterranean. Nor is it similar to the type of climate back in the interior as some authors have classified it either in writing or on maps.¹ K. Eirov, Director of the Bulgarian Weather Bureau has made a special study of the subject.²

1 Giotto Danielli, "Regioni Balcaniche, Tipi di Clima," Enciclopedia Italiana, Volume V., p. 916
 Marion I. Newbigin, "Climate of the Balkan Peninsula", Encyclopaedia Britannica, XIV edition, Volume II., p. 685

2 "Limite de l'influence de la Mer Noire sur le Climat de la Peninsule Balcanique".
 See Bulletin de la Societe Bulgare de Geographie--Tome III, 1936, pp. 228-239, where a resumé is given in French. Article written in Bulgarian.

In contrast to the climate of the interior, Kirov found that as a result of the influence of the Black Sea its littoral and neighboring lands have warmer autumns than springs. Also he ascertained that the annual and diurnal range of temperature is lower; the period of killing frost is shorter; greater rainfall comes in the autumn and not during the spring season. Winds manifest somewhat of a monsoonal character--during the summer they come from the sea and in winter change from land to sea. The humidity is greater both absolute and relative. The amount of sunshine is greater as a result of lower percentage in cloudiness.

It should be added also that with higher latitudes, temperature and rainfall proportionally decrease. North of the Balkan Mountains--Varna, Halevik, and Constantza--all have six months of 50°F. or over as a mean monthly temperature. South of the Balkan Mountains, in Burgas for instance, seven months are registered with such a temperature. Total annual rainfall progressively decreases from north to south. While Constantza averages an annual precipitation of only 15.8 inches, Burgas reaches up to 23 inches and the others come between.

Black, cold weather is not uncommon in winter as the Siberian anticyclones freely reach the Balkan Peninsula, particularly the lands north of the Balkan Mountains.

The Continental type of climate covers by far the largest part of the Balkan Peninsula. Here again we find sub-types. North of the Balkan Mountains, close to the Danube River, on the Danubean Table Land and western Dobrudja, the steppe climate of eastern Europe, a transitional form, predominates. Hot summers, alternating with very cold winters, are most typical features of this climatic zone. The change from cold winters to hot summers is not gradual. Extreme temperatures of 30° F. below zero during very cold winter days are not uncommon. High temperatures of 90° F. or even 100° F. in mid-summer are a rule and not an exception. Of all climatic regions on the peninsula this has the highest range of annual temperature. On the other hand it is known for its small amount of total annual precipitation, decreasing eastward. While Plevna, in the center of the Danubean Table Land, registers 24.5 inches of annual precipitation, Silistria and Razgradjik, northeast of it, get 23 inches each, and parts of northern Dobrudja receive only 16 inches. This region has a summer maximum and a winter minimum of precipitation. Heavier rainfall is not the only characteristic of it. Lack of a balanced distribution during the growing season is even more pronounced. Severe winters with heavy snows are not uncommon. During an average year snow covers the ground for over forty days.

In the western north half of the peninsula, comprising most of Yugoslavia and the northern part of southwestern Bulgaria, with the Sofia Plain in the center, the climate is continental of the central European type. The climatic features peculiar to the transitional steppe region of the peninsula are manifested ^{here with only a} few changes. While very low temperatures are common, highest temperatures are somewhat lower as a result of the mountainous character of the region. Rainfall increases westward. Thus, Sofia gets 24 inches of precipitation while places in Herzegovina receive twice that amount.

Alpine climate is characteristic of the highest mountains on the peninsula,

such as the Rila, the Pirin, the Olympus, the Rhodope, the highest portions of the Balkan Mountains, the Rhodope Mountains, etc. Data regarding Alpine climate in the Balkans is rather meager. Permanent meteorological stations are of recent origin and results are not easily available. But of what is known here are some of its characteristics: It has low atmospheric pressure, low temperature, and copious rainfall. Autumn temperatures are higher than spring temperatures. More clouds are formed during the summer season than during the winter. The annual range of temperature is rather low. The "Musale Hut", a permanent tourist camp below the peak of the same name, at an elevation of 7800 feet, has 61.7° F. ^{of 2w} annual range of temperature. Petrohan, a meteorological station at the highest point (4592 feet) of a pass having the same name, in the western part of the Balkan Mountains, has 65.6° F. annual range of temperature. Total annual precipitation is 46 inches.

While no mountain of the Balkan Peninsula is within the line of permanent snow all are snow capped for over ten months, and isolated snow patches, in shady spots, remain throughout the year.

Summarizing the discussion of types of climate, it should be noted that none of these climatic regions has strictly definite boundaries. Rather each is separated from the rest by a transitional type of climate ~~-----~~ an overlapping, as in the case of the continental climate with its two sub-types of central European and eastern European climates. Using such a system as a basis, K. Kirov has produced an excellent study of "Les limites des influences climatiques dans la Péninsule Balkanique",¹ where besides the major types of climate some transitional zones are distinguished. These are: 1) zone of modified Mediterranean climate, 2) transitional zone influenced by the Mediterranean Sea (by its arm--the Aegean Sea), and

1 See Bulletin de la société Bulgare de géographie--Tome IV, 1936, p.47

3) transitional continental zone. In the case of the first and second climatic sub-types the river valleys are chief avenues through which the Mediterranean influence penetrates. But the existence of the transitional continental zone, south of the modified steppe zone, is due to the presence of the Balkan Mountains which cause a greater rainfall in the former zone.

On the whole, morphology has played a greater part than geographic location in the formation of all these types and sub-types existing on the Balkan Peninsula.

VII VEGETATION

The Balkan Peninsula is a veritable museum of flora. Here are found such rare specimens as the Caucasian plant Celtis ^C caucasica and Haberlea Rhodopensis, a native of the central part of the Balkan Mountains, which is said to exist in no other part of Europe. However the prevailing type of plant life is the vegetation of central Europe.

Originally most of the peninsula, including the central part and all of the northwest, outside of the Adriatic littoral, was rich in deciduous forests. Notwithstanding the fact that much was cut in the past, there is a good deal left to make almost one-third of this part of the peninsula forested. The predominating types of deciduous forest trees are oak and beech, interspersed with ash, elm, lime, poplar, willow, etc. In higher mountains coniferous trees predominate. Different kinds of pine, fir, spruce, etc. are the species that are especially prominent. Rich pasture lands exist on treeless slopes and humid mountain peaks.

The northeastern part of the peninsula is conspicuously lacking in large forests. A predominant feature the landscape is the steppe-like vegetation of eastern Europe. Parts of the Danubian Table Land and the Dobrudja are lacking even in shrubs. In early summer the ground is covered with blooming bulbous plants and green grasses. A month or two later all

this gay vegetation is gone. The landscape is one of dry and desolate steppe devoid of life.

Crossing the Balkan Mountains one finds that besides central European flora there are plants which are identified as Mediterranean. Going further south he sees shrubs of evergreens of which the Yew is the most characteristic plant of Mediterranean vegetation. There are cypress trees, lemon trees, orange trees, fig trees, pomegranates, etc. However it is the olive tree which is most representative of Balkan Mediterranean flora.

VIII SUMMARY

The Balkan Peninsula is the easternmost of the three southern European peninsulas. It differs from the Iberian and Italian peninsulas in being much broader to the north and having no mountain barrier to separate it from the rest of the continent. It occupies a very important strategic position.

The name of the Balkan Peninsula came from the Turkish word "Balcan" which means a "mountain".

Its coast line, especially in the south, is extremely articulated.

Structurally it consists of three great mountain systems. Two of them, the Balkan Mountains in the northeast and the "Dinagris" in the northwest, are young folded mountains. In the center, is the Rhodope Massif, whose core consists of old rocks.

Lowlands are found on the rim of the peninsula; the larger ones occupy the northeastern part of it. There are small depressions in the interior which are the only level lands there.

The Balkan Peninsula proper is lacking in large rivers. Maritza, the longest river, is not navigable.

Its climate is highly variable as a result of morphology and location. Three major types of climate are distinguished: 1) the Mediterranean,

2) the continental of central Europe, and 3) the steppe of eastern Europe.

The vegetation conforms, in general, to the prevailing types of climate.

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